

New Graph

[7, 7, 7, 6, A, A, B, C, B, C, 1, 5], [6, 8, 8, 7, 3, 3, A, B, C, 2, 4, 9]

$$\pi = [1, 1, 1, 1, 1, 1, 2, 1, 1, 2, 2, 2]$$

POSSIBLE RANKS

1 x 16
2 x 8
4 x 4

BASE DETERMINANT 3762658697/34359738368, .1095077808

NullSpace of Δ

{1, 4}, {2, 3, 10, 11, 12}, {5, 9}, {6, 7, 8}

1 . Coloring, { }

$$\Omega p(\Delta)=0: \quad p = s^2 - 3s^3 - 6s^4 - 8s^5 - 24s^6 - 32s^7 - 32s^8$$

R: [7, 7, 7, 6, A, A, B, C, B, C, 1, 5]

B: [6, 8, 8, 7, 3, 3, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	4 vs 7	8 vs 10

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3]] \$

$$[y_2, 0, 0, 0, y_1, -y_1 + y_3, y_4, 0, 0, y_2, y_3, y_4]$$

$$p' = s^3 - s^6 \quad p = -s^2 + s^5 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: {{9, 12}, {2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 2, 1, 1], [0, 2, 1, 1, 0, 0, 2, 4, 1, 1, 2, 2], [0, 1, 0, 2, 0, 0, 1, 3, 2, 2, 4, 1], [0, 2, 0, 4, 0, 0, 2, 1, 1, 1, 3, 2], [0, 1, 0, 3, 0, 0, 4, 2, 2, 2, 1, 1], [0, 2, 0, 1, 0, 0, 3, 1, 1, 4, 2, 2], [0, 4, 0, 2, 0, 0, 1, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 2, 4, 1, 1, 2, 2], [0, 1, 0, 2, 0, 0, 1, 3, 2, 2, 4, 1], [0, 2, 0, 4, 0, 0, 2, 1, 1, 1, 3, 2]] \$$$

$$[0, 3 y_1, -3 y_1 - 3 y_3 + 5 y_5 - 3 y_7 + 8 y_8, -3 y_2 - 3 y_4 + 8 y_5 - 3 y_6 + 5 y_8, 0, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7, 3 y_8]$$

$$p' = s^3 - s^9 \quad p = s^3 - s^9$$

M \; N

$$\$ [[0, 0, 0, 0, 384, 60, 0, 0, 0, 332, 0, 428], [0, 0, 0, 308, 0, 166, 0, 286, 0, 223, 0, 221], [0, 0, 0, 332, 0, 222, 0, 194, 0, 349, 0, 107], [0, 308, 332, 0, 0, 0, 60, 0, 384, 0, 120, 0], [384, 0, 0, 0, 0, 0, 378, 0, 0, 0, 442, 0], [60, 166, 222, 0, 0, 0, 320, 0, 214, 0, 222, 0], [0, 0, 0, 60, 378, 320, 0, 320, 0, 446, 0, 884], [0, 286, 194, 0, 0, 0, 320, 0, 164, 0, 240, 0], [0, 0, 0, 384, 0, 214, 0, 164, 0, 442, 0, 0], [332, 223, 349, 0, 0, 0, 446, 0, 442, 0, 616, 0], [0, 0, 0, 120, 442, 222, 0, 240, 0, 616, 0, 768], [428, 221, 107, 0, 0, 0, 884, 0, 0, 0, 768, 0]] \$ \quad \$ [[0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 0, 1], [0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 0, 1], [0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 0, 1], [1, 1, 1, 0, 0, 0, 1, 0, 1, 0, 1, 0], [1, 1, 1, 0, 0, 0, 1, 0, 1, 0, 1, 0], [1, 1, 1, 0, 0, 0, 1, 0, 1, 0, 1, 0], [0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 0, 1], [1, 1, 1, 0, 0, 0, 1, 0, 1, 0, 1, 0], [0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 0, 1], [1, 1, 1, 0, 0, 0, 1, 0, 1, 0, 1, 0]] \$$$

$$\tau = 72, r' = 1/2$$

R: [7, 7, 7, 6, A, A, B, C, B, C, 1, 5]

B: [6, 8, 8, 7, 3, 3, A, B, C, 2, 4, 9]

Ranges

Action of R on ranges, [[24], [24], [25], [18], [20], [24], [25], [25], [18], [20], [24], [25], [25], [18], [22], [22], [2], [29], [3], [29], [29], [3], [30], [30], [19], [30], [4], [30], [4], [1]]

Action of B on ranges, [[11], [11], [6], [21], [23], [12], [27], [7], [26], [23], [12], [27], [7], [26], [24], [25], [15], [13], [10], [13], [14], [10], [29], [8], [28], [30], [17], [9], [5], [16]]

Cycles: R, {{1, 7, 11}, {5, 10, 12}}, B, {{9, 12}, {2, 4, 7, 8, 10, 11}}

$$\beta(\{1, 5\}) = 12/301$$

$$\beta(\{1, 6\}) = 15/2408$$

$$\beta(\{1, 10\}) = 83/2408$$

$$\beta(\{1, 12\}) = 107/2408$$

$$\begin{aligned}
\beta(\{2, 4\}) &= 11/344 \\
\beta(\{2, 6\}) &= 83/4816 \\
\beta(\{2, 8\}) &= 143/4816 \\
\beta(\{2, 10\}) &= 223/9632 \\
\beta(\{2, 12\}) &= 221/9632 \\
\beta(\{3, 4\}) &= 83/2408 \\
\beta(\{3, 6\}) &= 111/4816 \\
\beta(\{3, 8\}) &= 97/4816 \\
\beta(\{3, 10\}) &= 349/9632 \\
\beta(\{3, 12\}) &= 107/9632 \\
\beta(\{4, 7\}) &= 15/2408 \\
\beta(\{4, 9\}) &= 12/301 \\
\beta(\{4, 11\}) &= 15/1204 \\
\beta(\{5, 7\}) &= 27/688 \\
\beta(\{5, 11\}) &= 221/4816 \\
\beta(\{6, 7\}) &= 10/301 \\
\beta(\{6, 9\}) &= 107/4816 \\
\beta(\{6, 11\}) &= 111/4816 \\
\beta(\{7, 8\}) &= 10/301 \\
\beta(\{7, 10\}) &= 223/4816 \\
\beta(\{7, 12\}) &= 221/2408 \\
\beta(\{8, 9\}) &= 41/2408 \\
\beta(\{8, 11\}) &= 15/602 \\
\beta(\{9, 10\}) &= 221/4816 \\
\beta(\{10, 11\}) &= 11/172 \\
\beta(\{11, 12\}) &= 24/301
\end{aligned}$$

Partitions

$$\alpha(\{\{1, 2, 3, 7, 9, 11\}, \{4, 5, 6, 8, 10, 12\}\}) = 1/1$$

$$b_1 = \{1, 2, 3, 7, 9, 11\} \text{ , } b_2 = \{4, 5, 6, 8, 10, 12\}$$

Action of R and B on the blocks of the partitions: = [1, 2] [2, 1]
with invariant measure [1, 1]

N by blocks, check: true . ‘ See partition graph.

‘ ‘ See level-2 partition graph.

‘

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 1, 1] , [0, 2, 1, 1, 0, 0, 4, 2, 1, 2, 1, 2] , [0, 2, 0, 1, 0, 0, 3, 1, 2, 4, 2, 1] , [0, 4, 0, 2, 0, 0, 3, 0, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 0, 6, 0, 2, 3, 0, 1] , [0, 3, 0, 0, 0, 0, 4, 0, 1, 6, 0, 2] , [0, 6, 0, 0, 0, 0, 3, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 6, 0, 1, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 6, 0, 1] , [0, 6, 0, 0, 0, 0, 3, 0, 1, 4, 0, 2]] \$

[0, -3 y₁ - 3 y₇ - 3 y₆ - 3 y₅ - 3 y₄ + 13 y₃ - 3 y₂ - 3 y₈ + 13 y₉, 3 y₁, 3 y₇, 0, 3 y₆, 3 y₅, 3 y₄, 3 y₃, 3 y₂, 3 y₈, 3 y₉]

$$p = -s^6 - s^7 + s^9 + s^{10}$$

3. Coloring, {3}

R: [7, 7, 8, 6, A, A, B, C, B, C, 1, 5]

B: [6, 8, 7, 7, 3, 3, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	8 vs 10

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3]] \$

[-3 y₁ + 7 y₂ - 3 y₄, 0, 0, 0, 3 y₃, -3 y₃ + 3 y₂, 3 y₁, -3 y₃ + 3 y₂, 0, 3 y₃, 3 y₄, 3 y₂]

$$p = -s^2 + s^5 \quad p' = -s^3 + s^6 \quad p = -s^2 + s^8 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 1, 1] , [0, 2, 1, 1, 0, 0, 4, 2, 1, 2, 1, 2] , [0, 2, 0, 1, 0, 0, 2, 2, 2, 4, 2, 1] , [0, 4, 0, 2, 0, 0, 1, 2, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 2, 4, 2, 1, 2, 1] , [0, 1, 0, 2, 0, 0, 2, 2, 1, 2, 4, 2] , [0, 2, 0, 4, 0, 0, 2, 1, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 0, 4, 2, 1, 2, 1, 2] , [0, 2, 0, 1, 0, 0, 2, 2, 2, 4, 2, 1] , [0, 4, 0, 2, 0, 0, 1, 2, 1, 2, 2, 2]] \$

$$[0, -3 y_1 - 3 y_3 + 5 y_5 - 3 y_7 + 8 y_8, -3 y_2 - 3 y_4 + 8 y_5 - 3 y_6 + 5 y_8, 3 y_2, 0, 3 y_1, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7, 3 y_8]$$

$$p = -s^3 + s^9 \quad p' = -s^3 + s^9$$

4. Coloring, {4}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, B, C, B, C, 1, 5]

B: [6, 8, 8, 6, 3, 3, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	3 vs 6	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 2]] \$$$

$$[16 y_1 + 7 y_3 - 27 y_2, 0, 0, 0, 4 y_1 + 3 y_3 - 7 y_2, 0, 2 y_1, 0, 0, 10 y_1 + 4 y_3 - 16 y_2, 2 y_3, 2 y_2]$$

$$p' = s^2 - s^5 \quad p' = s - s^4 \quad p = -s + s^4$$

Omega Rank for B : cycles: {{9, 12}, {3, 4, 6, 8, 11}} order: 10

See Matrix

$$\$ [[0, 2, 2, 2, 0, 2, 0, 2, 2, 2, 1, 1], [0, 2, 2, 1, 0, 2, 0, 4, 1, 0, 2, 2], [0, 0, 2, 2, 0, 1, 0, 4, 2, 0, 4, 1], [0, 0, 1, 4, 0, 2, 0, 2, 1, 0, 4, 2], [0, 0, 2, 4, 0, 4, 0, 1, 2, 0, 2, 1], [0, 0, 4, 2, 0, 4, 0, 2, 1, 0, 1, 2], [0, 0, 4, 1, 0, 2, 0, 4, 2, 0, 2, 1], [0, 0, 2, 2, 0, 1, 0, 4, 1, 0, 4, 2], [0, 0, 1, 4, 0, 2, 0, 2, 2, 0, 4, 1]] \$$$

$$[0, -3 y_1 - 3 y_3 - 3 y_4 - 3 y_2 + 13 y_5 - 3 y_6 - 3 y_7 + 13 y_8, 3 y_1, 3 y_3, 0, 3 y_4, 0, 3 y_2, 3 y_5, 3 y_6, 3 y_7, 3 y_8]$$

$$p = -s^3 - s^4 + s^8 + s^9$$

5 . Coloring, {5}

$$\Omega p(\Delta)=0: \quad p = 6s^2 - s^3 - 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, B, C, B, C, 1, 5]

B: [6, 8, 8, 7, A, 3, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 0, 3, 0, 0, 1, 3, 1] , [3, 0, 3, 0, 1, 0, 5, 0, 0, 0, 3, 1] , [3, 0, 1, 0, 1, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 1, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[y_8, 0, y_1, 0, y_2, y_3, y_4, 0, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{9, 12}, {2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 1, 1] , [0, 3, 1, 1, 0, 0, 2, 3, 1, 1, 2, 2] , [0, 1, 0, 2, 0, 0, 1, 4, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 0, 2, 1, 1, 1, 4, 2] , [0, 1, 0, 4, 0, 0, 3, 2, 2, 2, 1, 1] , [0, 2, 0, 1, 0, 0, 4, 1, 1, 3, 2, 2] , [0, 3, 0, 2, 0, 0, 1, 2, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 2, 3, 1, 1, 2, 2] , [0, 1, 0, 2, 0, 0, 1, 4, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 0, 2, 1, 1, 1, 4, 2]] \$

$$[0, -2y_3 + 11y_2 + 11y_1 - 2y_6 + 11y_5 - 39y_4 + 11y_7 - 2y_8, 2y_3, 2y_2, 0, 2y_1, 2y_6, 2y_5, 2y_4, 2y_7, 2y_8, 3y_2 + 3y_1 + 3y_5 - 11y_4 + 3y_7]$$

$$p' = -s^3 + s^9 \quad p = -s^3 + s^9$$

6 . Coloring, {6}

$$\Omega p(\Delta)=0: \quad p = -2s^2 - 5s^3 + 2s^4 + 16s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, B, C, B, C, 1, 5]

B: [6, 8, 8, 8, 7, 3, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 10

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{1, 7, 11\}\}$ order: 3

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 3, 3], [3, 0, 1, 0, 3, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 4, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 4, 3], [4, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 4, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 4, 3], [4, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 1]] \$$

$[y_2, 0, y_1, 0, -2y_2 - 2y_1 + 5y_3 + 5y_4 - 4y_5, y_3, 4y_2 + 4y_1 - 6y_3 - 6y_4 + 5y_5, 0, 0, 5y_2 + 5y_1 - 8y_3 - 8y_4 + 6y_5, y_4, y_5]$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 2, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 3, 2, 2, 3, 1], [0, 2, 0, 3, 0, 0, 2, 2, 1, 1, 3, 2], [0, 1, 0, 3, 0, 0, 3, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 0, 3, 1, 1, 3, 2, 2], [0, 3, 0, 2, 0, 0, 2, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 2, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 3, 2, 2, 3, 1], [0, 2, 0, 3, 0, 0, 2, 2, 1, 1, 3, 2]] \$$

$[0, -6y_1 - 3y_5 + 5y_4 - 3y_3 + 8y_7, 3y_1, -3y_6 + 8y_4 - 3y_2 + 5y_7, 0, 3y_1, 3y_5, 3y_6, 3y_4, 3y_2, 3y_3, 3y_7]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8 \quad p'' = -s^3 + s^9$$

7. Coloring, {7}

R: [7, 7, 7, 6, A, A, A, C, B, C, 1, 5]

B: [6, 8, 8, 8, 7, 3, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$[y_6, 0, 0, 0, y_5, y_4, y_3, 0, 0, y_2, y_4, y_1]$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 0, 3, 1] , [0, 0, 1, 3, 0, 0, 2, 4, 1, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 1, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 3, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 6, 0, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 4, 0, 1, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 3, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 6, 0, 1, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 6, 1]] \$

$[0, 6y_1, -3y_3 - 9y_1 - 3y_2 - 3y_4 + 13y_5 - 3y_6 + 13y_7, 3y_3, 0, 3y_1, 3y_2, 3y_4, 3y_5, 0, 3y_6, 3y_7]$

$$p = -s^4 - s^5 + s^7 + s^8 \quad p = s^4 - s^6 - s^7 + s^9$$

8 . Coloring, {8}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 16s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, B, B, B, C, 1, 5]

B: [6, 8, 8, 7, 3, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	4 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3
See Matrix

$\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 2]] \$$

$[2 y_1, 0, 0, 0, 4 y_1 - 2 y_2 - 7 y_3 + 3 y_4, 2 y_2, 16 y_1 - 27 y_3 + 7 y_4, 0, 0, 2 y_3, 2 y_4, 10 y_1 - 16 y_3 + 4 y_4]$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6
See Matrix

$\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 2, 0, 2], [0, 2, 1, 0, 0, 0, 2, 4, 2, 1, 0, 4], [0, 1, 0, 0, 0, 0, 0, 3, 4, 2, 0, 6], [0, 2, 0, 0, 0, 0, 0, 1, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$[0, y_1, y_4, 2 y_2, 0, y_2, 2 y_4 - 3 y_2, y_3, y_6, y_7, 0, y_5]$

$$p' = -s^6 + s^8 \quad p = s^6 - s^8$$

Â» SYNC'D !RANK'D

9. Coloring, {9}

$$\Omega p(\Delta)=0: \quad p = -9s^3 - 2s^4 - 16s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, B, C, C, C, 1, 5]

B: [6, 8, 8, 7, 3, 3, A, B, B, 2, 4, 9]

' See graph

' ' See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 2, 4]] \$$$

$$[2 y_1, 0, 0, 0, -27 y_1 - 2 y_2 + 16 y_4 + 7 y_3, 2 y_2, -7 y_1 + 4 y_4 + 3 y_3, 0, 0, 2 y_4, -16 y_1 + 10 y_4 + 4 y_3, 2 y_3]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 2, 2, 0], [0, 2, 1, 2, 0, 0, 2, 4, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 2, 3, 0, 2, 4, 0], [0, 2, 0, 4, 0, 4, 1, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 4, 2, 0, 4, 1, 0], [0, 4, 0, 1, 0, 0, 3, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 1, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 2, 4, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 2, 3, 0, 2, 4, 0]] \$$$

$$[0, y_3, y_1, y_2, 0, y_8, y_7, y_6, 2 y_8, y_5, y_4, 0]$$

$$p = s^3 - s^9$$

10 . Coloring, {10}

R: [7, 7, 7, 6, A, A, B, C, B, 2, 1, 5]

B: [6, 8, 8, 7, 3, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 4, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 5, 0, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0]] \$

$$[y_1, y_7, 0, 0, y_2, y_6, y_3, 0, 0, y_4, y_5, y_6]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 2, 1, 3] , [0, 0, 1, 1, 0, 0, 2, 2, 3, 1, 2, 4] , [0, 0, 0, 2, 0, 0, 1, 1, 4, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 1, 1, 6] , [0, 0, 0, 1, 0, 0, 2, 0, 6, 2, 0, 5] , [0, 0, 0, 0, 0, 0, 1, 0, 5, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, y_1, y_4, 0, y_2, y_3, y_5, y_6, y_9, y_7, y_8]$$

11 . Coloring, {11}

R: [7, 7, 7, 6, A, A, B, C, B, C, 4, 5]

B: [6, 8, 8, 7, 3, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	9 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 2, 0, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 3, 0, 0, 0, 5, 0, 3] , [0, 0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[0, 0, 0, y_1, y_2, y_3, y_4, 0, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 2, 1, 1], [1, 2, 1, 0, 0, 2, 0, 4, 1, 1, 2, 2], [2, 1, 2, 0, 0, 1, 0, 3, 2, 0, 4, 1], [4, 0, 1, 0, 0, 2, 0, 3, 1, 0, 3, 2], [3, 0, 2, 0, 0, 4, 0, 1, 2, 0, 3, 1], [3, 0, 4, 0, 0, 3, 0, 2, 1, 0, 1, 2], [1, 0, 3, 0, 0, 3, 0, 4, 2, 0, 2, 1], [2, 0, 3, 0, 0, 1, 0, 3, 1, 0, 4, 2], [4, 0, 1, 0, 0, 2, 0, 3, 2, 0, 3, 1], [3, 0, 2, 0, 0, 4, 0, 1, 1, 0, 3, 2]] \$$

$[-3 y_1 - 3 y_2 - 3 y_5 - 3 y_3 - 3 y_4 + 13 y_6 - 3 y_7 - 3 y_8 + 13 y_9, 3 y_1, 3 y_2, 0, 0, 3 y_5, 3 y_3, 3 y_4, 3 y_6, 3 y_7, 3 y_8, 3 y_9]$

$$p = -s^4 - s^5 + s^9 + s^{10}$$

12 . Coloring, {12}

R: [7, 7, 7, 6, A, A, B, C, B, C, 1, 9]

B: [6, 8, 8, 7, 3, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	9 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 1, 5, 2], [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$[y_4, 0, 0, 0, 0, y_1, y_2, 0, y_3, y_6, y_5, y_7]$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 2, 1, 1], [0, 2, 3, 1, 1, 0, 2, 4, 0, 1, 2, 0], [0, 1, 1, 2, 0, 0, 1, 5, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 4, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 5, 1, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 2, 4, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 1, 5, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 1, 5, 0]] \$$

$$[0, y_1, y_2, y_3, y_4, y_9, y_5, y_6, 0, y_7, y_8, y_9]$$

$$p = -s^4 + s^{10}$$

13 . Coloring, {2, 3}

R: [7, 8, 8, 6, A, A, B, C, B, C, 1, 5]

B: [6, 7, 7, 7, 3, 3, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	6 vs 9

Omega Rank for R : cycles: {{5, 10, 12}, {1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 4], [1, 0, 0, 0, 4, 0, 3, 0, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 1, 0, 0, 4, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 4], [1, 0, 0, 0, 4, 0, 3, 0, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 1, 0, 0, 4, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 4]] \$$$

$$[-18y_1 + 14y_2 + 9y_4 + 2y_3, 0, 0, 0, y_1, -5y_1 + 4y_2 + 2y_4 + y_3, y_2, -10y_1 + 8y_2 + 4y_4 + 2y_3, 0, y_4, y_3, -16y_1 + 13y_2 + 8y_4 + 2y_3]$$

$$p' = -s^3 + s^6 \quad p = -s^2 + s^8 \quad p = -s^2 + s^5 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 2, 1, 1], [0, 2, 1, 1, 0, 0, 6, 0, 1, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 0, 2, 6, 0, 1], [0, 6, 0, 0, 0, 0, 3, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 6, 0, 2, 3, 0, 1], [0, 3, 0, 0, 0, 0, 4, 0, 1, 6, 0, 2], [0, 6, 0, 0, 0, 0, 3, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 6, 0, 1, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 0, 2, 6, 0, 1]] \$$$

$$[0, -6y_1 - 6y_5 - 3y_2 + 13y_3 - 3y_4 + 13y_6, 3y_1, 3y_1, 0, 3y_5, 3y_2, 0, 3y_3, 3y_4, 3y_5, 3y_6]$$

$$p' = -s^3 - s^4 + s^6 + s^7 \quad p = -s^3 + s^9 \quad p = -s^3 - s^4 + s^6 + s^7$$

14 . Coloring, {2, 4}

R: [7, 8, 7, 7, A, A, B, C, B, C, 1, 5]

B: [6, 7, 8, 6, 3, 3, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}, {1, 7, 11}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 2] , [2, 0, 0, 0, 2, 0, 3, 0, 0, 3, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 2] , [2, 0, 0, 0, 2, 0, 3, 0, 0, 3, 3, 3]] \$

$[y_2, 0, 0, 0, y_2, 0, y_1 + y_3, y_1, 0, y_3, y_4, y_4]$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}, {3, 4, 6, 8, 11}, {2, 7, 10}}

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 2, 1, 1] , [0, 2, 2, 1, 0, 2, 2, 2, 1, 1, 1, 2] , [0, 1, 2, 1, 0, 1, 2, 2, 2, 2, 2, 1] , [0, 2, 1, 2, 0, 1, 1, 2, 1, 2, 2, 2] , [0, 2, 1, 2, 0, 2, 2, 1, 2, 1, 2, 1] , [0, 1, 2, 2, 0, 2, 2, 1, 1, 2, 1, 2] , [0, 2, 2, 1, 0, 2, 1, 2, 2, 1, 1] , [0, 2, 2, 1, 0, 1, 2, 2, 1, 1, 2, 2] , [0, 1, 1, 2, 0, 1, 2, 2, 2, 2, 2, 1] , [0, 2, 1, 2, 0, 2, 1, 1, 1, 2, 2, 2]] \$

$[0, -3y_7 + 5y_5 - 3y_4 + 5y_2, 3y_1, -3y_1 - 3y_8 - 3y_6 - 3y_3 + 8y_5 + 8y_2, 0, 3y_8, 3y_7, 3y_6, 3y_5, 3y_4, 3y_3, 3y_2]$

$$p = s - 2s^3 - 3s^4 - 2s^5 - s^6 + 2s^8 + 3s^9 + 2s^{10} \quad p = -s - s^2 + s^4 + s^5 + s^6 + s^7 - s^9 - s^{10}$$

15 . Coloring, {2, 5}

R: [7, 8, 7, 6, 3, A, B, C, B, C, 1, 5]

B: [6, 7, 8, 7, A, 3, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3], [3, 0, 2, 0, 3, 0, 3, 0, 0, 1, 2, 2], [2, 0, 3, 0, 2, 0, 5, 0, 0, 0, 3, 1], [3, 0, 2, 0, 1, 0, 5, 0, 0, 0, 5, 0], [5, 0, 1, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$[y_8, 0, y_7, 0, y_6, y_5, y_4, y_5, 0, y_3, y_2, y_1]$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1], [0, 3, 1, 1, 0, 0, 4, 1, 1, 2, 1, 2], [0, 2, 0, 1, 0, 0, 4, 1, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 3, 0, 1, 4, 1, 2], [0, 4, 0, 1, 0, 0, 5, 0, 2, 3, 0, 1], [0, 3, 0, 0, 0, 0, 5, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 3, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 5, 0, 1, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 3, 0, 1, 5, 0, 2]] \$$

$[0, -3y_1 - 3y_9 - 3y_4 - 3y_5 - 3y_6 + 13y_7 - 3y_8 - 3y_3 + 13y_2, 3y_1, 3y_9, 0, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8, 3y_3, 3y_2]$

$$p = -s^6 - s^7 + s^9 + s^{10}$$

16 . Coloring, $\{2, 6\}$

R: [7, 8, 7, 6, A, 3, B, C, B, C, 1, 5]

B: [6, 7, 8, 7, 3, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	8 vs 10

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{1, 7, 11\}\}$ order: 3

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3], [3, 0, 1, 0, 3, 0, 3, 0, 0, 2, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 3], [4, 0, 0, 0, 3, 0, 3, 0, 0, 2, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 3], [4, 0, 0, 0, 3, 0, 3, 0, 0, 2, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 3, 3, 2]] \$$

$[-2y_1 - 20y_3 + 16y_2 - 27y_4 + 7y_5, 0, 2y_1, 0, -12y_3 + 10y_2 - 16y_4 + 4y_5, 2y_3, 2y_2, 2y_3, 0, 2y_4, 2y_5, -4y_3 + 4y_2 - 7y_4 + 3y_5]$

$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7 \quad p''' = -s^3 + s^9$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 4, 1, 1, 3, 1, 2], [0, 3, 0, 1, 0, 0, 4, 0, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2]] \$$

$[0, -6y_2 - 3y_1 - 3y_3 - 3y_4 + 13y_5 - 3y_6 - 3y_7 + 13y_8, 3y_2, 3y_1, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8]$

$p = -s^5 - s^6 + s^8 + s^9 \quad p' = s^5 - s^7 - s^8 + s^{10}$

17 . Coloring, $\{2, 7\}$

R: [7, 8, 7, 6, A, A, A, C, B, C, 1, 5]

B: [6, 7, 8, 7, 3, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[y_6, 0, 0, 0, y_1, y_5, y_2, y_5, 0, y_3, y_5, y_4]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 3, 1] , [0, 0, 1, 3, 0, 0, 4, 2, 1, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 1, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 3, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 6, 0, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 4, 0, 1, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 3, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 6, 0, 1, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 6, 1]] \$

$$[0, 6y_2, -3y_1 - 9y_2 - 3y_3 - 3y_4 + 13y_5 - 3y_6 + 13y_7, 3y_1, 0, 3y_2, 3y_3, 3y_4, 3y_5, 0, 3y_6, 3y_7]$$

$$p = -s^4 - s^5 + s^7 + s^8 \quad p = s^4 - s^6 - s^7 + s^9$$

18 . Coloring, {2, 8}

R: [7, 8, 7, 6, A, A, B, B, B, C, 1, 5]

B: [6, 7, 8, 7, 3, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	4 vs 8	6 vs 9

Omega Rank for R : cycles: {{5, 10, 12}, {1, 7, 11}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2]] \$

$$[-27 y_4 - 20 y_3 + 7 y_2 + 16 y_1, 0, 0, 0, 2 y_4, 2 y_3, 2 y_2, 2 y_3, 0, -16 y_4 - 12 y_3 + 4 y_2 + 10 y_1, 2 y_1, -7 y_4 - 4 y_3 + 3 y_2 + 4 y_1]$$

$$p = -s^2 + s^8 \quad p' = -s^3 + s^6 \quad p = -s^2 + s^5 \quad p' = s^2 - s^5$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 0, 2], [0, 2, 1, 0, 0, 0, 4, 2, 2, 2, 0, 3], [0, 2, 0, 0, 0, 0, 2, 1, 3, 4, 0, 4], [0, 4, 0, 0, 0, 0, 2, 0, 4, 2, 0, 4], [0, 2, 0, 0, 0, 0, 4, 0, 4, 2, 0, 4], [0, 2, 0, 0, 0, 0, 2, 0, 4, 4, 0, 4], [0, 4, 0, 0, 0, 0, 2, 0, 4, 2, 0, 4], [0, 2, 0, 0, 0, 0, 4, 0, 4, 2, 0, 4], [0, 2, 0, 0, 0, 0, 2, 0, 4, 4, 0, 4]] \$$$

$$[0, y_5, y_4, 2 y_3, 0, y_3, y_2, y_1, y_4 - y_3 - y_1 + y_6, -y_5 - y_2 + 2 y_4 - 2 y_3 + 2 y_6, 0, y_6]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7 \quad p' = s^5 - s^8$$

19. Coloring, {2, 9}

R: [7, 8, 7, 6, A, A, B, C, C, C, 1, 5]

B: [6, 7, 8, 7, 3, 3, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	4 vs 8	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}, {1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 2, 0, 0, 3, 0, 2, 0, 0, 3, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 3]] \$$$

$$[y_3, 0, 0, 0, 5 y_3 - 2 y_1 - y_2 - y_4, y_1, y_3, y_1, 0, y_2, y_3, y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p' = -s^3 + s^6 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 2, 0] , [0, 2, 1, 2, 0, 0, 4, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 1, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 5, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[0, y_1, y_2, y_3, 0, y_4, y_5, y_6, 2y_4, y_7, y_8, 0]$$

$$p = -s^6 + s^9$$

20 . Coloring, {2, 10}

R: [7, 8, 7, 6, A, A, B, C, B, 2, 1, 5]

B: [6, 7, 8, 7, 3, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}, {1, 7, 11}}

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 2, 2, 0, 3, 2, 1] , [2, 3, 0, 0, 1, 0, 3, 2, 0, 1, 2, 2] , [2, 1, 0, 0, 2, 0, 2, 3, 0, 1, 3, 2] , [3, 1, 0, 0, 2, 0, 2, 1, 0, 2, 2, 3] , [2, 2, 0, 0, 3, 0, 3, 1, 0, 2, 2, 1] , [2, 2, 0, 0, 1, 0, 2, 2, 0, 3, 3, 1] , [3, 3, 0, 0, 1, 0, 2, 2, 0, 1, 2, 2] , [2, 1, 0, 0, 2, 0, 3, 3, 0, 1, 2, 2]] \$

$$[7y_1, 9y_1 - 7y_2 - 7y_7 + 9y_6 - 7y_5 - 7y_4 + 9y_3 - 7y_8, 0, 0, 7y_2, 7y_7, 7y_6, 7y_5, 0, 7y_4, 7y_3, 7y_8]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 1, 3] , [0, 0, 1, 1, 0, 0, 2, 2, 3, 2, 1, 4] , [0, 0, 0, 1, 0, 0, 1, 1, 4, 2, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 1, 1, 6] , [0, 0, 0, 1, 0, 0, 2, 0, 6, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_1, y_1 - y_2 + y_8 - y_7 - y_6 - y_5 + y_4 + y_3, 0, y_2, y_8, y_7, y_6, y_5, y_4, y_3]$$

$$p = -s^8 + s^9$$

21 . Coloring, {2, 11}

R: [7, 8, 7, 6, A, A, B, C, B, C, 4, 5]

B: [6, 7, 8, 7, 3, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	6 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 3, 3], [0, 0, 0, 3, 3, 2, 0, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 3, 0, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 2, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$$

$$[0, 0, 0, y_1, y_2, y_3, 2y_4, y_4, 0, y_5, y_7, y_6]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}, {2, 7, 10}}

See Matrix

$$\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 1, 1], [1, 2, 1, 0, 0, 2, 2, 2, 1, 2, 1, 2], [1, 2, 2, 0, 0, 1, 2, 1, 2, 2, 2, 1], [2, 2, 1, 0, 0, 1, 2, 2, 1, 2, 1, 2], [1, 2, 1, 0, 0, 2, 2, 1, 2, 2, 2, 1], [2, 2, 2, 0, 0, 1, 2, 1, 1, 2, 1, 2], [1, 2, 1, 0, 0, 2, 2, 2, 2, 1, 1], [1, 2, 2, 0, 0, 1, 2, 1, 1, 2, 2, 2], [2, 2, 1, 0, 0, 1, 2, 2, 2, 2, 1, 1], [1, 2, 1, 0, 0, 2, 2, 1, 1, 2, 2, 2]] \$$$

$$[7y_3 - 2y_1 - 2y_2 - 2y_4 - 2y_5, 2y_3, 2y_1, 0, 0, 2y_2, 2y_3, 2y_4, 3y_3 - 2y_6, 2y_3, 2y_5, 2y_6]$$

$$p = -s - s^2 + s^6 + s^7 \quad p = s - s^3 - s^6 + s^8 \quad p = -s - s^4 + s^6 + s^9 \quad p = s - s^5 - s^6 + s^{10}$$

22 . Coloring, {2, 12}

R: [7, 8, 7, 6, A, A, B, C, B, C, 1, 9]

B: [6, 7, 8, 7, 3, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 0, 3, 1, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

[$y_1, 0, 0, 0, 0, y_3, y_2, y_3, y_4, y_5, y_6, y_7$]

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 1, 1] , [0, 2, 3, 1, 1, 0, 4, 2, 0, 2, 1, 0] , [0, 2, 1, 1, 0, 0, 3, 3, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 3, 1, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 6, 0, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

[$0, y_1, y_2, y_3, y_4, y_9, y_5, y_6, 0, y_7, y_8, y_9$]

$$p = -s^7 + s^{10}$$

23 . Coloring, {3, 4}

R: [7, 7, 8, 7, A, A, B, C, B, C, 1, 5]

B: [6, 8, 7, 6, 3, 3, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	8 vs 10

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{1, 7, 11\}\}$ order: 3

See Matrix

$\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 3, 0, 0, 3, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 3, 0, 0, 3, 3, 3]] \$$

$[y_4, 0, 0, 0, y_4, 0, y_1 + y_2, y_1, 0, y_2, y_3, y_3]$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 3, 4, 6, 7, 8, 10, 11\}\}$ order: 8

See Matrix

$\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 2, 1, 1], [0, 2, 2, 1, 0, 2, 2, 2, 1, 1, 1, 2], [0, 1, 2, 1, 0, 1, 2, 2, 2, 2, 2, 1], [0, 2, 1, 2, 0, 1, 2, 2, 2], [0, 2, 1, 2, 0, 2, 1, 2, 2, 2, 1, 1], [0, 2, 2, 1, 0, 2, 1, 2, 1, 1, 2, 2], [0, 1, 2, 2, 0, 1, 2, 2, 2, 1, 2, 1], [0, 1, 1, 2, 0, 2, 2, 1, 1, 2, 2, 2], [0, 2, 2, 2, 0, 2, 1, 1, 2, 2, 1, 1], [0, 2, 2, 1, 0, 2, 2, 2, 1, 1, 1, 2]] \$$

$[0, -3y_1 - 3y_2 + 5y_4 - 3y_6 + 8y_7, 3y_8, -3y_8 - 3y_3 + 8y_4 - 3y_5 + 5y_7, 0, 3y_1, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7]$

$$p' = -s + s^9 \quad p = -s + s^9$$

24 . Coloring, $\{3, 5\}$

R: $[7, 7, 8, 6, 3, A, B, C, B, C, 1, 5]$

B: $[6, 8, 7, 7, A, 3, A, B, C, 2, 4, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{3, 5, 8, 12\}\}$ order: 12

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3], [3, 0, 2, 0, 3, 0, 2, 1, 0, 1, 2, 2], [2, 0, 3, 0, 2, 0, 3, 2, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 2, 3, 0, 0, 3, 2], [3, 0, 2, 0, 2, 0, 2, 2, 0, 0, 2, 3], [2, 0, 2, 0, 3, 0, 3, 2, 0, 0, 2, 2], [2, 0, 3, 0, 2, 0, 2, 2, 0, 0, 3, 2], [3, 0, 2, 0, 2, 0, 2, 3, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 3, 2, 0, 0, 2, 3]] \$$

$[7y_1, 0, 9y_1 - 7y_7 - 7y_8 + 9y_5 - 7y_6 - 7y_2 + 9y_3 - 7y_4, 0, 7y_7, 7y_8, 7y_5, 7y_6, 0, 7y_2, 7y_3, 7y_4]$

$$p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1], [0, 3, 1, 1, 0, 0, 3, 2, 1, 2, 1, 2], [0, 2, 0, 1, 0, 0, 2, 3, 2, 3, 2, 1], [0, 3, 0, 2, 0, 0, 1, 2, 1, 2, 3, 2], [0, 2, 0, 3, 0, 0, 2, 3, 2, 1, 2, 1], [0, 1, 0, 2, 0, 0, 3, 2, 1, 2, 3, 2], [0, 2, 0, 3, 0, 0, 2, 1, 2, 3, 2, 1], [0, 3, 0, 2, 0, 0, 3, 2, 1, 2, 1, 2], [0, 2, 0, 1, 0, 0, 2, 3, 2, 3, 2, 1], [0, 3, 0, 2, 0, 0, 1, 2, 1, 2, 3, 2]] \$$

$[0, -3y_4 - 3y_3 + 5y_5 - 3y_7 + 8y_6, -3y_1 - 3y_2 + 8y_5 - 3y_8 + 5y_6, 3y_1, 0, 3y_4, 3y_3, 3y_2, 3y_5, 3y_8, 3y_7, 3y_6]$

$$p = -s^3 + s^9 \quad p' = s^3 - s^9$$

25 . Coloring, $\{3, 6\}$

R: [7, 7, 8, 6, A, 3, B, C, B, C, 1, 5]

B: [6, 8, 7, 7, 3, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 10

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3], [3, 0, 1, 0, 3, 0, 2, 1, 0, 2, 2, 2], [2, 0, 0, 0, 2, 0, 3, 1, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 2, 0, 0, 2, 3, 4], [3, 0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 3, 0, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 2, 0, 0, 2, 3, 4], [3, 0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 3, 0, 0, 4, 2, 3]] \$$

$[4 y_5 - 16 y_4 + 10 y_3 + 10 y_2 + 4 y_1, 0, -2 y_6 + 7 y_5 - 27 y_4 + 16 y_3 + 16 y_2 + 7 y_1, 0, 2 y_6, 2 y_5, 2 y_4, 2 y_3, 0, 2 y_2, 3 y_5 - 7 y_4 + 4 y_3 + 4 y_2 + 3 y_1, 2 y_1]$

$$p = s^4 - s^7 \quad p' = s^4 - s^7 \quad p'' = s^5 - s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 3, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 0, 1, 3, 2, 3, 2, 1], [0, 3, 0, 2, 0, 0, 1, 3, 1, 1, 3, 2], [0, 1, 0, 3, 0, 0, 2, 3, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 3, 1, 1, 2, 3, 2], [0, 2, 0, 3, 0, 0, 3, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 3, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 0, 1, 3, 2, 3, 2, 1], [0, 3, 0, 2, 0, 0, 1, 3, 1, 1, 3, 2]] \$$

$[0, -3 y_7 - 3 y_6 + 5 y_4 - 3 y_2 + 8 y_1, 3 y_7, -3 y_7 - 3 y_5 + 8 y_4 - 3 y_3 + 5 y_1, 0, 3 y_7, 3 y_6, 3 y_5, 3 y_4, 3 y_3, 3 y_2, 3 y_1]$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8 \quad p'' = -s^3 + s^9$$

26. Coloring, $\{3, 7\}$

R: $[7, 7, 8, 6, A, A, A, C, B, C, 1, 5]$

B: $[6, 8, 7, 7, 3, 3, B, B, C, 2, 4, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 1, 3], [1, 0, 0, 0, 3, 0, 2, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 5]] \$$

0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

[y₆, 0, 0, 0, y₅, y₄, y₃, y₄, 0, y₂, y₄, y₁]

$$p' = -s^4 + s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 3, 1], [0, 0, 1, 3, 0, 0, 4, 2, 1, 0, 3, 2], [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 6, 1], [0, 0, 0, 6, 0, 0, 3, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 6, 0, 2, 0, 3, 1], [0, 0, 0, 3, 0, 0, 4, 0, 1, 0, 6, 2], [0, 0, 0, 6, 0, 0, 3, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 6, 0, 1, 0, 3, 2], [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 6, 1]] \$

[0, 6 y₄, 3 y₁, -9 y₁ - 3 y₅ + 13 y₆ - 3 y₂ + 13 y₃, 0, 3 y₄, 3 y₅, 6 y₁ - 9 y₄, 3 y₆, 0, 3 y₂, 3 y₃]

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8 \quad p = -s^3 + s^9$$

27 . Coloring, {3, 8}

R: [7, 7, 8, 6, A, A, B, B, B, C, 1, 5]

B: [6, 8, 7, 7, 3, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	9 vs 9	9 vs 9	4 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2]] \$

[2 y₁, 0, 0, 0, 10 y₂ + 8 y₃ - 16 y₄ + 4 y₁, 2 y₃, 2 y₂, 2 y₃, 0, 3 y₁ + 4 y₂ + 4 y₃ - 7 y₄, 16 y₂ + 16 y₃ - 27 y₄ + 7 y₁, 2 y₄]

$$p = -s^2 + s^5 \quad p' = -s^3 + s^6 \quad p' = -s^2 + s^5 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 0, 2] , [0, 2, 1, 0, 0, 0, 4, 2, 2, 2, 0, 3] , [0, 2, 0, 0, 0, 0, 1, 2, 3, 4, 0, 4] , [0, 4, 0, 0, 0, 0, 0, 2, 4, 1, 0, 5] , [0, 1, 0, 0, 0, 0, 0, 4, 5, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 1, 6, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, y_1, y_2, 2y_3, 0, y_3, y_4, y_5, y_7, y_6, 0, y_8]$$

$$p = -s^7 + s^9$$

28 . Coloring, {3, 9}

R: [7, 7, 8, 6, A, A, B, C, C, C, 1, 5]

B: [6, 8, 7, 7, 3, 3, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	4 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 2, 4] , [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 3] , [2, 0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 4] , [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 3] , [2, 0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 4] , [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 3]] \$

$$[y_3, 0, 0, 0, 5y_3 - 2y_1 - y_2 - y_4, y_1, y_3, y_1, 0, y_2, y_3, y_4]$$

$$p' = -s^3 + s^6 \quad p = -s^2 + s^5 \quad p = -s^2 + s^8 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 2, 0] , [0, 2, 1, 2, 0, 0, 4, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 3, 2, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 4, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 2, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 2, 0, 4, 2, 0]] \$

$$[0, y_1, y_2, y_3, 0, y_4, y_5, y_6, 2 y_4, y_7, y_8, 0]$$

$$p = -s^3 + s^9$$

29 . Coloring, {3, 10}

R: [7, 7, 8, 6, A, A, B, C, B, 2, 1, 5]

B: [6, 8, 7, 7, 3, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 4, 0, 0, 3, 2, 1] , [2, 3, 0, 0, 1, 0, 5, 0, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 5, 0, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_7, y_8, 0, 0, y_6, y_5, y_4, y_5, 0, y_1, y_2, y_3]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 1, 3] , [0, 0, 1, 1, 0, 0, 4, 0, 3, 2, 1, 4] , [0, 0, 0, 1, 0, 0, 2, 0, 4, 4, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 5, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, y_3 + y_7, y_1, 0, y_3, y_2, y_3, y_4, y_5, y_7, y_6]$$

$$p = -s^6 + s^8 \quad p' = -s^6 + s^8$$

30 . Coloring, {3, 11}

R: [7, 7, 8, 6, A, A, B, C, B, C, 4, 5]

B: [6, 8, 7, 7, 3, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 2, 0, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 3, 0, 0, 0, 5, 0, 3] , [0, 0, 0, 0, 3, 2, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

[0, 0, 0, y_1 , y_2 , y_4 , $2y_3$, y_3 , 0, y_5 , y_6 , y_7]

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 3, 6, 7, 8, 10, 11}} order: 8

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 1, 1] , [1, 2, 1, 0, 0, 2, 2, 2, 1, 2, 1, 2] , [1, 2, 2, 0, 0, 1, 1, 2, 2, 2, 2, 1] , [2, 2, 1, 0, 0, 1, 2, 2, 1, 1, 2, 2] , [2, 1, 1, 0, 0, 2, 1, 2, 2, 2, 2, 1] , [2, 2, 2, 0, 0, 2, 1, 1, 1, 1, 2, 2] , [2, 1, 2, 0, 0, 2, 2, 2, 2, 1, 1, 1] , [1, 1, 2, 0, 0, 2, 2, 1, 1, 2, 2, 2] , [2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 1, 1] , [1, 2, 1, 0, 0, 2, 2, 2, 1, 2, 1, 2]] \$

[-3 y_1 - 3 y_4 + 8 y_5 - 3 y_6 + 5 y_8 , -3 y_2 - 3 y_3 + 5 y_5 - 3 y_7 + 8 y_8 , 3 y_1 , 0, 0, 3 y_2 , 3 y_3 , 3 y_4 , 3 y_5 , 3 y_6 , 3 y_7 , 3 y_8]

$$p = -s + s^9 \quad p' = -s + s^9$$

31 . Coloring, {3, 12}

R: [7, 7, 8, 6, A, A, B, C, B, C, 1, 9]

B: [6, 8, 7, 7, 3, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 1, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 5, 1], [5, 0, 0, 0, 0, 4, 0, 1, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$[y_1, 0, 0, 0, 0, y_6, y_7, y_6, y_3, y_4, y_5, y_2]$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 1, 1], [0, 2, 3, 1, 1, 0, 4, 2, 0, 2, 1, 0], [0, 2, 1, 1, 0, 0, 4, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 4, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 2, 4, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 4, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 4, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 2, 0, 4, 2, 0]] \$$

$[0, y_1 + y_2 - y_3 - y_4 + y_5 + y_6 - y_7, y_1, y_2, y_3, y_8, y_4, y_5, 0, y_6, y_7, y_8]$

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9 \quad p' = -s^4 + s^{10}$$

32 . Coloring, $\{4, 5\}$

$$\Omega p(\Delta)=0: \quad p = 3s^2 + 2s^3 - 8s^5 + 32s^7 \quad p' = 3s^2 + 2s^3 - 8s^5 + 32s^7$$

R: $[7, 7, 7, 7, 3, A, B, C, B, C, 1, 5]$

B: $[6, 8, 8, 6, A, 3, A, B, C, 2, 4, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 1, 3, 3], [3, 0, 2, 0, 3, 0, 3, 0, 0, 0, 4, 1], [4, 0, 3, 0, 1, 0, 5, 0, 0, 0, 3, 0], [3, 0, 1, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0]] \$$

$$[y_1, 0, y_6, 0, y_2, 0, y_3, 0, 0, y_4, y_5, y_7]$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{3, 4, 6, 8, 11\}\}$ order: 10

See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 3, 1, 1], [0, 3, 2, 1, 0, 2, 0, 3, 1, 0, 2, 2], [0, 0, 2, 2, 0, 1, 0, 5, 2, 0, 3, 1], [0, 0, 1, 3, 0, 2, 0, 2, 1, 0, 5, 2], [0, 0, 2, 5, 0, 3, 0, 1, 2, 0, 2, 1], [0, 0, 3, 2, 0, 5, 0, 2, 1, 0, 1, 2], [0, 0, 5, 1, 0, 2, 0, 3, 2, 0, 2, 1], [0, 0, 2, 2, 0, 1, 0, 5, 1, 0, 3, 2], [0, 0, 1, 3, 0, 2, 0, 2, 2, 0, 5, 1]] \$$

$$[0, -3y_1 - 3y_2 - 3y_5 - 3y_6 + 13y_7 - 3y_8 - 3y_3 + 13y_4, 3y_1, 3y_2, 0, 3y_5, 0, 3y_6, 3y_7, 3y_8, 3y_3, 3y_4]$$

$$p = -s^3 - s^4 + s^8 + s^9$$

33 . Coloring, $\{4, 6\}$

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, 3, B, C, B, C, 1, 5]

B: [6, 8, 8, 6, 3, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 1, 3, 3] , [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1] , [4, 0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 3, 3] , [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1] , [4, 0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 3, 3]] \$

$$[y_3, 0, y_1, 0, y_2, 0, 4y_3 + 4y_1 + 5y_2 - 6y_4, 0, 0, -2y_3 - 2y_1 - 4y_2 + 5y_4, y_4, 5y_3 + 5y_1 + 6y_2 - 8y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}, {2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 2, 0, 3, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 1, 0, 3, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 0, 2, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 3, 0, 2, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 3, 0, 1, 1, 3, 2, 2] , [0, 3, 0, 2, 0, 2, 0, 2, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 2, 0, 3, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 1, 0, 3, 2, 2, 3, 1]] \$

$$[0, -3y_1 - 3y_2 + 5y_4 - 3y_6 + 8y_7, 3y_1, -3y_3 + 8y_4 - 3y_5 + 5y_7, 0, 3y_2, 0, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

34 . Coloring, {4, 7}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, A, C, B, C, 1, 5]

B: [6, 8, 8, 6, 3, 3, B, B, C, 2, 4, 9]

' See graph

' ' See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 6	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 0, 4, 0, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[y_1, 0, 0, 0, y_2, 0, y_3, 0, 0, y_4, y_5, y_6]$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{3, 4, 6, 8, 11\}\}$ order: 10

See Matrix

$$\$ [[0, 2, 2, 2, 0, 2, 0, 2, 2, 0, 3, 1], [0, 0, 2, 3, 0, 2, 0, 4, 1, 0, 2, 2], [0, 0, 2, 2, 0, 3, 0, 2, 2, 0, 4, 1], [0, 0, 3, 4, 0, 2, 0, 2, 1, 0, 2, 2], [0, 0, 2, 2, 0, 4, 0, 3, 2, 0, 2, 1], [0, 0, 4, 2, 0, 2, 0, 2, 1, 0, 3, 2], [0, 0, 2, 3, 0, 2, 0, 4, 2, 0, 2, 1], [0, 0, 2, 2, 0, 3, 0, 2, 1, 0, 4, 2]] \$$$

$$[0, -3y_1 - 3y_2 - 3y_3 - 3y_4 + 13y_5 - 3y_6 + 13y_7, 3y_1, 3y_2, 0, 3y_3, 0, 3y_4, 3y_5, 0, 3y_6, 3y_7]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

35 . Coloring, $\{4, 8\}$

$$\Omega p(\Delta)=0: \quad p' = s^2 - 16s^4 - 8s^5 + 16s^6 + 64s^7 \quad p' = s^3 + 4s^4 - 8s^6 - 16s^7 \quad p = s^2 + 56s^5 + 16s^6 - 64s^7 - 256s^8$$

R: $[7, 7, 7, 7, A, A, B, B, B, C, 1, 5]$

B: $[6, 8, 8, 6, 3, 3, A, C, C, 2, 4, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	3 vs 6	5 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 2]] \$$$

$$[y_3, 0, 0, 0, y_2, 0, y_1, 0, 0, y_2, -y_3 + 5y_2 - y_1, y_2]$$

$$p' = s - s^4 \quad p = s - s^4 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 0, 2, 2, 2, 0, 2] , [0, 2, 2, 0, 0, 2, 0, 4, 2, 0, 0, 4] , [0, 0, 2, 0, 0, 0, 0, 4, 4, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, y_1, y_5 + y_2 - y_4, y_3, 0, y_1, 0, y_5, y_2, y_3, 0, y_4]$$

$$p = -s^5 + s^6 \quad p' = -s^5 + s^7 \quad p'' = -s^5 + s^8$$

36 . Coloring, {4, 9}

$$\Omega p(\Delta)=0: \quad p' = 3s^2 + 2s^3 + 8s^4 - 8s^5 - 32s^7 \quad p = 3s^2 - 10s^3 - 40s^5 + 32s^6 - 32s^7 + 128s^8$$

R: [7, 7, 7, 7, A, A, B, C, C, C, 1, 5]

B: [6, 8, 8, 6, 3, 3, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	3 vs 6	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 4] , [2, 0, 0, 0, 4, 0, 2, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 4] , [2, 0, 0, 0, 4, 0, 2, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 2]] \$

$$[y_1, 0, 0, 0, y_2, 0, y_3, 0, 0, y_1, y_2, y_3]$$

$$p = -s + s^4 \quad p' = -s + s^4 \quad p'' = -s^2 + s^5$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 0, 2, 2, 2, 2, 0] , [0, 2, 2, 2, 0, 2, 0, 4, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 0, 4, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 0, 2, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 4, 0, 2, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 0, 4, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 2, 0, 4, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 0, 4, 0, 0, 4, 0]] \$

$$[0, y_1, y_2, y_3, 0, y_4, 0, y_5, y_6, y_6, y_7, 0]$$

$$p = -s^3 + s^8$$

37 . Coloring, {4, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, B, C, B, 2, 1, 5]

B: [6, 8, 8, 6, 3, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 0, 4, 0, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 4, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 5, 0, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[y_1, y_2, 0, 0, y_3, 0, y_4, 0, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{9, 12}, {3, 4, 6, 8, 11}} order: 10

See Matrix

$$\$ [[0, 0, 2, 2, 0, 2, 0, 2, 2, 2, 1, 3], [0, 0, 2, 1, 0, 2, 0, 2, 3, 0, 2, 4], [0, 0, 2, 2, 0, 1, 0, 2, 4, 0, 2, 3], [0, 0, 1, 2, 0, 2, 0, 2, 3, 0, 2, 4], [0, 0, 2, 2, 0, 2, 0, 1, 4, 0, 2, 3], [0, 0, 2, 2, 0, 2, 0, 2, 3, 0, 1, 4], [0, 0, 2, 1, 0, 2, 0, 2, 4, 0, 2, 3], [0, 0, 2, 2, 0, 1, 0, 2, 3, 0, 2, 4]] \$$$

$$[0, 0, -7y_1 - 7y_2 - 7y_6 + 9y_7 + 9y_3 - 7y_4 + 9y_5, 7y_1, 0, 7y_2, 0, 7y_6, 7y_7, 7y_3, 7y_4, 7y_5]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

38 . Coloring, {4, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, B, C, B, C, 4, 5]

B: [6, 8, 8, 6, 3, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	3 vs 6	8 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 3, 2, 2], [0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 3, 2, 2]] \$$$

$$[0, 0, 0, 16y_1 - 27y_2 + 7y_3, 4y_1 + 3y_3 - 7y_2, 0, 2y_1, 0, 0, 10y_1 - 16y_2 + 4y_3, 2y_3, 2y_2]$$

$$p' = s^2 - s^5 \quad p' = s - s^4 \quad p = s - s^4$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

$$\$ [[2, 2, 2, 0, 0, 2, 0, 2, 2, 2, 1, 1], [1, 2, 2, 0, 0, 2, 0, 4, 1, 0, 2, 2], [2, 0, 2, 0, 0, 1, 0, 4, 2, 0, 4, 1], [4, 0, 1, 0, 0, 2, 0, 2, 1, 0, 4, 2], [4, 0, 2, 0, 0, 4, 0, 1, 2, 0, 2, 1], [2, 0, 4, 0, 0, 4, 0, 2, 1, 0, 1, 2], [1, 0, 4, 0, 0, 2, 0, 4, 2, 0, 2, 1], [2, 0, 2, 0, 0, 1, 0, 4, 1, 0, 4, 2], [4, 0, 1, 0, 0, 2, 0, 2, 2, 0, 4, 1]] \$$$

$$[-3y_1 - 3y_2 - 3y_3 - 3y_6 + 13y_7 - 3y_4 - 3y_5 + 13y_8, 3y_1, 3y_2, 0, 0, 3y_3, 0, 3y_6, 3y_7, 3y_4, 3y_5, 3y_8]$$

$$p = -s^3 - s^4 + s^8 + s^9$$

39 . Coloring, {4, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, B, C, B, C, 1, 9]

B: [6, 8, 8, 6, 3, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 6	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 0, 4, 0, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 0, 6, 2], [6, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$[y_1, 0, 0, 0, 0, 0, y_2, 0, y_3, y_6, y_4, y_5]$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[0, 2, 2, 2, 2, 2, 0, 2, 0, 2, 1, 1], [0, 2, 4, 1, 1, 2, 0, 4, 0, 0, 2, 0], [0, 0, 3, 2, 0, 1, 0, 6, 0, 0, 4, 0], [0, 0, 1, 4, 0, 2, 0, 3, 0, 0, 6, 0], [0, 0, 2, 6, 0, 4, 0, 1, 0, 0, 3, 0], [0, 0, 4, 3, 0, 6, 0, 2, 0, 0, 1, 0], [0, 0, 6, 1, 0, 3, 0, 4, 0, 0, 2, 0], [0, 0, 3, 2, 0, 1, 0, 6, 0, 0, 4, 0], [0, 0, 1, 4, 0, 2, 0, 3, 0, 0, 6, 0]] \$$

$[0, 2 y_3 - 2 y_7, y_1, y_2, y_3, y_4, 0, y_5, 0, 2 y_7, y_6, y_7]$

$$p' = -s^3 + s^8 \quad p = -s^3 + s^8$$

40 . Coloring, {5, 6}

R: [7, 7, 7, 6, 3, 3, B, C, B, C, 1, 5]

B: [6, 8, 8, 7, A, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
See Matrix

\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 0, 3, 3] , [3, 0, 3, 0, 3, 0, 4, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[y_4, 0, y_3, 0, y_2, y_1, y_5, 0, 0, 0, y_6, 3y_1]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {2, 4, 7, 8, 10, 11}} order: 6
See Matrix

\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 2, 2, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 1, 4, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 2, 2, 1, 1, 4, 2] , [0, 1, 0, 4, 0, 0, 2, 2, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 0, 4, 1, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 2, 2, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 2, 2, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 1, 4, 2, 2, 2, 1]] \$

$$[0, 11y_1 - 2y_2 - 2y_3 + 11y_4 - 39y_5 + 11y_6 - 2y_7, 0, 2y_1, 0, 2y_2, 2y_3, 2y_4, 2y_5, 2y_6, 2y_7, 3y_1 + 3y_4 - 11y_5 + 3y_6]$$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

41 . Coloring, {5, 7}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 3s^3 + 2s^4 + 16s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, A, C, B, C, 1, 5]

B: [6, 8, 8, 7, A, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5
See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 3]] \$

3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4]] \$

[y₁, 0, y₂, 0, y₃, y₆, y₄, 0, 0, y₅, y₆, y₇]

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 3, 1], [0, 1, 1, 3, 0, 0, 2, 3, 1, 0, 3, 2], [0, 0, 0, 3, 0, 0, 3, 2, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, 5, 0, 2, 0, 3, 1], [0, 0, 0, 3, 0, 0, 5, 0, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 3, 2], [0, 0, 0, 3, 0, 0, 5, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 5, 2]] \$

[0, 3 y₂ + 3 y₆, 3 y₂, 3 y₃, 0, 3 y₆, -6 y₂ - 9 y₆ - 3 y₃ - 3 y₁ + 13 y₅ - 3 y₇ + 13 y₄, 3 y₁, 3 y₅, 3 y₆, 3 y₇, 3 y₄]

$$p' = s^4 + s^5 - s^7 - s^8 \quad p = -s^4 - s^5 + s^7 + s^8 \quad p = -s^4 + s^{10}$$

42 . Coloring, {5, 8}

R: [7, 7, 7, 6, 3, A, B, B, B, C, 1, 5]

B: [6, 8, 8, 7, A, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 4, 2], [4, 0, 2, 0, 2, 0, 3, 0, 0, 1, 3, 1], [3, 0, 2, 0, 1, 0, 6, 0, 0, 0, 3, 1], [3, 0, 1, 0, 1, 0, 5, 0, 0, 0, 6, 0], [6, 0, 1, 0, 0, 0, 4, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0]] \$

[y₁, 0, y₂, 0, y₃, y₄, y₅, 0, 0, y₆, y₇, y₈]

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 0, 2], [0, 3, 1, 0, 0, 0, 2, 3, 2, 1, 0, 4], [0, 1, 0, 0, 0, 0, 0, 4, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 0, 1, 5, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$$

$$[0, y_1, y_2, 4y_2 - 2y_3, 0, 2y_2 - y_3, y_3, y_6, y_4, y_5, 0, y_7]$$

$$p = -s^6 + s^8 \quad p' = -s^6 + s^8$$

43 . Coloring, $\{5, 9\}$

R: [7, 7, 7, 6, 3, A, B, C, C, C, 1, 5]

B: [6, 8, 8, 7, A, 3, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 2, 4], [2, 0, 2, 0, 4, 0, 3, 0, 0, 1, 3, 1], [3, 0, 4, 0, 1, 0, 4, 0, 0, 0, 3, 1], [3, 0, 1, 0, 1, 0, 7, 0, 0, 0, 4, 0], [4, 0, 1, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0]] \$$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, 0, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 2, 0], [0, 3, 1, 2, 0, 0, 2, 3, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 2, 4, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 4, 1, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 3, 2, 0, 4, 1, 0], [0, 4, 0, 1, 0, 0, 4, 2, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 1, 4, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 3, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 2, 4, 0, 2, 3, 0]] \$$

$$[0, y_1, y_2, y_3, 0, y_4, y_5, y_6, 2y_4, y_8, y_7, 0]$$

$$p = -s^3 + s^9$$

44 . Coloring, {5, 10}

$$\Omega p(\Delta)=0: p = -6s^2 + 5s^3 - 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, B, C, B, 2, 1, 5]

B: [6, 8, 8, 7, A, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 3, 1], [3, 1, 2, 0, 1, 0, 5, 0, 0, 1, 3, 0], [3, 1, 1, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 0, 5, 0, 0, 0, 0], [5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[y_1, y_5, y_4, 0, -y_5 + y_4 + 3y_6, y_6, y_3, 0, 0, -y_5 + y_4 + 2y_6, y_2, y_6]$$

$$p' = -s^5 + s^8 \quad p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 1, 3], [0, 0, 1, 1, 0, 0, 2, 1, 3, 1, 2, 5], [0, 0, 0, 2, 0, 0, 1, 1, 5, 2, 1, 4], [0, 0, 0, 1, 0, 0, 2, 0, 4, 1, 1, 7], [0, 0, 0, 1, 0, 0, 1, 0, 7, 2, 0, 5], [0, 0, 0, 0, 0, 0, 1, 0, 5, 1, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 1, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

45 . Coloring, {5, 11}

$$\Omega p(\Delta)=0: \quad p = 6s^2 + 5s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, B, C, B, C, 4, 5]

B: [6, 8, 8, 7, A, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{3, 4, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 1, 0, 0, 1, 3, 1], [0, 0, 3, 3, 1, 3, 2, 0, 0, 2, 1, 1], [0, 0, 1, 1, 1, 3, 3, 0, 0, 3, 2, 2], [0, 0, 1, 2, 2, 1, 1, 0, 0, 3, 3, 3], [0, 0, 2, 3, 3, 2, 1, 0, 0, 1, 1, 3], [0, 0, 3, 1, 3, 3, 2, 0, 0, 2, 1, 1], [0, 0, 3, 1, 1, 1, 3, 0, 0, 3, 2, 2]] \$

$$[0, 0, y_1 + y_2 - y_3 + y_4 + y_5 - y_6 - y_7, y_1, y_2, y_3, y_4, 0, 0, y_5, y_6, y_7]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 1, 1], [1, 3, 1, 0, 0, 2, 0, 3, 1, 1, 2, 2], [2, 1, 2, 0, 0, 1, 0, 4, 2, 0, 3, 1], [3, 0, 1, 0, 0, 2, 0, 3, 1, 0, 4, 2], [4, 0, 2, 0, 0, 3, 0, 1, 2, 0, 3, 1], [3, 0, 3, 0, 0, 4, 0, 2, 1, 0, 1, 2], [1, 0, 4, 0, 0, 3, 0, 3, 2, 0, 2, 1], [2, 0, 3, 0, 0, 1, 0, 4, 1, 0, 3, 2], [3, 0, 1, 0, 0, 2, 0, 3, 2, 0, 4, 1], [4, 0, 2, 0, 0, 3, 0, 1, 1, 0, 3, 2]] \$

$$[-3y_1 - 3y_2 - 3y_3 - 3y_4 - 3y_5 + 13y_6 - 3y_7 - 3y_8 + 13y_9, 3y_1, 3y_2, 0, 0, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8, 3y_9]$$

$$p = -s^4 - s^5 + s^9 + s^{10}$$

46 . Coloring, {5, 12}

$$\Omega p(\Delta)=0: \quad p = 9s^3 + 2s^4 + 16s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, B, C, B, C, 1, 9]

B: [6, 8, 8, 8, 7, A, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 1, 5, 1], [5, 0, 0, 0, 0, 0, 3, 0, 1, 0, 6, 1], [6, 0, 0, 0, 0, 5, 0, 1, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 0, 0], [6, 0, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[y_1, 0, y_2, 0, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 1, 1], [0, 3, 1, 1, 1, 0, 2, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 1, 4, 0, 3, 3, 0], [0, 3, 0, 3, 0, 0, 2, 3, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 3, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 4, 1, 0, 3, 3, 0], [0, 3, 0, 3, 0, 0, 3, 2, 0, 4, 1, 0], [0, 4, 0, 1, 0, 0, 3, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 1, 4, 0, 3, 3, 0], [0, 3, 0, 3, 0, 0, 2, 3, 0, 1, 4, 0]] \$

$$[0, y_3, y_2, y_1, y_2 + y_8, y_8, y_7, y_6, 0, y_5, y_4, y_8]$$

$$p' = -s^3 + s^9 \quad p = -s^3 + s^9$$

47 . Coloring, {6, 7}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, A, C, B, C, 1, 5]

B: [6, 8, 8, 8, 7, 3, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	6 vs 8	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 1, 3], [1, 0, 1, 0, 3, 0, 3, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 0, 2, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$

$$[y_1 + y_6, 0, y_1, 0, y_2, y_6, y_3, 0, 0, y_4, y_6, y_5]$$

$$p' = s^4 - s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 2, 3, 1, 1, 3, 2], [0, 1, 0, 3, 0, 0, 3, 1, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 3, 1, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2]] \$$

$$[0, 3y_1, 3y_2, -3y_1 - 6y_2 - 3y_3 - 3y_4 + 13y_5 - 3y_7 - 3y_8 + 13y_6, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_7, 3y_8, 3y_6]$$

$$p' = s^5 + s^6 - s^8 - s^9 \quad p = s^5 - s^7 - s^8 + s^{10}$$

Â» SYNC'D !RANK'D

48 . Coloring, {6, 8}

R: [7, 7, 7, 6, A, 3, B, B, B, C, 1, 5]

B: [6, 8, 8, 7, 3, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3
See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 4, 2], [4, 0, 1, 0, 2, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 5, 0, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 5, 2], [5, 0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 5, 0, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 5, 2], [5, 0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 1]] \$$

$[-3 y_1 - 7 y_2 + 14 y_3 + 8 y_5, 0, 3 y_1, 0, -5 y_2 + 7 y_3 + 7 y_5, -7 y_2 + 8 y_3 - 3 y_4 + 14 y_5, 3 y_2, 0, 0, 3 y_3, 3 y_4, 3 y_5]$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6
See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 2, 3, 2, 2, 0, 4], [0, 2, 0, 0, 0, 0, 0, 3, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$[0, y_1, y_2, 2 y_2, 0, y_2, y_7, y_3, y_4, y_5, 0, y_6]$

$$p' = s^6 - s^8 \quad p = s^6 - s^8$$

49. Coloring, $\{6, 9\}$

R: $[7, 7, 7, 6, A, 3, B, C, C, C, 1, 5]$

B: $[6, 8, 8, 7, 3, A, A, B, B, 2, 4, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 2, 4] , [2, 0, 1, 0, 4, 0, 3, 0, 0, 2, 3, 1] , [3, 0, 0, 0, 1, 0, 3, 0, 0, 4, 3, 2] , [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 3, 4] , [3, 0, 0, 0, 4, 0, 3, 0, 0, 2, 3, 1] , [3, 0, 0, 0, 1, 0, 3, 0, 0, 4, 3, 2] , [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 3, 4] , [3, 0, 0, 0, 4, 0, 3, 0, 0, 2, 3, 1]] \$

$$[-3y_1 + 3y_2, 0, 3y_1, 0, 7y_2 - 3y_5 - 3y_4, 3y_2 - 3y_3, 3y_2, 0, 0, 3y_5, 3y_3, 3y_4]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 2, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 3, 2, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 4, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 2, 3, 0, 2, 3, 0]] \$

$$[0, y_1, y_4, y_3, 0, y_4, y_2, y_6, 2y_4, y_5, y_7, 0]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

50 . Coloring, {6, 10}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 7s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, B, C, B, 2, 1, 5]

B: [6, 8, 8, 7, 3, A, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 0, 5, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 5, 0, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_1, y_4, y_5, 0, y_5 + y_7, y_7, y_2, 0, 0, y_3, y_6, y_7]$$

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 1, 3], [0, 0, 0, 1, 0, 0, 2, 1, 3, 2, 2, 5], [0, 0, 0, 2, 0, 0, 1, 0, 5, 2, 1, 5], [0, 0, \\ & 0, 1, 0, 0, 2, 0, 5, 1, 0, 7], [0, 0, 0, 0, 0, 0, 1, 0, 7, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9], [0, 0, 0, 0, 0, 0, \\ & 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$ \end{aligned}$$

$$[0, 0, y_2, y_1, 0, y_2, y_3, y_4, y_5, y_8, y_6, y_7]$$

$$p = -s^7 + s^9$$

51 . Coloring, {6, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 7s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, B, C, B, C, 4, 5]

B: [6, 8, 8, 7, 3, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 10

Omega Rank for R : cycles: {{5, 10, 12}, {3, 4, 6, 7, 11}}

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 3, 3], [0, 0, 1, 3, 3, 2, 1, 0, 0, 2, 3, 1], [0, 0, 2, 3, 1, 3, 1, 0, 0, 3, 1, 2], [0, 0, \\ & 3, 1, 2, 3, 2, 0, 0, 1, 1, 3], [0, 0, 3, 1, 3, 1, 3, 0, 0, 2, 2, 1], [0, 0, 1, 2, 1, 1, 3, 0, 0, 3, 3, 2], [0, 0, 1, 3, 2, 2, \\ & 1, 0, 0, 1, 3, 3], [0, 0, 2, 3, 3, 3, 1, 0, 0, 2, 1, 1]] \$ \end{aligned}$$

$$[0, 0, -3y_3 + 5y_4 - 3y_5 - 3y_6 + 5y_1 - 3y_2 + 5y_7, 3y_3, 3y_4, 3y_5, 3y_6, 0, 0, 3y_1, 3y_2, 3y_7]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 1, 0, 3, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 0, 2, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 3, 0, 2, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 3, 0, 1, 1, 3, 2, 2] , [2, 3, 0, 0, 0, 2, 0, 2, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 1, 0, 3, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 0, 2, 1, 1, 3, 2]] \$

$[-3y_3 + 8y_4 - 3y_5 + 5y_7, -6y_2 - 3y_1 + 5y_4 - 3y_6 + 8y_7, 3y_2, 0, 0, 3y_1, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8 \quad p'' = -s^3 + s^9$$

52 . Coloring, {6, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, 3, B, C, B, C, 1, 9]

B: [6, 8, 8, 7, 3, A, A, B, C, 2, 4, 5]

' See graph

' ' See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	6 vs 8	9 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 3, 3] , [3, 0, 1, 0, 0, 0, 3, 0, 3, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 6, 0] , [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$[y_6, 0, y_5, 0, 0, y_4, y_3, 0, y_2, y_4, y_1, y_5 + 2y_4]$

$$p' = -s^4 + s^7 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 0, 2, 3, 0, 2, 2, 0] , [0, 2, 1, 2, 0, 0, 1, 5, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 2, 3, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 3, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 5, 1, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 3, 2, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 2, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 1, 5, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 2, 3, 0, 1, 5, 0]] \$

$[0, y_1, y_2, y_3, y_4, y_9, y_5, y_6, 0, y_7, y_8, y_9]$

$$p = -s^4 + s^{10}$$

Â» SYNC'D !RANK'D

53 . Coloring, {7, 8}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, A, B, B, C, 1, 5]

B: [6, 8, 8, 7, 3, 3, B, C, C, 2, 4, 9]

' See graph

' ' See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

$[y_1, 0, 0, 0, y_2, y_3, y_4, 0, 0, y_5, 2y_3, y_6]$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 0, 2, 2] , [0, 0, 1, 2, 0, 0, 2, 4, 2, 0, 1, 4] , [0, 0, 0, 1, 0, 0, 2, 1, 4, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 1, 0, 6, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 1, 6] , [0, 0, 0, 1, 0, 0, 2, 0, 6, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 1, 5] , [0, 0, 0, 1, 0, 0, 2, 0, 5, 0, 2, 6]] \$

$$[0, 10 y_2, 11 y_1 - 15 y_2 + 11 y_4 - 5 y_3 - 5 y_5 + 11 y_6 - 5 y_7, 5 y_1, 0, 5 y_2, 5 y_4, 5 y_3, 5 y_5, 0, 5 y_6, 5 y_7]$$

$$p = -s^4 + s^6 + s^7 - s^9 \quad p' = -s^4 - s^5 + s^7 + s^8$$

54. Coloring, {7, 9}

$$\Omega p(\Delta)=0: \quad p = 3s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, A, C, C, C, 1, 5]

B: [6, 8, 8, 7, 3, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	5 vs 6	6 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$$$

$$[2 y_3, 0, 0, 0, y_1, y_3, y_2, 0, 0, y_5, 0, y_4]$$

$$p = -s^3 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 0, 4, 0], [0, 0, 1, 4, 0, 0, 2, 4, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 1, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[0, 2 y_3, y_1, y_2, 0, y_3, y_4, y_5, 2 y_3, 0, y_6, 0]$$

$$p' = s^4 - s^7 \quad p = -s^4 + s^7$$

Â» SYNC'D !RANK'D

55 . Coloring, {7, 10}

R: [7, 7, 7, 6, A, A, A, C, B, 2, 1, 5]

B: [6, 8, 8, 7, 3, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, 0, 0, y_1, y_5, y_3, 0, 0, y_4, y_5, y_5]$$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 0, 3, 3] , [0, 0, 1, 3, 0, 0, 2, 2, 3, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 1, 2, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 4, 0, 3, 0, 3, 2]] \$

$$[0, 0, -5y_1 - 5y_2 - 5y_3 - 5y_4 + 11y_5 - 5y_6 + 11y_7, 5y_1, 0, 5y_2, 5y_3, 5y_4, 5y_5, 0, 5y_6, 5y_7]$$

$$p = s^4 + s^5 - s^7 - s^8$$

56 . Coloring, {7, 11}

R: [7, 7, 7, 6, A, A, A, C, B, C, 4, 5]

B: [6, 8, 8, 7, 3, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 4, 1, 3], [0, 0, 0, 1, 3, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$

$$[0, 0, 0, y_1, y_2, y_3, 3 y_5, 0, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{1, 3, 6, 8, 11\}\}$ order: 10

See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 0, 3, 1], [3, 0, 1, 0, 0, 2, 0, 4, 1, 0, 3, 2], [3, 0, 2, 0, 0, 3, 0, 1, 2, 0, 4, 1], [4, 0, 3, 0, 0, 3, 0, 2, 1, 0, 1, 2], [1, 0, 3, 0, 0, 4, 0, 3, 2, 0, 2, 1], [2, 0, 4, 0, 0, 1, 0, 3, 1, 0, 3, 2], [3, 0, 1, 0, 0, 2, 0, 4, 2, 0, 3, 1], [3, 0, 2, 0, 0, 3, 0, 1, 1, 0, 4, 2], [4, 0, 3, 0, 0, 3, 0, 2, 2, 0, 1, 1]] \$$

$$[-3 y_1 - 3 y_5 - 9 y_6 - 3 y_2 + 13 y_3 - 3 y_4 + 13 y_7, 6 y_6, 3 y_1, 0, 0, 3 y_5, 3 y_6, 3 y_2, 3 y_3, 0, 3 y_4, 3 y_7]$$

$$p' = -s^2 - s^3 + s^7 + s^8 \quad p = -s^2 - s^3 + s^7 + s^8$$

57 . Coloring, $\{7, 12\}$

R: [7, 7, 7, 6, A, A, A, C, B, C, 1, 9]

B: [6, 8, 8, 7, 3, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	7 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 4, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 0, 4, 2, 3, 4] , [3, 0, 0, 0, 0, 2, 0, 4, 1, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 2, 4, 1] , [4, 0, 0, 0, 0, 0, 4, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 4, 0, 2, 4, 1, 3]] \$

$$[y_1 + y_2 - y_3 - y_4 + y_5 + y_6, 0, 0, 0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 0, 3, 1] , [0, 0, 3, 3, 1, 0, 2, 4, 0, 0, 3, 0] , [0, 0, 1, 3, 0, 0, 3, 3, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[0, 2y_7, y_1, y_2, y_3, y_7, y_4, y_5, 0, 0, y_6, y_7]$$

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

58 . Coloring, {8, 9}

R: [7, 7, 7, 6, A, A, B, B, C, C, 1, 5]

B: [6, 8, 8, 7, 3, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	10 vs 10

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3]] \$

$$[y_4, 0, 0, 0, y_3, y_2, y_1, 0, 0, y_4, y_3 + y_2, y_1]$$

$$p' = s^3 - s^6 \quad p' = s^2 - s^5 \quad p = s^2 - s^5$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 2, 1, 1], [0, 2, 1, 1, 0, 0, 2, 4, 1, 1, 2, 2], [0, 1, 0, 2, 0, 0, 1, 3, 2, 2, 1, 4], [0, 2, 0, 1, 0, 0, 2, 1, 4, 1, 2, 3], [0, 1, 0, 2, 0, 0, 1, 2, 3, 2, 4, 1], [0, 2, 0, 4, 0, 0, 2, 1, 1, 1, 3, 2], [0, 1, 0, 3, 0, 0, 4, 2, 2, 2, 1, 1], [0, 2, 0, 1, 0, 0, 3, 1, 1, 4, 2, 2], [0, 4, 0, 2, 0, 0, 1, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 2, 4, 1, 1, 2, 2]] \$$$

$$[0, y_1, y_4, y_3, 0, y_2, y_8, y_7, y_6, y_5, y_{10}, y_9]$$

59 . Coloring, {8, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, B, B, B, 2, 1, 5]

B: [6, 8, 8, 7, 3, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 4, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$$

$$[y_1, y_2, 0, 0, 2y_3, y_3, y_4, 0, 0, y_5, y_6, 0]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 2, 0, 4] , [0, 0, 1, 0, 0, 0, 2, 2, 4, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 1, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, 0, y_1, 2y_2, 0, y_2, 2y_1 - 3y_2, y_3, y_5, -3y_1 + 4y_2 + 2y_3, 0, y_4]$$

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6 \quad p = -s^4 + s^8$$

60 . Coloring, {8, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, A, B, B, B, C, 4, 5]

B: [6, 8, 8, 7, 3, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 7	6 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 2, 0, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 4, 0, 0, 0, 4, 0, 3] , [0, 0, 0, 3, 3, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

$$[0, 0, 0, y_7, y_6, y_5, y_4, 0, 0, y_3, y_2, y_1]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 2, 0, 2] , [0, 2, 1, 0, 0, 2, 0, 4, 2, 1, 0, 4] , [0, 1, 2, 0, 0, 0, 0, 3, 4, 0, 0, 6] , [0, 0, 0, 0, 0, 3, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[2y_5, y_1, 2y_1 + 4y_5 - 3y_3, 0, 0, -3y_5 + 2y_3, y_5, y_6, y_4, y_3, 0, y_2]$$

$$p = -s^5 + s^9 \quad p' = -s^5 + s^7 \quad p = -s^5 + s^7$$

61 . Coloring, {8, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 3s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, B, B, B, C, 1, 9]

B: [6, 8, 8, 7, 3, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 7	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 2, 4, 2], [4, 0, 0, 0, 0, 0, 2, 0, 2, 1, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 5, 0, 1, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$$

$$[y_1, 0, 0, 0, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 2, 4, 0, 1, 0, 2], [0, 1, 2, 0, 2, 0, 0, 5, 0, 2, 0, 4], [0, 2, 2, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3]] \$$$

$$[0, y_1, y_2, 2y_4, y_3, y_4, y_5, y_6, 0, y_8, 0, y_7]$$

$$p = -s^5 + s^9$$

62 . Coloring, {9, 10}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, A, B, C, C, 2, 1, 5]

B: [6, 8, 8, 7, 3, 3, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 0, 4, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 4, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[y_1, y_2, 0, 0, y_4, y_3, y_5, 0, 0, y_7, y_6, 2y_3]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 2, 2, 2] , [0, 0, 1, 2, 0, 0, 2, 2, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 1, 2, 2, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 4, 1, 2] , [0, 0, 0, 1, 0, 0, 3, 0, 2, 4, 2, 4] , [0, 0, 0, 2, 0, 0, 1, 0, 4, 3, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 1, 4, 3] , [0, 0, 0, 4, 0, 0, 2, 0, 3, 2, 4, 1]] \$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

63 . Coloring, {9, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, A, B, C, C, C, 4, 5]

B: [6, 8, 8, 7, 3, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 2, 2, 4] , [0, 0, 0, 2, 4, 2, 0, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 2, 0, 0, 0, 6, 0, 3] , [0, 0, 0, 0, 3, 3, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 0, 4, 0, 6]] \$

[0, 0, 0, $y_1, y_2, y_3, y_4, 0, 0, y_7, y_5, y_6$]

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5
See Matrix

\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 2, 2, 0] , [2, 2, 1, 0, 0, 2, 0, 4, 0, 1, 4, 0] , [4, 1, 2, 0, 0, 2, 0, 3, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 0, 3, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0]] \$

[$y_1, y_2, y_3, 0, 0, y_4, y_5, y_7, 2y_5, y_8, y_6, 0$]

$$p = -s^4 + s^9$$

64 . Coloring, {9, 12}

$$\Omega p(\Delta)=0: \quad p = 6s^2 - s^3 - 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, A, B, C, C, C, 1, 9]

B: [6, 8, 8, 7, 3, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 2, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 1, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 5] , [2, 0, 0, 0, 0, 0, 3, 0, 5, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 5] , [3, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 5]] \$$

$$[7y_5, 0, 0, 0, 0, 9y_5 + 9y_6 - 7y_1 - 7y_2 + 9y_3 - 7y_4, 7y_6, 0, 7y_1, 7y_2, 7y_3, 7y_4]$$

$$p = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 2, 2, 0] , [0, 2, 3, 2, 0, 0, 2, 4, 0, 1, 2, 0] , [0, 1, 0, 2, 0, 0, 2, 5, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 2, 1, 0, 2, 5, 0] , [0, 2, 0, 5, 0, 0, 4, 2, 0, 2, 1, 0] , [0, 2, 0, 1, 0, 0, 5, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 1, 2, 0, 5, 2, 0] , [0, 5, 0, 2, 0, 0, 2, 4, 0, 1, 2, 0] , [0, 1, 0, 2, 0, 0, 2, 5, 0, 2, 4, 0]] \$$

$$[0, y_1, y_2, y_5, 2y_4, y_4, y_3, y_8, 0, y_7, y_6, 0]$$

$$p = -s^3 + s^9$$

65 . Coloring, $\{10, 11\}$

$$\Omega p(\Delta)=0: p = s^2 + 3s^3 - 6s^4 + 8s^5 - 24s^6 + 32s^7 - 32s^8$$

R: [7, 7, 7, 6, A, A, B, C, B, 2, 4, 5]

B: [6, 8, 8, 7, 3, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 6, 7, 10, 11\}\}$ order: 6
See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 2, 2, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 3, 2, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 3, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 2, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 2, 0, 0, 3, 3, 0]] \$$

$$[0, y_1 - y_2 - y_6 + y_7 + y_3 - y_4 + y_5, 0, y_1, y_2, y_6, y_7, 0, 0, y_3, y_4, y_5]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

$$\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 2, 1, 3], [1, 0, 1, 0, 0, 2, 0, 2, 3, 1, 2, 4], [2, 0, 2, 0, 0, 1, 0, 1, 4, 0, 2, 4], [2, 0, 1, 0, 0, 2, 0, 2, 4, 0, 1, 4], [1, 0, 2, 0, 0, 2, 0, 1, 4, 0, 2, 4], [2, 0, 2, 0, 0, 1, 0, 2, 4, 0, 1, 4], [1, 0, 1, 0, 0, 2, 0, 2, 4, 0, 2, 4], [2, 0, 2, 0, 0, 1, 0, 1, 4, 0, 2, 4], [2, 0, 1, 0, 0, 2, 0, 2, 4, 0, 1, 4]] \$$$

$$[-y_1 - y_2 + 2y_4 + 2y_5 - y_3 - y_6, 0, y_1, 0, 0, y_2, y_4 + y_5 - y_7, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

M \; N

$$\$ [[0, 0, 0, 0, 0, 0, 1164, 0, 1260, 1812, 0, 1472], [0, 0, 0, 956, 0, 0, 2328, 0, 0, 1539, 0, 885], [0, 0, 0, 0, 0, 0, 1212, 0, 1284, 1305, 0, 1907], [0, 956, 0, 0, 1260, 1164, 0, 0, 0, 2328, 0], [0, 0, 0, 1260, 0, 0, 2132, 0, 0, 1284, 0, 1032], [0, 0, 0, 1164, 0, 0, 478, 0, 736, 1794, 0, 1536], [1164, 2328, 1212, 0, 2132, 478, 0, 478, 0, 0, 3624, 0], [0, 0, 0, 0, 0, 0, 478, 0, 1396, 1770, 0, 2064], [1260, 0, 1284, 0, 0, 736, 0, 1396, 0, 0, 1032, 0], [1812, 1539, 1305, 0, 1284, 1794, 0, 1770, 0, 0, 1912, 0], [0, 0, 0, 2328, 0, 0, 3624, 0, 1032, 1912, 0, 2520], [1472, 885, 1907, 0, 1032, 1536, 0, 2064, 0, 0, 2520, 0]] \$ \quad \$ [[0, 0, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1], [0, 0, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1], [0, 0, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1], [1, 1, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0], [0, 0, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1], [0, 0, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1], [1, 1, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0], [0, 0, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1], [1, 1, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0], [1, 1, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0], [0, 0, 0, 1, 0, 0, 1, 0, 1, 0, 1, 0], [1, 1, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0], [1, 1, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0]] \$$$

$$\tau = 74, r' = 1/2$$

R: [7, 7, 7, 6, A, A, B, C, B, 2, 4, 5]

B: [6, 8, 8, 7, 3, 3, A, B, C, C, 1, 9]

Ranges

Action of R on ranges, [[24], [24], [6], [16], [19], [24], [6], [16], [24], [24], [6], [16], [21], [21], [14], [29], [7], [17], [29], [29], [7], [17], [30], [15], [30], [8], [18], [15], [5], [13]]

Action of B on ranges, [[21], [22], [22], [20], [23], [26], [27], [25], [26], [27], [27], [25], [9], [9], [1], [11], [12], [10], [11], [12], [12], [10], [29], [3], [30], [30], [28], [4], [4], [2]]

Cycles: R, {{2, 4, 6, 7, 10, 11}}, B, {{9, 12}, {1, 3, 6, 8, 11}}

$$\beta(\{1, 7\}) = 291/11416$$

$$\beta(\{1, 9\}) = 315/11416$$

$$\beta(\{1, 10\}) = 453/11416$$

$$\beta(\{1, 12\}) = 46/1427$$

$$\beta(\{2, 4\}) = 239/11416$$

$\beta(\{2, 7\}) = 291/5708$
 $\beta(\{2, 10\}) = 1539/45664$
 $\beta(\{2, 12\}) = 885/45664$
 $\beta(\{3, 7\}) = 303/11416$
 $\beta(\{3, 9\}) = 321/11416$
 $\beta(\{3, 10\}) = 1305/45664$
 $\beta(\{3, 12\}) = 1907/45664$
 $\beta(\{4, 5\}) = 315/11416$
 $\beta(\{4, 6\}) = 291/11416$
 $\beta(\{4, 11\}) = 291/5708$
 $\beta(\{5, 7\}) = 533/11416$
 $\beta(\{5, 10\}) = 321/11416$
 $\beta(\{5, 12\}) = 129/5708$
 $\beta(\{6, 7\}) = 239/22832$
 $\beta(\{6, 9\}) = 23/1427$
 $\beta(\{6, 10\}) = 897/22832$
 $\beta(\{6, 12\}) = 48/1427$
 $\beta(\{7, 8\}) = 239/22832$
 $\beta(\{7, 11\}) = 453/5708$
 $\beta(\{8, 9\}) = 349/11416$
 $\beta(\{8, 10\}) = 885/22832$
 $\beta(\{8, 12\}) = 129/2854$
 $\beta(\{9, 11\}) = 129/5708$
 $\beta(\{10, 11\}) = 239/5708$
 $\beta(\{11, 12\}) = 315/5708$

Partitions

$\alpha(\{\{1, 2, 3, 5, 6, 8, 11\}, \{4, 7, 9, 10, 12\}\}) = 1/1$

$b_1 = \{1, 2, 3, 5, 6, 8, 11\}$, , $b_2 = \{4, 7, 9, 10, 12\}$

Action of R and B on the blocks of the partitions: = [2, 1] [1, 2]
with invariant measure [1, 1]

N by blocks, check: true . ‘ See partition graph.

‘ ‘ See level-2 partition graph.

‘

\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 0, 2, 2, 0, 1, 2, 2] , [0, 0, 3, 2, 2, 0, 1, 3, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 0, 2, 3, 0, 1, 3, 2] , [0, 0, 1, 3, 2, 0, 2, 2, 0, 2, 3, 1] , [0, 0, 2, 3, 1, 0, 3, 1, 0, 2, 2, 2] , [0, 0, 1, 2, 2, 0, 3, 2, 0, 3, 1, 2] , [0, 0, 2, 1, 2, 0, 2, 1, 0, 3, 2, 3] , [0, 0, 2, 2, 3, 0, 1, 2, 0, 2, 1, 3]] \$

[0, 0, y₁, y₂, y₄, y₃, y₇, y₈, 0, y₆, y₅, y₉]

67 . Coloring, {11, 12}

R: [7, 7, 7, 6, A, A, B, C, B, C, 4, 9]

B: [6, 8, 8, 7, 3, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	8 vs 10

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 5, 2] , [0, 0, 0, 5, 0, 3, 0, 0, 2, 2, 3, 1] , [0, 0, 0, 3, 0, 5, 0, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 3, 0, 0, 2, 5, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 2, 5] , [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 3, 3]] \$

[0, 0, 0, y₁, 0, y₂, y₇, 0, y₃, y₄, y₅, y₆]

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5
See Matrix

\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 2, 1, 1] , [1, 2, 3, 0, 1, 2, 0, 4, 0, 1, 2, 0] , [2, 1, 3, 0, 0, 1, 0, 5, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 0, 4, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 1, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 5, 0, 2, 0, 0, 1, 0] , [1, 0, 5, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 1, 0, 5, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 0, 4, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 1, 0, 0, 4, 0]] \$

[y₁, y₂, y₃, 0, y₆, y₄, y₈, y₅, 0, y₆, y₇, y₈]

$$p = -s^4 + s^9 \quad p' = -s^4 + s^9$$

68 . Coloring, {2, 3, 4}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, A, B, C, B, C, 1, 5]

B: [6, 7, 7, 6, 3, 3, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 0, 2, 2, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 3, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 2, 0, 0, 4, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 3, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 2, 0, 0, 4, 3, 3]] \$$$

$$[2 y_1, 0, 0, 0, 2 y_2, 0, -7 y_1 + 3 y_2 + 4 y_4, -27 y_1 + 7 y_2 - 2 y_3 + 16 y_4, 0, 2 y_3, -16 y_1 + 4 y_2 + 10 y_4, 2 y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 2, 2, 0, 2, 2, 1, 1], [0, 2, 2, 1, 0, 2, 4, 0, 1, 2, 0, 2], [0, 2, 2, 0, 0, 1, 4, 0, 2, 4, 0, 1], [0, 4, 1, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1]] \$$$

$$[0, -3 y_1 - 3 y_2 - 3 y_3 - 3 y_4 + 13 y_5 - 3 y_6 - 3 y_7 + 13 y_8, 3 y_1, 3 y_2, 0, 3 y_3, 3 y_4, 0, 3 y_5, 3 y_6, 3 y_7, 3 y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

69 . Coloring, {2, 3, 5}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, B, C, B, C, 1, 5]

B: [6, 7, 7, 7, A, 3, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}, {1, 7, 11}} order: 12

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 3, 3], [3, 0, 2, 0, 3, 0, 2, 1, 0, 1, 1, 3], [1, 0, 3, 0, 3, 0, 3, 2, 0, 0, 2, 2], [2, 0, 3, 0, 2, 0, 1, 3, 0, 0, 3, 2], [3, 0, 2, 0, 2, 0, 2, 3, 0, 0, 1, 3], [1, 0, 2, 0, 3, 0, 3, 2, 0, 0, 2, 3], [2, 0, 3, 0, 3, 0, 1, 2, 0, 0, 3, 2], [3, 0, 3, 0, 2, 0, 2, 3, 0, 0, 1, 2], [1, 0, 2, 0, 2, 0, 3, 3, 0, 0, 2, 3]] \$

[6 y₁ - 5 y₃ + 6 y₄ + 6 y₅ - 5 y₆, 0, 5 y₁ - 5 y₂ + 5 y₄ + 5 y₅ - 5 y₇, 0, 5 y₁, 5 y₂, 5 y₃, 5 y₄, 0, 5 y₅, 5 y₆, 5 y₇]

$$p = -s^3 - s^5 + s^6 + s^8 \quad p' = -s^3 - s^5 + s^6 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 1, 1], [0, 3, 1, 1, 0, 0, 5, 0, 1, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 3, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 5, 0, 2, 3, 0, 1], [0, 3, 0, 0, 0, 0, 5, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 3, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 5, 0, 1, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 5, 0, 1]] \$

[0, -6 y₁ - 3 y₅ + 13 y₂ - 3 y₃ - 3 y₄ + 13 y₆, 3 y₁ - 3 y₄, 3 y₁, 0, 3 y₄, 3 y₅, 0, 3 y₂, 3 y₃, 3 y₄, 3 y₆]

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = -s^3 + s^9 \quad p = s^3 - s^5 - s^6 + s^8$$

70 . Coloring, {2, 3, 6}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, B, C, B, C, 1, 5]

B: [6, 7, 7, 7, 3, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 3, 3], [3, 0, 1, 0, 3, 0, 2, 1, 0, 2, 1, 3], [1, 0, 0, 0, 3, 0, 3, 1, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 1, 0, 0, 3, 3, 4], [3, 0, 0, 0, 4, 0, 2, 0, 0, 3, 1, 3], [1, 0, 0, 0, 3, 0, 3, 0, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 1, 0, 0, 3, 3, 4], [3, 0, 0, 0, 4, 0, 2, 0, 0, 3, 1, 3], [1, 0, 0, 0, 3, 0, 3, 0, 0, 4, 2, 3]] \$$

$[5y_5 + 6y_2 - 8y_3 - 8y_1 + 5y_6, 0, -y_4 + 4y_5 + 5y_2 - 6y_3 - 6y_1 + 4y_6, 0, y_4, y_5, y_2, y_3, 0, y_1, -2y_5 - 4y_2 + 5y_3 + 5y_1 - 2y_6, y_6]$

$$p = s^4 - s^7 \quad p' = s^4 - s^7 \quad p'' = s^5 - s^8$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1]] \$$

$[0, -3y_1 - 3y_6 + 13y_3 - 3y_4 - 9y_5 + 13y_2, 3y_5, 3y_1, 0, 3y_5, 3y_6, 0, 3y_3, 3y_4, 3y_5, 3y_2]$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p' = -s^3 + s^9 \quad p'' = s^3 - s^5 - s^6 + s^8$$

71 . Coloring, $\{2, 3, 7\}$

R: [7, 8, 8, 6, A, A, A, C, B, C, 1, 5]

B: [6, 7, 7, 7, 3, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 0, 2, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 1, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$

$$[y_1, 0, 0, 0, y_2, y_5, y_3, 2y_5, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 0, 3, 1] , [0, 0, 1, 3, 0, 0, 6, 0, 1, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 3, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 6, 0, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 4, 0, 1, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 3, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 6, 0, 1, 0, 3, 2]] \$

$$[0, 6y_2, -3y_1 - 9y_2 - 3y_3 + 13y_4 - 3y_5 + 13y_6, 3y_1, 0, 3y_2, 3y_3, 0, 3y_4, 0, 3y_5, 3y_6]$$

$$p' = s^3 + s^4 - s^6 - s^7 \quad p = s^3 + s^4 - s^6 - s^7$$

72 . Coloring, {2, 3, 8}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, B, B, B, C, 1, 5]

B: [6, 7, 7, 7, 3, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	4 vs 8	5 vs 8

Omega Rank for R : cycles: {{5, 10, 12}, {1, 7, 11}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2]] \$

$[y_4, 0, 0, 0, y_3, -10y_4 - 7y_3 + 3y_2 + 16y_1, y_2, -20y_4 - 14y_3 + 6y_2 + 32y_1, 0, y_1, -8y_4 - 4y_3 + 2y_2 + 13y_1, -11y_4 - 8y_3 + 4y_2 + 18y_1]$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^8 \quad p'' = -s^2 + s^5 \quad p''' = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 2, 0, 2] , [0, 2, 1, 0, 0, 0, 6, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 3, 0, 2, 6, 0, 2] , [0, 6, 0, 0, 0, 0, 3, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 6, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 3, 0, 2, 6, 0, 2] , [0, 6, 0, 0, 0, 0, 3, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 6, 0, 2, 3, 0, 2]] \$

$$[0, -y_1 - 3y_3 - y_2 + 6y_5 - y_4, y_1, 2y_3, 0, y_3, y_2, 0, y_5, y_4, 0, y_5]$$

$$p' = s^4 - s^7 \quad p = -s^3 + s^6 \quad p'' = s^3 - s^6$$

Â» SYNC'D !RANK'D

73 . Coloring, {2, 3, 9}

$$\Omega p(\Delta)=0: \quad p = 6s^2 + 5s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, B, C, C, C, 1, 5]

B: [6, 7, 7, 7, 3, 3, A, B, B, 2, 4, 9]

' See graph

' ' See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 8	6 vs 8

Omega Rank for R : cycles: {{5, 10, 12}, {1, 7, 11}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 2, 2, 4] , [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 1, 4] , [1, 0, 0, 0, 4, 0, 2, 0, 0, 4, 2, 3] , [2, 0, 0, 0, 3, 0, 1, 0, 0, 4, 2, 4] , [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 1, 4] , [1, 0, 0, 0, 4, 0, 2, 0, 0, 4, 2, 3] , [2, 0, 0, 0, 3, 0, 1, 0, 0, 4, 2, 4] , [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 1, 4]] \$

$[-4y_1 - 2y_2 + 2y_3 + 2y_4, 0, 0, 0, 16y_1 + 9y_2 - 11y_3 - 2y_4, 2y_1, 14y_1 + 7y_2 - 9y_3 - 2y_4, 4y_1, 0, 2y_2, 2y_3, 2y_4]$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p = -s^2 + s^8 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 2, 2, 0] , [0, 2, 1, 2, 0, 0, 6, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$[0, y_1, y_2, y_3, 0, y_6, y_4, 0, 2y_6, y_5, 2y_2 - 2y_6, 0]$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

74 . Coloring, {2, 3, 10}

R: [7, 8, 8, 6, A, A, B, C, B, 2, 1, 5]

B: [6, 7, 7, 7, 3, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	5 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}, {1, 7, 11}}

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 2, 2, 0, 3, 1, 2] , [1, 3, 0, 0, 2, 0, 3, 2, 0, 1, 2, 2] , [2, 1, 0, 0, 2, 0, 1, 3, 0, 2, 3, 2] , [3, 2, 0, 0, 2, 0, 2, 1, 0, 2, 1, 3] , [1, 2, 0, 0, 3, 0, 3, 2, 0, 2, 2, 1] , [2, 2, 0, 0, 1, 0, 1, 2, 0, 3, 3, 2] , [3, 3, 0, 0, 2, 0, 2, 2, 0, 1, 1, 2] , [1, 1, 0, 0, 2, 0, 3, 3, 0, 2, 2, 2]] \$

$$[3 y_7, 3 y_8, 0, 0, 3 y_5, 3 y_6, 3 y_4, 3 y_3, 0, 3 y_2, 3 y_1, 5 y_7 - 3 y_8 - 3 y_5 - 3 y_6 + 5 y_4 - 3 y_3 - 3 y_2 + 5 y_1]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 2, 1, 3], [0, 0, 1, 1, 0, 0, 4, 0, 3, 3, 0, 4], [0, 0, 0, 0, 0, 0, 2, 0, 4, 4, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[0, 0, y_1, y_1, 0, y_4, 2 y_1 - 2 y_4 + y_2 + y_3 - y_5, 0, y_2, y_3, y_4, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7 \quad p = -s^5 + s^8$$

75 . Coloring, {2, 3, 11}

R: [7, 8, 8, 6, A, A, B, C, B, C, 4, 5]

B: [6, 7, 7, 7, 3, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 2, 3, 3], [0, 0, 0, 3, 3, 2, 0, 0, 0, 3, 1, 4], [0, 0, 0, 1, 4, 3, 0, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 1, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$$$

$$[0, 0, 0, y_1, y_2, y_3, y_4, 2 y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 2, 1, 1] , [1, 2, 1, 0, 0, 2, 4, 0, 1, 3, 0, 2] , [0, 3, 2, 0, 0, 1, 3, 0, 2, 4, 0, 1] , [0, 4, 1, 0, 0, 0, 5, 0, 1, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 5, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 3, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 5, 0, 2, 3, 0, 1] , [0, 3, 0, 0, 0, 0, 5, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 3, 0, 2, 5, 0, 1]] \$

$$[-3 y_2 - 3 y_1 - 3 y_3 - 3 y_4 + 13 y_5 - 3 y_6 - 3 y_7 + 13 y_8, 3 y_2, 3 y_1, 0, 0, 3 y_3, 3 y_4, 0, 3 y_5, 3 y_6, 3 y_7, 3 y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

76 . Coloring, {2, 3, 12}

R: [7, 8, 8, 6, A, A, B, C, B, C, 1, 9]

B: [6, 7, 7, 7, 3, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 0, 3, 1, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 5, 1] , [5, 0, 0, 0, 0, 3, 0, 1, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$

$$[y_1, 0, 0, 0, 0, y_2, y_3, 2 y_2, y_4, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 2, 1, 1] , [0, 2, 3, 1, 1, 0, 6, 0, 0, 3, 0, 0] , [0, 3, 1, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[0, y_1, y_5, y_4, y_4, y_6, y_3, 0, 0, y_2, y_6, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

77 . Coloring, {2, 4, 5}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, B, C, B, C, 1, 5]

B: [6, 7, 8, 6, A, 3, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 3, 3], [3, 0, 2, 0, 3, 0, 3, 0, 0, 0, 3, 2], [3, 0, 3, 0, 2, 0, 5, 0, 0, 0, 3, 0], [3, 0, 2, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_7, 0, y_7, y_5, y_6]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}, {3, 4, 6, 8, 11}}

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 1, 1], [0, 3, 2, 1, 0, 2, 2, 1, 1, 1, 1, 2], [0, 1, 2, 1, 0, 1, 3, 2, 2, 2, 1, 1], [0, 2, 1, 1, 0, 1, 1, 2, 1, 3, 2, 2], [0, 3, 1, 2, 0, 1, 2, 1, 2, 1, 2, 1], [0, 1, 1, 2, 0, 2, 3, 1, 1, 2, 1, 2], [0, 2, 2, 1, 0, 2, 1, 1, 2, 3, 1, 1], [0, 3, 2, 1, 0, 1, 2, 2, 1, 1, 1, 2], [0, 1, 1, 1, 0, 1, 3, 2, 2, 2, 2, 1], [0, 2, 1, 2, 0, 1, 1, 1, 1, 3, 2, 2]] \$$$

$$[0, -3y_3 + 6y_7 - 3y_6 + 6y_8, -3y_1 - 3y_4 - 3y_2 + 7y_7 - 3y_5 + 7y_8, 3y_1, 0, 3y_4, 3y_3, 3y_2, 3y_7, 3y_6, 3y_5, 3y_8]$$

$$p = -2s - 3s^2 - 2s^3 + s^5 + 2s^6 + 3s^7 + 2s^8 - s^{10} \quad p = s + 2s^2 + 2s^3 + s^4 - s^6 - 2s^7 - 2s^8 - s^9$$

78 . Coloring, {2, 4, 6}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, 3, B, C, B, C, 1, 5]

B: [6, 7, 8, 6, 3, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	4 vs 8	9 vs 10

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\begin{aligned} \$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 3, 3], [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 3, 2], [3, 0, \\ 0, 0, 2, 0, 3, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, \\ 3, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 2]] \$ \end{aligned}$$

$$[3 y_3, 0, 3 y_4, 0, 7 y_3 + 4 y_4 - 3 y_1 - 3 y_2, 0, 3 y_3 + 3 y_4, 3 y_4, 0, 3 y_1, 3 y_3 + 3 y_4, 3 y_2]$$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p' = s^2 - s^5 \quad p = s^2 - s^8$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 2, 1, 1, 3, 1, 2], [0, 3, 0, 1, 0, 1, 3, 0, 2, 4, 1, 1], [0, 4, \\ 0, 1, 0, 1, 3, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 1, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, \\ 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, \\ 0, 2]] \$ \end{aligned}$$

$$[0, 3 y_2, 3 y_1, -3 y_2 - 3 y_1 - 3 y_9 - 3 y_8 - 3 y_7 + 13 y_6 - 3 y_5 - 3 y_4 + 13 y_3, 0, 3 y_9, 3 y_8, 3 y_7, 3 y_6, \\ 3 y_5, 3 y_4, 3 y_3]$$

$$p = -s^6 - s^7 + s^9 + s^{10}$$

79 . Coloring, {2, 4, 7}

R: [7, 8, 7, 7, A, A, A, C, B, C, 1, 5]

B: [6, 7, 8, 6, 3, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$[y_1, 0, 0, 0, y_5, 0, y_6, y_3, 0, y_2, y_3, y_4]$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {3, 4, 6, 8, 11}} order: 10

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 0, 3, 1] , [0, 0, 2, 3, 0, 2, 2, 2, 1, 0, 2, 2] , [0, 0, 2, 2, 0, 3, 0, 2, 2, 0, 4, 1] , [0, 0, 3, 4, 0, 2, 0, 2, 1, 0, 2, 2] , [0, 0, 2, 2, 0, 4, 0, 3, 2, 0, 2, 1] , [0, 0, 4, 2, 0, 2, 0, 2, 1, 0, 3, 2] , [0, 0, 2, 3, 0, 2, 0, 4, 2, 0, 2, 1] , [0, 0, 2, 2, 0, 3, 0, 2, 1, 0, 4, 2] , [0, 0, 3, 4, 0, 2, 0, 2, 2, 0, 2, 1]] \$

$[0, -3y_1 - 3y_2 - 3y_3 - 3y_4 - 3y_5 + 13y_6 - 3y_7 + 13y_8, 3y_1, 3y_2, 0, 3y_3, 3y_4, 3y_5, 3y_6, 0, 3y_7, 3y_8]$

$$p = -s^3 - s^4 + s^8 + s^9$$

80 . Coloring, {2, 4, 8}

$$\Omega p(\Delta)=0: p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, B, B, B, C, 1, 5]

B: [6, 7, 8, 6, 3, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2]] \$$

$$[-y_4 - y_1 - y_2 + 5y_3, 0, 0, 0, y_3, 0, y_4, y_1, 0, y_3, y_2, y_3]$$

$$p = s^2 - s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 2, 0, 2], [0, 2, 2, 0, 0, 2, 2, 2, 2, 1, 0, 3], [0, 1, 2, 0, 0, 0, 2, 2, 3, 2, 0, 4], [0, 2, 0, 0, 0, 0, 1, 2, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 2, 0, 5, 1, 0, 6], [0, 1, 0, 0, 0, 0, 2, 0, 6, 2, 0, 5], [0, 2, 0, 0, 0, 0, 1, 0, 5, 2, 0, 6], [0, 2, 0, 0, 0, 0, 2, 0, 6, 1, 0, 5], [0, 1, 0, 0, 0, 0, 2, 0, 5, 2, 0, 6]] \$$

$$[0, 5y_8, 5y_7, 5y_6, 0, 5y_5, 5y_4, 5y_3, 5y_2, 5y_1, 0, 11y_8 - 5y_7 - 5y_6 - 5y_5 + 11y_4 - 5y_3 - 5y_2 + 11y_1]$$

$$p = s^5 + s^6 - s^8 - s^9$$

81 . Coloring, $\{2, 4, 9\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, B, C, C, C, 1, 5]

B: [6, 7, 8, 6, 3, 3, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3
See Matrix

$\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 4]] \$$

$[-7 y_1 + 3 y_2 + 3 y_3 + 4 y_4, 0, 0, 0, -27 y_1 + 7 y_2 + 7 y_3 + 16 y_4, 0, 2 y_1, 2 y_2, 0, 2 y_3, -16 y_1 + 4 y_2 + 4 y_3 + 10 y_4, 2 y_4]$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}, \{2, 7, 10\}\}$
See Matrix

$\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 2, 2, 0], [0, 2, 2, 2, 0, 2, 2, 2, 0, 1, 3, 0], [0, 1, 2, 3, 0, 2, 2, 2, 0, 2, 2, 0], [0, 2, 2, 0, 3, 1, 2, 0, 2, 2, 0], [0, 2, 3, 2, 0, 2, 2, 2, 0, 1, 2, 0], [0, 1, 2, 2, 0, 2, 2, 3, 0, 2, 2, 0], [0, 2, 2, 2, 0, 2, 1, 2, 0, 2, 3, 0], [0, 2, 2, 3, 0, 2, 2, 2, 0, 1, 2, 0], [0, 1, 2, 2, 0, 3, 2, 2, 0, 2, 2, 0]] \$$

$[0, 5 y_1, 11 y_1 - 5 y_2 - 5 y_3 + 11 y_4 - 5 y_5 - 5 y_6 + 11 y_7 - 5 y_8, 5 y_2, 0, 5 y_3, 5 y_4, 5 y_5, 5 y_6, 5 y_7, 5 y_8, 0]$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

82 . Coloring, $\{2, 4, 10\}$

R: [7, 8, 7, 7, A, A, B, C, B, 2, 1, 5]

B: [6, 7, 8, 6, 3, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}, \{1, 7, 11\}\}$

See Matrix

$\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 2, 2, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 3, 2, 0, 1, 2, 2], [2, 1, 0, 0, 2, 0, 3, 2, 0, 1, 3, 2], [3, 1, 0, 0, 2, 0, 2, 1, 0, 2, 3, 2], [3, 2, 0, 0, 2, 0, 3, 1, 0, 2, 2, 1], [2, 2, 0, 0, 1, 0, 3, 2, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 2, 2, 0, 1, 3, 2]] \$$

$$[y_1 + y_2 - y_3 + y_4 + y_5 - y_6 + y_7, y_1, 0, 0, y_2, 0, y_3, y_4, 0, y_5, y_6, y_7]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{3, 4, 6, 8, 11\}\}$ order: 10

See Matrix

$\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 2, 1, 3], [0, 0, 2, 1, 0, 2, 0, 2, 3, 1, 1, 4], [0, 0, 2, 1, 0, 1, 0, 2, 4, 0, 2, 4], [0, 0, 1, 2, 0, 1, 0, 2, 4, 0, 2, 4], [0, 0, 1, 2, 0, 2, 0, 1, 4, 0, 2, 4], [0, 0, 2, 2, 0, 2, 0, 1, 4, 0, 1, 4], [0, 0, 2, 1, 0, 2, 0, 2, 4, 0, 1, 4], [0, 0, 2, 1, 0, 1, 0, 2, 4, 0, 2, 4], [0, 0, 1, 2, 0, 1, 0, 2, 4, 0, 2, 4]] \$$

$$[0, 0, y_2, y_3, 0, y_1, y_6 + y_7 - y_4, -y_2 - y_3 - y_1 + 2y_6 + 2y_7 - y_5, y_6, y_7, y_5, y_4]$$

$$p' = s^3 - s^8 \quad p = s^3 - s^8$$

83 . Coloring, $\{2, 4, 11\}$

R: $[7, 8, 7, 7, A, A, B, C, B, C, 4, 5]$

B: $[6, 7, 8, 6, 3, 3, A, B, C, 2, 1, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	8 vs 10

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{4, 7, 11\}\}$ order: 3

See Matrix

$\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 3, 0, 0, 3, 2, 2], [0, 0, 0, 2, 2, 0, 3, 0, 0, 3, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 3, 0, 0, 3, 2, 2], [0, 0, 0, 2, 2, 0, 3, 0, 0, 3, 3, 3]] \$$

$$[0, 0, 0, y_1, y_1, 0, y_2, y_3, 0, y_2 - y_3, y_4, y_4]$$

$$p' = -s^3 + s^6 \quad p = -s^2 + s^5 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}, {2, 7, 10}}

See Matrix

$$\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 2, 1, 1], [1, 2, 2, 0, 0, 2, 2, 2, 1, 1, 1, 2], [1, 1, 2, 0, 0, 1, 2, 2, 2, 2, 2, 1], [2, 2, 1, 0, 0, 1, 1, 2, 1, 2, 2, 2], [2, 2, 1, 0, 0, 2, 2, 1, 2, 1, 2, 1], [2, 1, 2, 0, 0, 2, 2, 1, 1, 2, 1, 2], [1, 2, 2, 0, 0, 2, 1, 2, 2, 2, 1, 1], [1, 2, 2, 0, 0, 1, 2, 2, 1, 1, 2, 2], [2, 1, 1, 0, 0, 1, 2, 2, 2, 2, 2, 1], [2, 2, 1, 0, 0, 2, 1, 1, 1, 2, 2, 2]] \$$$

$$[3y_3, 3y_2, 3y_1, 0, 0, -3y_3 - 3y_1 - 3y_4 + 8y_5 - 3y_6 + 8y_8, -3y_2 + 5y_5 - 3y_7 + 5y_8, 3y_4, 3y_5, 3y_7, 3y_6, 3y_8]$$

$$p' = -s - 2s^2 - 2s^3 - s^4 + s^6 + 2s^7 + 2s^8 + s^9 \quad p = -s - 2s^2 - 2s^3 - s^4 + s^6 + 2s^7 + 2s^8 + s^9$$

84 . Coloring, {2, 4, 12}

R: [7, 8, 7, 7, A, A, B, C, B, C, 1, 9]

B: [6, 7, 8, 6, 3, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	9 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 0, 5, 3], [5, 0, 0, 0, 0, 0, 3, 0, 3, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[y_1, 0, 0, 0, 0, 0, y_6, y_5, y_4, 2y_5, y_3, y_2]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}, {3, 4, 6, 8, 11}}

See Matrix

\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 2, 1, 1] , [0, 2, 4, 1, 1, 2, 2, 2, 0, 1, 1, 0] , [0, 1, 3, 1, 0, 1, 2, 4, 0, 2, 2, 0] , [0, 2, 1, 2, 0, 1, 1, 3, 0, 2, 4, 0] , [0, 2, 1, 4, 0, 2, 2, 1, 0, 1, 3, 0] , [0, 1, 2, 3, 0, 4, 2, 1, 0, 2, 1, 0] , [0, 2, 4, 1, 0, 3, 1, 2, 0, 2, 1, 0] , [0, 2, 3, 1, 0, 1, 2, 4, 0, 1, 2, 0] , [0, 1, 1, 2, 0, 1, 2, 3, 0, 2, 4, 0] , [0, 2, 1, 4, 0, 2, 1, 1, 0, 2, 3, 0]] \$

[0, 5 y₁, 11 y₁ - 5 y₂ - 5 y₃ - 5 y₄ + 11 y₆ - 5 y₅ + 11 y₇ - 5 y₈ - 5 y₉, 5 y₂, 5 y₃, 5 y₄, 5 y₆, 5 y₅, 0, 5 y₇, 5 y₈, 5 y₉]

$$p = -s^3 - s^4 - s^5 + s^8 + s^9 + s^{10}$$

85 . Coloring, {2, 5, 6}

R: [7, 8, 7, 6, 3, 3, B, C, B, C, 1, 5]

B: [6, 7, 8, 7, A, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 3, 3] , [3, 0, 3, 0, 3, 0, 4, 0, 0, 0, 2, 1] , [2, 0, 3, 0, 1, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

[y₂, 0, y₁, 0, y₇, y₆, y₅, y₆, 0, 0, y₄, y₃]

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 4, 0, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 0, 5, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 4, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1]] \$

$$[0, -3y_1 - 3y_2 - 6y_3 + 13y_4 - 3y_5 - 3y_6 + 13y_7, 0, 3y_1, 0, 3y_3, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7]$$

$$p = s^4 + s^5 - s^7 - s^8 \quad p = s^4 - s^6 - s^7 + s^9$$

86 . Coloring, {2, 5, 7}

$$\Omega p(\Delta)=0: \quad p = 3s^4 + 4s^5 + 8s^7 + 16s^8$$

R: [7, 8, 7, 6, 3, A, A, C, B, C, 1, 5]

B: [6, 7, 8, 7, A, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\begin{aligned} \$ [& [2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, \\ & 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, \\ & 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3]] \$ \end{aligned}$$

$$[y_7, 0, y_6, 0, y_5, y_4, y_3, y_4, 0, y_2, y_4, y_1]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1], [0, 1, 1, 3, 0, 0, 4, 1, 1, 0, 3, 2], [0, 0, 0, 3, 0, 0, 4, 1, 2, 0, 5, 1], [0, 0, \\ & 0, 5, 0, 0, 3, 0, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, 5, 0, 2, 0, 3, 1], [0, 0, 0, 3, 0, 0, 5, 0, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, \\ & 3, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 3, 2], [0, 0, 0, 3, 0, 0, 5, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, \\ & 5, 2]] \$ \end{aligned}$$

$$[0, 3y_1 + 3y_4, 3y_1, -6y_1 - 9y_4 - 3y_2 - 3y_3 + 13y_7 - 3y_5 + 13y_6, 0, 3y_4, 3y_2, 3y_3, 3y_7, 3y_4, 3y_5, 3y_6]$$

$$p = -s^4 - s^5 + s^7 + s^8 \quad p = s^4 - s^6 - s^7 + s^9 \quad p = -s^4 + s^{10}$$

87 . Coloring, {2, 5, 8}

R: [7, 8, 7, 6, 3, A, B, B, B, C, 1, 5]

B: [6, 7, 8, 7, A, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 4, 2] , [4, 0, 2, 0, 2, 0, 3, 0, 0, 1, 3, 1] , [3, 0, 2, 0, 1, 0, 6, 0, 0, 0, 3, 1] , [3, 0, 1, 0, 1, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 1, 0, 0, 0, 4, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0]] \$

$$[y_3, 0, y_2, 0, y_1, y_7, y_8, y_7, 0, y_6, y_5, y_4]$$

$$p = s^6 - s^9$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 0, 2] , [0, 3, 1, 0, 0, 0, 4, 1, 2, 2, 0, 3] , [0, 2, 0, 0, 0, 0, 3, 1, 3, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 2, 0, 3, 3, 0, 4] , [0, 3, 0, 0, 0, 0, 4, 0, 4, 2, 0, 3] , [0, 2, 0, 0, 0, 0, 3, 0, 3, 4, 0, 4] , [0, 4, 0, 0, 0, 0, 2, 0, 4, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 4, 0, 3, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 3, 0, 4, 4, 0, 3]] \$

$$[0, 5y_1, 5y_3, -14y_1 + 18y_3 - 14y_2 + 18y_4 + 18y_5 - 14y_6 + 18y_7, 0, -7y_1 + 9y_3 - 7y_2 + 9y_4 + 9y_5 - 7y_6 + 9y_7, 5y_2, 5y_4, 5y_5, 5y_6, 0, 5y_7]$$

$$p = s^4 - s^6 - s^7 + s^9 \quad p = -s^4 - s^5 + s^7 + s^8$$

88 . Coloring, {2, 5, 9}

R: [7, 8, 7, 6, 3, A, B, C, C, C, 1, 5]

B: [6, 7, 8, 7, A, 3, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 2, 4] , [2, 0, 2, 0, 4, 0, 3, 0, 0, 1, 2, 2] , [2, 0, 4, 0, 2, 0, 4, 0, 0, 0, 3, 1] , [3, 0, 2, 0, 1, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_1, 0, y_2, 0, y_7, y_4, y_3, y_4, 0, y_5, y_6, y_8]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 2, 0] , [0, 3, 1, 2, 0, 0, 4, 1, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 5, 1, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 5, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[0, y_3, y_2, y_1, 0, y_6, y_4, y_5, 2y_6, y_7, y_8, 0]$$

$$p = -s^6 + s^9$$

89 . Coloring, {2, 5, 10}

R: [7, 8, 7, 6, 3, A, B, C, B, 2, 1, 5]

B: [6, 7, 8, 7, A, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 9
 See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1], [3, 1, 2, 0, 1, 0, 3, 2, 0, 1, 2, 1], [2, 1, 1, 0, 1, 0, 5, 1, 0, 0, 3, 2], [3, 0, 1, 0, 2, 0, 3, 1, 0, 0, 5, 1], [5, 0, 2, 0, 1, 0, 4, 0, 0, 0, 3, 1], [3, 0, 1, 0, 1, 0, 7, 0, 0, 0, 4, 0], [4, 0, 1, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0]] \$$

$$[y_3, y_2, y_1, 0, y_9, y_8, y_6, y_7, 0, y_4, y_5, y_{10}]$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8
 See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3], [0, 0, 1, 1, 0, 0, 2, 1, 3, 2, 1, 5], [0, 0, 0, 1, 0, 0, 1, 1, 5, 2, 1, 5], [0, 0, 0, 1, 0, 0, 1, 0, 5, 1, 1, 7], [0, 0, 0, 1, 0, 0, 1, 0, 7, 1, 0, 6], [0, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$$[0, 0, y_1, y_2, 0, y_3, y_7, y_4, y_8, y_5, y_6, y_9]$$

90 . Coloring, $\{2, 5, 11\}$

R: [7, 8, 7, 6, 3, A, B, C, B, C, 4, 5]

B: [6, 7, 8, 7, A, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 9	8 vs 10

Omega Rank for R : cycles: $\{\{3, 4, 5, 6, 7, 10, 11, 12\}\}$ order: 8
 See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 1, 0, 0, 1, 2, 2], [0, 0, 3, 2, 2, 3, 2, 0, 0, 2, 1, 1], [0, 0, 2, 1, 1, 2, 3, 0, 0, 3, 2, 2], [0, 0, 1, 2, 2, 1, 2, 0, 0, 2, 3, 3], [0, 0, 2, 3, 3, 2, 1, 0, 0, 1, 2, 2], [0, 0, 3, 2, 2, 3, 2, 0, 0, 2, 1, 1], [0, 0, 2, 1, 1, 2, 3, 0, 0, 3, 2, 2], [0, 0, 1, 2, 2, 1, 2, 0, 0, 2, 3, 3]] \$$

$$[0, 0, y_1, y_1 - y_2 - y_3 + y_4, y_1 - y_2 - y_3 + y_4, y_1, y_2 + y_3, y_2, 0, y_3, y_4, y_4]$$

$$p = -s^2 + s^3 - s^4 + s^9 \quad p = -s^2 + s^3 - s^4 + s^5 \quad p = -s^2 + s^6 \quad p' = -s^2 + s^6 \quad p' = -s^3 + s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {2, 7, 10}, {9, 12}}

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1], [1, 3, 1, 0, 0, 2, 2, 1, 1, 2, 1, 2], [1, 2, 2, 0, 0, 1, 3, 1, 2, 2, 1, 1], [1, 2, 1, 0, 0, 1, 2, 2, 1, 3, 1, 2], [1, 3, 1, 0, 0, 1, 2, 1, 2, 2, 2, 1], [2, 2, 1, 0, 0, 1, 3, 1, 1, 2, 1, 2], [1, 2, 1, 0, 0, 2, 1, 2, 3, 1, 1], [1, 3, 2, 0, 0, 1, 2, 1, 1, 2, 1, 2], [1, 2, 1, 0, 0, 1, 3, 2, 2, 2, 1, 1], [1, 2, 1, 0, 0, 1, 2, 1, 1, 3, 2, 2]] \$$$

$$[-3y_1 - 3y_2 - 3y_4 + 6y_8 - 3y_6 + 6y_7, -3y_3 + 7y_8 - 3y_5 + 7y_7, 3y_1, 0, 0, 3y_2, 3y_3, 3y_4, 3y_8, 3y_5, 3y_6, 3y_7]$$

$$p = -s - 2s^2 - 2s^3 - s^4 + s^6 + 2s^7 + 2s^8 + s^9 \quad p = 2s + 3s^2 + 2s^3 - s^5 - 2s^6 - 3s^7 - 2s^8 + s^{10}$$

91 . Coloring, {2, 5, 12}

R: [7, 8, 7, 6, 3, A, B, C, B, C, 1, 9]

B: [6, 7, 8, 7, A, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 1, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 1], [6, 0, 0, 0, 0, 4, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[y_1, 0, y_3, 0, 0, y_3, y_2, y_3, y_7, y_4, y_5, y_6]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1] , [0, 3, 1, 1, 1, 0, 4, 1, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 4, 1, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 5, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_1, y_4, y_3, y_4 + y_7, y_7, y_2, y_6, 0, y_5, y_8, y_7]$$

$$p' = -s^6 + s^9 \quad p = -s^6 + s^9$$

92 . Coloring, {2, 6, 7}

R: [7, 8, 7, 6, A, 3, A, C, B, C, 1, 5]

B: [6, 7, 8, 7, 3, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3] , [1, 0, 1, 0, 3, 0, 3, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

$$[y_3 + y_6, 0, y_3, 0, y_4, y_6, y_5, y_6, 0, y_2, y_6, y_1]$$

$$p = s^4 - s^7 \quad p' = s^5 - s^8 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 4, 1, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 0, 4, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2]] \$

$$[0, -3y_1 - 6y_2 - 3y_3 - 6y_7 + 13y_6 - 3y_5 + 13y_4, 3y_2, 3y_1, 0, 3y_2, 3y_3, 3y_7, 3y_6, 3y_7, 3y_5, 3y_4]$$

$$p' = s^5 + s^6 - s^8 - s^9 \quad p = s^4 - s^{10} \quad p' = s^4 - s^6 - s^7 + s^9$$

93 . Coloring, {2, 6, 8}

R: [7, 8, 7, 6, A, 3, B, B, B, C, 1, 5]

B: [6, 7, 8, 7, 3, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	5 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 4, 2], [4, 0, 1, 0, 2, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 5, 0, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 5, 2], [5, 0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 5, 0, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 5, 2], [5, 0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 5, 0, 0, 2, 3, 2]] \$$$

$$[3y_1, 0, 3y_2, 0, 3y_3, -7y_1 - 7y_2 + 14y_3 + 8y_5 - 3y_4, -6y_3 + 6y_5 + 3y_4, -7y_1 - 7y_2 + 14y_3 + 8y_5 - 3y_4, 0, 3y_5, 3y_4, -5y_1 - 5y_2 + 7y_3 + 7y_5]$$

$$p' = s^3 - s^6 \quad p = -s^3 + s^6 \quad p' = s^4 - s^7 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 1, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3], [0, 4, 0, 0, 0, 3, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3]] \$$$

$$[0, y_1, 3y_1 + 3y_3 - 10y_4 + 3y_5, 6y_1 + 6y_3 - 20y_4 + 6y_5, 0, 3y_1 + 3y_3 - 10y_4 + 3y_5, y_3, 3y_1 + 3y_3 - 9y_4 + 3y_5 - y_2, y_2, y_5, 0, y_4]$$

$$p = -s^3 + s^9 \quad p' = -s^4 + s^7 \quad p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

94 . Coloring, {2, 6, 9}

R: [7, 8, 7, 6, A, 3, B, C, C, C, 1, 5]

B: [6, 7, 8, 7, 3, A, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 2, 4] , [2, 0, 1, 0, 4, 0, 3, 0, 0, 2, 2, 2] , [2, 0, 0, 0, 2, 0, 3, 0, 0, 4, 3, 2] , [3, 0, 0, 0, 2, 0, 2, 0, 0, 2, 3, 4] , [3, 0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 2] , [2, 0, 0, 0, 2, 0, 3, 0, 0, 4, 3, 2] , [3, 0, 0, 0, 2, 0, 2, 0, 0, 2, 3, 4] , [3, 0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 2] , [2, 0, 0, 0, 2, 0, 3, 0, 0, 4, 3, 2]] \$

$[-y_1 - y_3 + y_5 + y_2, 0, y_1, 0, -2y_3 + 2y_5 + 2y_2 - y_4, y_3 - 2y_5 + y_4, y_2, y_3 - 2y_5 + y_4, 0, y_3, y_5, y_4]$

$p = -s^3 + s^6 \quad p = -s^3 + s^9 \quad p' = -s^4 + s^7 \quad p' = -s^3 + s^6$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 4, 1, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 5, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$[0, y_1, y_3, y_2, 0, y_3, y_4, y_6, 2y_3, y_7, y_5, 0]$

$p = s^5 - s^8 \quad p' = s^5 - s^8$

95 . Coloring, {2, 6, 10}

R: [7, 8, 7, 6, A, 3, B, C, B, 2, 1, 5]

B: [6, 7, 8, 7, 3, A, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}, \{1, 7, 11\}\}$

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1], [3, 1, 1, 0, 1, 0, 3, 2, 0, 2, 2, 1], [2, 2, 0, 0, 1, 0, 4, 1, 0, 1, 3, 2], [3, 1, 0, 0, 2, 0, 2, 0, 1, 4, 1], [4, 1, 0, 0, 1, 0, 3, 1, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 4, 1, 0, 1, 3, 1], [3, 1, 0, 0, 1, 0, 2, 2, 0, 2, 4, 1], [4, 2, 0, 0, 1, 0, 3, 1, 0, 1, 2, 2], [2, 1, 0, 0, 2, 0, 4, 2, 0, 1, 3, 1], [3, 1, 0, 0, 1, 0, 2, 1, 0, 2, 4, 2]] \$$$

$$[7y_4, 7y_1, -7y_4 + 9y_1 + 9y_2 - 7y_3 - 7y_5 + 9y_6 + 9y_9 - 7y_7 + 9y_8, 0, 7y_2, 7y_3, 7y_5, 7y_6, 0, 7y_9, 7y_7, 7y_8]$$

$$p = -s^3 - s^4 - s^5 + s^8 + s^9 + s^{10}$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3], [0, 0, 0, 1, 0, 0, 2, 1, 3, 3, 1, 5], [0, 0, 0, 1, 0, 0, 1, 0, 5, 2, 1, 6], [0, 0, 0, 1, 0, 0, 1, 0, 6, 1, 0, 7], [0, 0, 0, 0, 0, 0, 1, 0, 7, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[0, 0, y_1, 2y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^7 + s^8 \quad p = -s^7 + s^9$$

96 . Coloring, $\{2, 6, 11\}$

R: [7, 8, 7, 6, A, 3, B, C, B, C, 4, 5]

B: [6, 7, 8, 7, 3, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 10

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}, \{5, 10, 12\}\}$
See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3], [0, 0, 1, 3, 3, 2, 1, 0, 0, 2, 2, 2], [0, 0, 2, 2, 2, 3, 1, 0, 0, 3, 1, 2], [0, 0, 3, 1, 2, 2, 0, 0, 2, 1, 3], [0, 0, 2, 1, 3, 1, 3, 0, 0, 2, 2, 2], [0, 0, 1, 2, 2, 1, 2, 0, 0, 3, 3, 2], [0, 0, 1, 3, 2, 2, 1, 0, 0, 2, 2, 3], [0, 0, 2, 2, 3, 3, 1, 0, 0, 2, 1, 2], [0, 0, 3, 1, 2, 2, 2, 0, 0, 3, 1, 2]] \$$

$[0, 0, -7y_1 + 9y_2 - 7y_3 - 7y_4 + 9y_5 + 9y_6 - 7y_7 + 9y_8, 7y_1, 7y_2, 7y_3, 7y_4, 7y_5, 0, 7y_6, 7y_7, 7y_8]$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 2, 2, 1, 1, 3, 1, 2], [1, 3, 0, 0, 0, 1, 3, 0, 2, 4, 1, 1], [1, 4, 0, 0, 0, 1, 3, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 1, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2]] \$$

$[-3y_1 - 3y_2 - 3y_3 - 3y_4 - 3y_5 + 13y_8 - 3y_6 - 3y_7 + 13y_9, 3y_1, 3y_2, 0, 0, 3y_3, 3y_4, 3y_5, 3y_8, 3y_6, 3y_7, 3y_9]$

$$p = -s^6 - s^7 + s^9 + s^{10}$$

97 . Coloring, $\{2, 6, 12\}$

R: [7, 8, 7, 6, A, 3, B, C, B, C, 1, 9]

B: [6, 7, 8, 7, 3, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	9 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3] , [3, 0, 1, 0, 0, 0, 3, 0, 3, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 6, 0] , [6, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[y_6, 0, y_5, 0, 0, y_4, y_3, y_4, y_2, y_4, y_1, 2y_5 + y_4]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9
See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 0, 4, 1, 0, 3, 1, 0] , [0, 3, 1, 1, 0, 0, 4, 2, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 4, 1, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 5, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[0, y_5, y_3, y_4, y_2, y_9, y_6, y_1, 0, y_7, y_8, y_9]$$

$$p = -s^7 + s^{10}$$

98 . Coloring, {2, 7, 8}

R: [7, 8, 7, 6, A, A, A, B, B, C, 1, 5]

B: [6, 7, 8, 7, 3, 3, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 0, 2, 0, 0, 5, 1, 4] , [1, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

$$[y_1, 0, 0, 0, y_2, y_4, y_3, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 2, 2], [0, 0, 1, 2, 0, 0, 4, 2, 2, 0, 2, 3], [0, 0, 0, 2, 0, 0, 2, 1, 3, 0, 4, 4], [0, 0, 0, 4, 0, 0, 2, 0, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 4, 4], [0, 0, 0, 4, 0, 0, 2, 0, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 4, 4]] \$$$

$$[0, 2y_1 - 2y_4 - 2y_5 + 2y_3, y_1, 2y_4 + 2y_5 - y_6 - y_2, 0, y_1 - y_4 - y_5 + y_3, y_6, y_4, y_5, 0, y_2, y_3]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

99 . Coloring, {2, 7, 9}

R: [7, 8, 7, 6, A, A, A, C, C, C, 1, 5]

B: [6, 7, 8, 7, 3, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 7	6 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$$

$$[2y_3, 0, 0, 0, y_1, y_3, y_2, y_3, 0, y_4, 0, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 4, 0] , [0, 0, 1, 4, 0, 0, 4, 2, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, 2 y_4, y_1, y_2, 0, y_4, y_3, y_5, 2 y_4, 0, y_6, 0]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

100 . Coloring, {2, 7, 10}

R: [7, 8, 7, 6, A, A, A, C, B, 2, 1, 5]

B: [6, 7, 8, 7, 3, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 0, 2, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 1, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4]] \$

$$[y_1, y_2, 0, 0, y_3, y_7, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = s^4 - s^9$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 3, 3] , [0, 0, 1, 3, 0, 0, 2, 2, 3, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 1, 2, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 4, 0, 3, 0, 3, 2]] \$

$$[0, 0, 5 y_2, 5 y_3, 0, -5 y_2 - 5 y_3 - 5 y_1 - 5 y_4 + 11 y_5 - 5 y_6 + 11 y_7, 5 y_1, 5 y_4, 5 y_5, 0, 5 y_6, 5 y_7]$$

$$p = -s^4 - s^5 + s^7 + s^8$$

101 . Coloring, {2, 7, 11}

R: [7, 8, 7, 6, A, A, A, C, B, C, 4, 5]

B: [6, 7, 8, 7, 3, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[0, 0, 0, y_3, y_2, y_1, 2y_6, y_6, 0, y_5, y_6, y_4]$$

$$p' = -s^4 + s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 3, 1] , [3, 0, 1, 0, 0, 2, 2, 2, 1, 0, 3, 2] , [3, 0, 2, 0, 0, 3, 0, 1, 2, 0, 4, 1] , [4, 0, 3, 0, 0, 3, 0, 2, 1, 0, 1, 2] , [1, 0, 3, 0, 0, 4, 0, 3, 2, 0, 2, 1] , [2, 0, 4, 0, 0, 1, 0, 3, 1, 0, 3, 2] , [3, 0, 1, 0, 0, 2, 0, 4, 2, 0, 3, 1] , [3, 0, 2, 0, 0, 3, 0, 1, 1, 0, 4, 2] , [4, 0, 3, 0, 0, 3, 0, 2, 2, 0, 1, 1]] \$

$$[-3y_1 - 3y_2 - 3y_3 - 3y_4 - 3y_5 + 13y_6 - 3y_7 + 13y_8, 3y_1, 3y_2, 0, 0, 3y_3, 3y_4, 3y_5, 3y_6, 0, 3y_7, 3y_8]$$

$$p = s^3 + s^4 - s^8 - s^9$$

102 . Coloring, {2, 7, 12}

R: [7, 8, 7, 6, A, A, A, C, B, C, 1, 9]

B: [6, 7, 8, 7, 3, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 1, 3], [1, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 5], [2, 0, 0, 0, 0, 0, 1, 0, 5, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 1, 5, 2], [5, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 1], [3, 0, 0, 0, 0, 0, 5, 0, 1, 3, 2, 2], [2, 0, 0, 0, 0, 0, 3, 0, 2, 5, 1, 3], [1, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 5]] \$

$[y_1, 0, 0, 0, 0, y_7, y_6, y_7, y_5, y_4, y_3, y_2]$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 3, 1], [0, 0, 3, 3, 1, 0, 4, 2, 0, 0, 3, 0], [0, 0, 1, 3, 0, 0, 3, 3, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 3, 1, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$[0, 2 y_7, y_2, y_1, y_5, y_7, y_3, y_4, 0, 0, y_6, y_7]$

$$p' = s^5 - s^8 \quad p = -s^5 + s^8$$

103 . Coloring, {2, 8, 9}

R: [7, 8, 7, 6, A, A, B, B, C, C, 1, 5]

B: [6, 7, 8, 7, 3, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3
See Matrix

$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2]] \$$

$$[y_2, 0, 0, 0, -y_1 + y_3, y_1, -y_1 + y_4, y_1, 0, y_2, y_3, y_4]$$

$$p' = -s^2 + s^5 \quad p' = -s^3 + s^6 \quad p = -s^2 + s^8 \quad p = -s^2 + s^5$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 9
See Matrix

$\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 1, 1], [0, 2, 1, 1, 0, 0, 4, 2, 1, 2, 2, 1], [0, 2, 0, 2, 0, 0, 3, 1, 1, 4, 1, 2], [0, 4, 0, 1, 0, 0, 4, 0, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 5, 0, 1, 4, 2, 0], [0, 4, 0, 2, 0, 0, 4, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0, 4, 0, 0]] \$$

$$[0, y_1, y_2, y_5, 0, y_3, y_6, y_4, y_7, y_8, y_9, y_{10}]$$

104 . Coloring, $\{2, 8, 10\}$

R: [7, 8, 7, 6, A, A, B, B, B, 2, 1, 5]

B: [6, 7, 8, 7, 3, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	4 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 2, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 4, 2, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 3, 3, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[y_2, y_1, 0, 0, 2y_3, y_3, y_4, y_6, 0, y_7, y_5, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 0, 4] , [0, 0, 1, 0, 0, 0, 2, 2, 4, 2, 0, 5] , [0, 0, 0, 0, 0, 0, 0, 1, 5, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_1, 2y_2, 0, y_2, 2y_1 - 2y_2, y_3, y_4, -2y_1 + 4y_2 + 2y_3, 0, -5y_1 + 9y_2 + 3y_3 + y_4]$$

$$p = -s^4 + s^6 \quad p = -s^4 + s^7 \quad p = -s^4 + s^8 \quad p = -s^4 + s^5$$

105 . Coloring, {2, 8, 11}

R: [7, 8, 7, 6, A, A, B, B, B, C, 4, 5]

B: [6, 7, 8, 7, 3, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 2, 0, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 4, 0, 0, 0, 4, 0, 3] , [0, 0, 0, 0, 3, 3, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6]] \$

$$[0, 0, 0, y_1, y_5, y_6, 2y_7, y_7, 0, y_2, y_3, y_4]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 0, 2] , [0, 2, 1, 0, 0, 2, 2, 2, 2, 2, 0, 3] , [0, 2, 2, 0, 0, 0, 2, 1, 3, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 2, 2, 4, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 2, 0, 4, 2, 0, 6] , [0, 2, 0, 0, 0, 0, 2, 0, 6, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 2, 0, 4, 2, 0, 6] , [0, 2, 0, 0, 0, 0, 2, 0, 6, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 2, 0, 4, 2, 0, 6]] \$

$$[y_6, y_5, y_4, 0, 0, y_3, y_5, y_2, y_1, y_5, 0, -y_6 + 5y_5 - y_4 - y_3 - y_2 - y_1]$$

$$p' = s^6 - s^8 \quad p' = s^5 - s^7 \quad p = s^5 - s^9$$

106 . Coloring, {2, 8, 12}

R: [7, 8, 7, 6, A, A, B, B, B, C, 1, 9]

B: [6, 7, 8, 7, 3, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 0, 2, 1, 5, 2] , [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 5, 0, 1, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[y_7, 0, 0, 0, 0, y_2, y_1, y_2, y_3, y_4, y_6, y_5]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {2, 7, 10}} order: 12

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 0, 4, 2, 0, 2, 0, 1] , [0, 2, 2, 0, 1, 0, 2, 3, 0, 4, 0, 2] , [0, 4, 1, 0, 2, 0, 2, 2, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 4, 1, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 0, 2, 2, 0, 4, 0, 1] , [0, 4, 2, 0, 1, 0, 2, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 4, 2, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 2, 1, 0, 4, 0, 2]] \$

$$[0, 2y_1 - y_4 + 2y_3 - y_5, y_1 + y_2 + y_3 - y_6, 2y_2, y_1, y_2, y_4, y_3, 0, y_5, 0, y_6]$$

$$p = -s^2 + s^5 + s^6 - s^9 \quad p = -s^2 - s^3 + 2s^6 + s^8 - s^9 \quad p' = -s^3 - s^5 + s^6 + s^8$$

107 . Coloring, {2, 9, 10}

R: [7, 8, 7, 6, A, A, B, C, C, 2, 1, 5]

B: [6, 7, 8, 7, 3, 3, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}, {1, 7, 11}}

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 0, 2, 2, 0, 3, 2, 1] , [2, 3, 0, 0, 1, 0, 2, 2, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 0, 2, 3, 0, 1, 2, 2] , [2, 1, 0, 0, 2, 0, 2, 2, 0, 2, 2, 3] , [2, 2, 0, 0, 3, 0, 2, 1, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 0, 2, 2, 0, 3, 2, 1] , [2, 3, 0, 0, 1, 0, 2, 2, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 0, 2, 3, 0, 1, 2, 2]] \$

$$[y_4, y_6, 0, 0, 5y_4 - y_6 - y_1 - y_2 - y_3 - y_5, y_1, y_4, y_2, 0, y_3, y_4, y_5]$$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7 \quad p' = -s^3 + s^8$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 2, 2] , [0, 0, 1, 2, 0, 0, 2, 2, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 2, 1, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 4, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 2, 4, 2]] \$

$$[0, 0, y_1 + y_2 - y_3 + y_4 + y_5 + y_6 - y_7 - y_8, y_1, 0, y_2, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

108 . Coloring, {2, 9, 11}

R: [7, 8, 7, 6, A, A, B, C, C, C, 4, 5]

B: [6, 7, 8, 7, 3, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 2, 4] , [0, 0, 0, 2, 4, 2, 0, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 2, 0, 0, 0, 6, 0, 3] , [0, 0, 0, 0, 3, 2, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

[0, 0, 0, $y_6, y_5, y_7, 2y_2, y_2, 0, y_3, y_1, y_4$]

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {2, 7, 10}}

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 2, 0] , [2, 2, 1, 0, 0, 2, 2, 2, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 2, 2, 1, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 3, 2, 2, 0, 2, 1, 0] , [1, 2, 3, 0, 0, 2, 2, 2, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 1, 2, 3, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 2, 2, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 2, 2, 1, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 3, 2, 2, 0, 2, 1, 0]] \$

[5 $y_5 - y_1 - y_2 - y_3 - y_4 - y_6, y_5, y_1, 0, 0, y_2, y_5, y_3, y_4, y_5, y_6, 0$]

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7 \quad p'' = -s^3 + s^8$$

109 . Coloring, {2, 9, 12}

R: [7, 8, 7, 6, A, A, B, C, C, C, 1, 9]

B: [6, 7, 8, 7, 3, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	3 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}, \{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 1, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5]] \$$

$$[2 y_2, 0, 0, 0, 0, 5 y_2 - 2 y_3, 2 y_2, 5 y_2 - 2 y_3, -2 y_1 + 2 y_3, 2 y_1, 2 y_2, 2 y_3]$$

$$p = -s^3 + s^6 \quad p = -s^3 + s^7 \quad p = -s^3 + s^8 \quad p = -s^3 + s^5 \quad p = -s^3 + s^4$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 2, 0], [0, 2, 3, 2, 0, 0, 4, 2, 0, 2, 1, 0], [0, 2, 0, 1, 0, 0, 4, 3, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 3, 0, 0, 4, 3, 0], [0, 4, 0, 3, 0, 0, 6, 0, 0, 3, 0, 0], [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 3, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0], [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0]] \$$

$$[0, y_1, y_2, y_3, 2 y_4, y_4, y_5, y_6, 0, y_8, y_7, 0]$$

$$p = -s^6 + s^9$$

110 . Coloring, $\{2, 10, 11\}$

R: [7, 8, 7, 6, A, A, B, C, B, 2, 4, 5]

B: [6, 7, 8, 7, 3, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 2, 0, 2, 0, 3, 2, 1] , [0, 3, 0, 2, 1, 3, 0, 2, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 2, 0, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 2, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2]] \$$

$[0, y_1, 0, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 1, 3] , [1, 0, 1, 0, 0, 2, 0, 2, 3, 2, 1, 4] , [1, 0, 2, 0, 0, 1, 0, 1, 4, 0, 2, 5] , [2, 0, 1, 0, 0, 1, 0, 2, 5, 0, 1, 4] , [1, 0, 1, 0, 0, 2, 0, 1, 4, 0, 2, 5] , [2, 0, 2, 0, 0, 1, 0, 1, 5, 0, 1, 4] , [1, 0, 1, 0, 0, 2, 0, 2, 4, 0, 1, 5] , [1, 0, 2, 0, 0, 1, 0, 1, 5, 0, 2, 4] , [2, 0, 1, 0, 0, 1, 0, 2, 4, 0, 1, 5]] \$$

$[7 y_1, 0, 7 y_2, 0, 0, 7 y_3, 9 y_1 + 9 y_2 + 9 y_3 + 9 y_4 - 7 y_7 - 7 y_6 + 9 y_5 - 7 y_8, 7 y_4, 7 y_7, 7 y_6, 7 y_5, 7 y_8]$

$$p = -s^3 - s^4 + s^8 + s^9$$

111 . Coloring, $\{2, 10, 12\}$

R: $[7, 8, 7, 6, A, A, B, C, B, 2, 1, 9]$

B: $[6, 7, 8, 7, 3, 3, A, B, C, C, 4, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 9

See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 0, 2, 2, 1, 1, 4, 1] , [4, 1, 0, 0, 0, 0, 3, 2, 1, 0, 3, 2] , [3, 0, 0, 0, 0, 4, 1, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 1] , [6, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$$[y_1, y_2, 0, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

Omega Rank for B : cycles: {{3, 4, 5, 7, 8, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 1, 3], [0, 0, 3, 1, 3, 0, 2, 2, 0, 2, 1, 2], [0, 0, 3, 1, 2, 0, 1, 3, 0, 2, 2, 2], [0, 0, 2, 2, 2, 0, 1, 3, 0, 1, 3, 2], [0, 0, 2, 3, 2, 0, 2, 2, 0, 1, 3, 1], [0, 0, 2, 3, 1, 0, 3, 2, 0, 2, 2, 1], [0, 0, 1, 2, 1, 0, 3, 2, 0, 3, 2, 2], [0, 0, 1, 2, 2, 0, 2, 1, 0, 3, 2, 3], [0, 0, 2, 2, 3, 0, 2, 1, 0, 2, 1, 3]] \$$$

$$[0, 0, y_8, y_7, y_6, y_5, y_4, y_3, 0, y_2, y_1, -y_8 + y_7 + y_6 + y_5 - y_4 + y_3 + y_2 - y_1]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

112 . Coloring, {2, 11, 12}

R: [7, 8, 7, 6, A, A, B, C, B, C, 4, 9]

B: [6, 7, 8, 7, 3, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 10

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 4, 3], [0, 0, 0, 4, 0, 3, 0, 0, 3, 2, 3, 1], [0, 0, 0, 3, 0, 4, 0, 0, 1, 3, 3, 2], [0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1, 3], [0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2, 4], [0, 0, 0, 2, 0, 1, 0, 0, 4, 3, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 4, 3]] \$$$

$$[0, 0, 0, y_6, 0, y_5, 2y_3, y_3, y_4, y_2, y_1, y_7]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {2, 7, 10}}

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 1, 1], [1, 2, 3, 0, 1, 2, 2, 2, 0, 2, 1, 0], [1, 2, 3, 0, 0, 1, 2, 3, 0, 2, 2, 0], [2, 2, 1, 0, 0, 1, 2, 3, 0, 2, 3, 0], [3, 2, 1, 0, 0, 2, 2, 1, 0, 2, 3, 0], [3, 2, 2, 0, 0, 3, 2, 1, 0, 2, 1, 0], [1, 2, 3, 0, 0, 3, 2, 2, 0, 2, 1, 0], [1, 2, 3, 0, 0, 1, 2, 3, 0, 2, 2, 0], [2, 2, 1, 0, 0, 1, 2, 3, 0, 2, 3, 0], [3, 2, 1, 0, 0, 2, 2, 1, 0, 2, 2, 0]] \$$$

3, 0]] \$

$$[5 y_5 - y_2 - y_1 - y_3 - y_4 - y_6 - y_7, y_5, y_2, 0, y_1, y_3, y_5, y_4, 0, y_5, y_6, y_7]$$

$$p' = -s^3 + s^8 \quad p' = -s^4 + s^9 \quad p = -s^3 + s^8$$

113 . Coloring, {3, 4, 5}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, B, C, B, C, 1, 5]

B: [6, 8, 7, 6, A, 3, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 10

Omega Rank for R : cycles: {{1, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 3, 3], [3, 0, 2, 0, 3, 0, 2, 1, 0, 0, 3, 2], [3, 0, 3, 0, 2, 0, 3, 2, 0, 0, 2, 1], [2, 0, 2, 0, 1, 0, 3, 3, 0, 0, 3, 2], [3, 0, 1, 0, 2, 0, 2, 2, 0, 0, 3, 3], [3, 0, 2, 0, 3, 0, 3, 1, 0, 0, 2, 2], [2, 0, 3, 0, 2, 0, 3, 2, 0, 0, 3, 1], [3, 0, 2, 0, 1, 0, 2, 3, 0, 0, 3, 2]] \$$$

$$[2 y_2 + 2 y_3 + 2 y_6 - y_1 - y_5, 0, y_2 + y_3 + y_6 - y_4, 0, y_2, 0, y_1, y_3, 0, y_6, y_5, y_4]$$

$$p = -s^2 - s^4 + s^5 + s^7 \quad p' = -s^2 - s^4 + s^5 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {2, 3, 4, 6, 7, 8, 10, 11}} order: 8

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 1, 1], [0, 3, 2, 1, 0, 2, 1, 2, 1, 1, 1, 2], [0, 1, 2, 1, 0, 1, 2, 3, 2, 1, 2, 1], [0, 1, 1, 2, 0, 1, 2, 1, 1, 2, 3, 2], [0, 2, 1, 3, 0, 2, 1, 1, 2, 2, 1, 1], [0, 2, 2, 1, 0, 3, 1, 2, 1, 1, 1, 2], [0, 1, 3, 1, 0, 1, 2, 2, 2, 1, 2, 1], [0, 1, 1, 2, 0, 1, 3, 1, 1, 2, 2, 2], [0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 1, 1], [0, 3, 2, 1, 0, 2, 1, 2, 1, 1, 1, 2]] \$$$

$$[0, -3y_2 - 3y_3 + 5y_6 - 3y_7 + 8y_8, -3y_1 - 3y_5 + 8y_6 - 3y_4 + 5y_8, 3y_1, 0, 3y_2, 3y_3, 3y_5, 3y_6, 3y_4, 3y_7, 3y_8]$$

$$p = -s + s^9 \quad p' = -s + s^9$$

114 . Coloring, {3, 4, 6}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, B, C, B, C, 1, 5]

B: [6, 8, 7, 6, 3, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}, {1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 3, 3], [3, 0, 0, 0, 3, 0, 2, 1, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2]] \$$$

$$[y_2, 0, y_1, 0, -y_1 + y_4, 0, y_3, y_2 - y_5, 0, y_5, y_4, y_3]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 1, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 1, 0, 3, 2, 3, 2, 1], [0, 3, 0, 2, 0, 1, 0, 3, 1, 1, 3, 2], [0, 1, 0, 3, 0, 2, 0, 3, 2, 1, 3, 1], [0, 1, 0, 3, 0, 3, 0, 1, 1, 2, 3, 2], [0, 2, 0, 3, 0, 3, 0, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 3, 0, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 1, 0, 3, 2, 3, 2, 1], [0, 3, 0, 2, 0, 1, 0, 3, 1, 1, 3, 2]] \$$$

$$[0, 3y_8, 3y_7, 3y_6, 0, 3y_5, 3y_4, 3y_3, 3y_2, -3y_7 - 3y_6 - 3y_3 + 8y_2 + 5y_1, -3y_8 - 3y_5 - 3y_4 + 5y_2 + 8y_1, 3y_1]$$

$$p' = s^3 - s^9 \quad p = s^3 - s^9$$

115 . Coloring, {3, 4, 7}

R: [7, 7, 8, 7, A, A, A, C, B, C, 1, 5]

B: [6, 8, 7, 6, 3, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 4, 1, 3], [1, 0, 0, 0, 3, 0, 2, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$$

$$[y_1, 0, 0, 0, y_2, 0, y_3, y_4, 0, y_6, y_4, y_5]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {3, 4, 6, 7, 11}} order: 10

See Matrix

$$\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 0, 3, 1], [0, 0, 2, 3, 0, 2, 2, 2, 1, 0, 2, 2], [0, 0, 2, 2, 0, 3, 2, 0, 2, 0, 4, 1], [0, 0, 3, 4, 0, 2, 2, 0, 1, 0, 2, 2], [0, 0, 2, 2, 0, 4, 3, 0, 2, 0, 2, 1], [0, 0, 4, 2, 0, 2, 2, 0, 1, 0, 3, 2], [0, 0, 2, 3, 0, 2, 4, 0, 2, 0, 2, 1], [0, 0, 2, 2, 0, 3, 2, 0, 1, 0, 4, 2], [0, 0, 3, 4, 0, 2, 2, 0, 2, 0, 2, 1]] \$$$

$$[0, -3y_1 - 3y_2 - 3y_3 - 3y_4 - 3y_5 + 13y_6 - 3y_7 + 13y_8, 3y_1, 3y_2, 0, 3y_3, 3y_4, 3y_5, 3y_6, 0, 3y_7, 3y_8]$$

$$p = -s^3 - s^4 + s^8 + s^9$$

116 . Coloring, {3, 4, 8}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, B, B, B, C, 1, 5]

B: [6, 8, 7, 6, 3, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	9 vs 9

Omega Rank for R : cycles: {{5, 10, 12}, {1, 7, 11}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 2] , [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 2] , [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2]] \$

$$[5y_4 - y_1 - y_2 - y_3, 0, 0, 0, y_4, 0, y_1, y_2, 0, y_4, y_3, y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 2, 0, 2] , [0, 2, 2, 0, 0, 2, 2, 2, 2, 1, 0, 3] , [0, 1, 2, 0, 0, 0, 2, 2, 3, 2, 0, 4] , [0, 2, 0, 0, 0, 2, 1, 4, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 0, 2, 5, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, y_5, y_1, y_2, 0, y_6, y_3, y_4, y_7, y_8, 0, y_9]$$

117 . Coloring, {3, 4, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, B, C, C, C, 1, 5]

B: [6, 8, 7, 6, 3, 3, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{1, 7, 11\}\}$ order: 3

See Matrix

$\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 4]] \$$

$[10 y_2 - 16 y_4 + 4 y_3, 0, 0, 0, 2 y_2, 0, 4 y_2 - 7 y_4 + 3 y_3, 2 y_1, 0, 16 y_2 - 2 y_1 - 27 y_4 + 7 y_3, 2 y_4, 2 y_3]$

$$p' = -s^3 + s^6 \quad p' = s^2 - s^5 \quad p = s^2 - s^5$$

Omega Rank for B : cycles: $\{\{2, 3, 4, 6, 7, 8, 10, 11\}\}$ order: 8

See Matrix

$\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 2, 2, 0], [0, 2, 2, 2, 0, 2, 2, 2, 0, 1, 3, 0], [0, 1, 2, 3, 0, 2, 2, 2, 0, 2, 2, 0], [0, 2, 2, 0, 3, 2, 1, 0, 2, 2, 0], [0, 2, 3, 2, 0, 2, 2, 2, 0, 2, 1, 0], [0, 2, 2, 1, 0, 2, 3, 2, 0, 2, 2, 0], [0, 2, 2, 2, 0, 1, 2, 2, 0, 3, 2, 0], [0, 3, 1, 2, 0, 2, 2, 2, 0, 2, 2, 0], [0, 2, 2, 2, 0, 2, 1, 3, 0, 2, 2, 0]] \$$

$[0, y_8, y_6, y_7, 0, y_4, y_5, y_3, y_1, y_2, y_9, 0]$

118 . Coloring, $\{3, 4, 10\}$

R: [7, 7, 8, 7, A, A, B, C, B, 2, 1, 5]

B: [6, 8, 7, 6, 3, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 4, 0, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 5, 0, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 5, 0, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$$[y_8, y_1, 0, 0, y_2, 0, y_3, y_4, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 2, 1, 3], [0, 0, 2, 1, 0, 2, 2, 0, 3, 1, 1, 4], [0, 0, 2, 1, 0, 1, 2, 0, 4, 2, 0, 4], [0, 0, 1, 0, 0, 1, 2, 0, 4, 2, 0, 6], [0, 0, 1, 0, 0, 0, 1, 0, 6, 2, 0, 6], [0, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

119 . Coloring, $\{3, 4, 11\}$

R: $[7, 7, 8, 7, A, A, B, C, B, C, 4, 5]$

B: $[6, 8, 7, 6, 3, 3, A, B, C, 2, 1, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	8 vs 10

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{4, 7, 11\}\}$ order: 3

See Matrix

$\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 3, 0, 0, 3, 2, 2], [0, 0, 0, 2, 2, 0, 3, 0, 0, 3, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 3, 0, 0, 3, 2, 2], [0, 0, 0, 2, 2, 0, 3, 0, 0, 3, 3, 3]] \$$

$$[0, 0, 0, y_1, y_1, 0, y_2 + y_3, y_2, 0, y_3, y_4, y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

1, 0]] \$

$$[0, y_1 + y_2 - y_3 - y_4 - y_5 + y_7 + y_6 - y_9 + y_8, y_1, y_2, y_3, y_4, y_5, y_7, 0, y_6, y_9, y_8]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9 - s^{10}$$

121 . Coloring, {3, 5, 6}

R: [7, 7, 8, 6, 3, 3, B, C, B, C, 1, 5]

B: [6, 8, 7, 7, A, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}, {1, 7, 11}} order: 12

See Matrix

$$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 3, 3], [3, 0, 3, 0, 3, 0, 2, 2, 0, 0, 2, 1], [2, 0, 3, 0, 1, 0, 3, 3, 0, 0, 2, 2], [2, 0, 1, 0, 2, 0, 2, 3, 0, 0, 3, 3], [3, 0, 2, 0, 3, 0, 2, 1, 0, 0, 2, 3], [2, 0, 3, 0, 3, 0, 3, 2, 0, 0, 2, 1], [2, 0, 3, 0, 1, 0, 2, 3, 0, 0, 3, 2], [3, 0, 1, 0, 2, 0, 2, 3, 0, 0, 2, 3]] \$$$

$$[7 y_1, 0, 7 y_2, 0, 9 y_1 - 7 y_2 - 7 y_3 + 9 y_4 - 7 y_5 + 9 y_6 - 7 y_7, 7 y_3, 7 y_4, 7 y_5, 0, 0, 7 y_6, 7 y_7]$$

$$p = -s^2 - s^3 - s^4 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 2, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 0, 1, 4, 2, 2, 2, 1], [0, 2, 0, 2, 0, 0, 1, 3, 1, 1, 4, 2], [0, 1, 0, 4, 0, 0, 2, 2, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 4, 1, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 3, 1, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 2, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 0, 1, 4, 2, 2, 2, 1]] \$$$

$$[0, -3 y_1 - 3 y_4 + 5 y_2 - 3 y_6 + 8 y_5, 0, -3 y_3 + 8 y_2 - 3 y_7 + 5 y_5, 0, 3 y_1, 3 y_4, 3 y_3, 3 y_2, 3 y_7, 3 y_6, 3 y_5]$$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

122 . Coloring, {3, 5, 7}

R: [7, 7, 8, 6, 3, A, A, C, B, C, 1, 5]

B: [6, 8, 7, 7, A, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	7 vs 10

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 0, 2, 1, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 1, 2, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 1, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$

$$[y_4 - y_3 + y_5, 0, -y_2 + y_4, 0, y_3, y_5, y_2, y_1, 0, y_4 + y_5 - y_1, y_5, y_4]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7 \quad p = -s^5 + s^8 \quad p = -s^5 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1] , [0, 1, 1, 3, 0, 0, 3, 2, 1, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 1, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 5, 0, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 5, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 5, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 5, 2]] \$

$$[0, 3y_1, 3y_1 - 3y_5, -6y_1 - 3y_5 - 3y_2 - 3y_3 + 13y_4 - 3y_6 + 13y_7, 0, 3y_5, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7]$$

$$p = -s^4 + s^6 + s^7 - s^9 \quad p = -s^4 - s^5 + s^7 + s^8 \quad p = -s^4 + s^{10}$$

123 . Coloring, {3, 5, 8}

R: [7, 7, 8, 6, 3, A, B, B, B, C, 1, 5]

B: [6, 8, 7, 7, A, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 9

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 4, 2], [4, 0, 2, 0, 2, 0, 2, 1, 0, 1, 3, 1], [3, 0, 2, 0, 1, 0, 4, 2, 0, 0, 3, 1], [3, 0, 1, 0, 1, 0, 3, 2, 0, 0, 6, 0], [6, 0, 1, 0, 0, 0, 3, 1, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 1, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0]] \$$

$$[y_1, 0, y_4, 0, y_3, y_2, y_7, y_8, 0, y_5, y_6, y_9]$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 0, 2], [0, 3, 1, 0, 0, 0, 3, 2, 2, 2, 0, 3], [0, 2, 0, 0, 0, 0, 1, 3, 3, 3, 0, 4], [0, 3, 0, 0, 0, 0, 2, 4, 1, 0, 6], [0, 1, 0, 0, 0, 0, 0, 3, 6, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 1, 6, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$$[0, y_1, y_2, 2 y_3, 0, y_3, y_4, y_5, y_8, y_6, 0, y_7]$$

$$p = -s^7 + s^9$$

124 . Coloring, $\{3, 5, 9\}$

R: [7, 7, 8, 6, 3, A, B, C, C, C, 1, 5]

B: [6, 8, 7, 7, A, 3, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{1, 7, 11\}\}$ order: 12

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 2, 4] , [2, 0, 2, 0, 4, 0, 2, 1, 0, 1, 2, 2] , [2, 0, 4, 0, 2, 0, 2, 2, 0, 0, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 4, 0, 0, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 2, 0, 0, 2, 4] , [2, 0, 2, 0, 4, 0, 2, 2, 0, 0, 2, 2] , [2, 0, 4, 0, 2, 0, 2, 2, 0, 0, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 4, 0, 0, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 2, 0, 0, 2, 4]] \$$

$$[y_4, 0, -y_1 - y_2 - y_3 - y_5 + 5y_4 - y_6, 0, y_1, y_2, y_4, y_3, 0, y_5, y_4, y_6]$$

$$p' = -s^3 + s^7 \quad p = -s^3 + s^7 \quad p' = -s^4 + s^8$$

Omega Rank for B : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 2, 0] , [0, 3, 1, 2, 0, 0, 3, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 3, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 2, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 3, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 2, 3, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 3, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 3, 0, 3, 2, 0]] \$$

$$[0, y_8, y_7, y_6, 0, y_5, y_4, y_3, 2y_5, y_2, y_1, 0]$$

$$p = s^3 - s^9$$

125 . Coloring, $\{3, 5, 10\}$

R: $[7, 7, 8, 6, 3, A, B, C, B, 2, 1, 5]$

B: $[6, 8, 7, 7, A, 3, A, B, C, C, 4, 9]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{1, 7, 11\}\}$ order: 12

See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 0, 4, 1, 0, 1, 2, 1] , [2, 1, 1, 0, 1, 0, 4, 2, 0, 0, 4, 1] , [4, 0, 1, 0, 1, 0, 3, 1, 0, 0, 4, 2] , [4, 0, 1, 0, 2, 0, 4, 1, 0, 0, 3, 1] , [3, 0, 2, 0, 1, 0, 4, 1, 0, 0, 4, 1] , [4, 0, 1, 0, 1, 0, 3, 2, 0, 0, 4, 1] , [4, 0, 1, 0, 1, 0, 4, 1, 0, 0, 3, 2] , [3, 0, 1, 0, 2, 0, 4, 1, 0, 0, 4, 1] , [4, 0, 2, 0, 1, 0, 3, 1, 0, 0, 4, 1]] \$$

$$[-5 y_1 + 11 y_2 + 11 y_3 - 5 y_4 - 5 y_5 + 11 y_6 - 5 y_7 - 5 y_8 + 11 y_9, 5 y_1, 5 y_2, 0, 5 y_3, 5 y_4, 5 y_5, 5 y_6, 0, 5 y_7, 5 y_8, 5 y_9]$$

$$p = s^4 + s^5 + s^6 - s^8 - s^9 - s^{10}$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3], [0, 0, 1, 1, 0, 0, 3, 0, 3, 2, 1, 5], [0, 0, 0, 1, 0, 0, 2, 0, 5, 3, 0, 5], [0, 0, 0, 0, 0, 1, 0, 5, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 9, 0, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[0, 0, y_7, y_1, 0, y_5, y_4, y_5, y_3, y_2, y_7, y_6]$$

$$p' = s^6 - s^8 \quad p = s^6 - s^8$$

126 . Coloring, {3, 5, 11}

R: [7, 7, 8, 6, 3, A, B, C, B, C, 4, 5]

B: [6, 8, 7, 7, A, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 10

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 0, 1, 0, 1, 2, 2], [0, 0, 3, 2, 2, 3, 0, 2, 0, 2, 0, 2], [0, 0, 2, 0, 2, 2, 0, 3, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 0, 2, 0, 2, 0, 6], [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6]] \$$$

$$[0, 0, y_8, y_7, y_4, y_5, y_6, y_8 - y_7 - y_4 + y_5 - y_6 - y_1 + y_2 + y_3, 0, y_1, y_2, y_3]$$

$$p = -s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: {{1, 2, 3, 6, 7, 8, 10, 11}, {9, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1] , [1, 3, 1, 0, 0, 2, 1, 2, 1, 2, 1, 2] , [1, 2, 2, 0, 0, 1, 1, 3, 2, 1, 2, 1] , [2, 1, 1, 0, 0, 1, 2, 2, 1, 1, 3, 2] , [3, 1, 1, 0, 0, 2, 1, 1, 2, 2, 2, 1] , [2, 2, 2, 0, 0, 3, 1, 1, 1, 1, 1, 2] , [1, 1, 3, 0, 0, 2, 2, 2, 1, 1, 1, 1] , [1, 1, 2, 0, 0, 1, 3, 1, 1, 2, 2, 2] , [2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1] , [1, 3, 1, 0, 0, 2, 1, 2, 1, 2, 1, 2, 1, 2]] \$

$[-3y_1 - 3y_3 + 8y_7 - 3y_6 + 5y_8, -3y_4 - 3y_2 + 5y_7 - 3y_5 + 8y_8, 3y_1, 0, 0, 3y_4, 3y_2, 3y_3, 3y_7, 3y_6, 3y_5, 3y_8]$

$$p = -s + s^9 \quad p' = -s + s^9$$

127 . Coloring, {3, 5, 12}

R: [7, 7, 8, 6, 3, A, B, C, B, C, 1, 9]

B: [6, 8, 7, 7, A, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 1, 3, 1, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 2] , [5, 0, 0, 0, 0, 4, 0, 2, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$[y_1, 0, y_3, 0, 0, y_3, y_2, y_5, y_4, y_5, y_6, y_7]$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1] , [0, 3, 1, 1, 1, 0, 3, 2, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 2, 3, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 1, 4, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 2, 4, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 3, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 4, 1, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 4, 2, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 2, 3, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 1, 4, 0, 2, 3, 0]] \$

$$[0, y_1 - y_7 - y_3 + y_4 + y_5 - y_6, y_2 - y_7, y_1, y_2, y_7, y_3, y_4, 0, y_5, y_6, y_7]$$

$$p = s^3 - s^9 \quad p' = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p'' = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

128 . Coloring, {3, 6, 7}

R: [7, 7, 8, 6, A, 3, A, C, B, C, 1, 5]

B: [6, 8, 7, 7, 3, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3], [1, 0, 1, 0, 3, 0, 2, 1, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 1, 1, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 6, 0, 5]] \$$$

$$[y_2 - y_3 + y_5, 0, y_2 - y_3, 0, y_1, y_5, y_2, y_3, 0, y_4, y_5, y_6]$$

$$p' = -s^5 + s^8 \quad p = -s^4 + s^7 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 3, 2, 1, 1, 3, 2], [0, 1, 0, 3, 0, 0, 3, 1, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 3, 1, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2]] \$$$

$$[0, 3 y_7, 3 y_3, -3 y_7 - 6 y_3 - 3 y_4 - 3 y_5 + 13 y_6 - 3 y_2 - 3 y_1 + 13 y_8, 0, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_2, 3 y_1, 3 y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9 \quad p = s^5 - s^7 - s^8 + s^{10}$$

129 . Coloring, {3, 6, 8}

R: [7, 7, 8, 6, A, 3, B, B, B, C, 1, 5]

B: [6, 8, 7, 7, 3, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}, {1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 4, 2] , [4, 0, 1, 0, 2, 0, 2, 1, 0, 2, 3, 1] , [3, 0, 0, 0, 1, 0, 4, 1, 0, 2, 3, 2] , [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 5, 2] , [5, 0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 1] , [3, 0, 0, 0, 1, 0, 5, 0, 0, 2, 3, 2] , [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 5, 2] , [5, 0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 1] , [3, 0, 0, 0, 1, 0, 5, 0, 0, 2, 3, 2]] \$

$[-3 y_1 + 14 y_2 - 7 y_3 - 7 y_5 + 8 y_6, 0, 3 y_1, 0, 3 y_2, 3 y_3, 8 y_2 - 7 y_3 - 3 y_4 - 7 y_5 + 14 y_6, 3 y_4, 0, 7 y_2 - 5 y_3 - 5 y_5 + 7 y_6, 3 y_5, 3 y_6]$

$p = -s^4 + s^7$ $p' = -s^4 + s^7$ $p'' = -s^5 + s^8$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 3, 2, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 0, 3, 3, 3, 0, 4] , [0, 3, 0, 0, 0, 0, 3, 4, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 3, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$[0, y_2, y_3, 2 y_3, 0, y_3, y_1, y_4, y_5, y_6, 0, y_7]$

$p' = -s^6 + s^8$ $p = -s^6 + s^8$

130 . Coloring, {3, 6, 9}

R: [7, 7, 8, 6, A, 3, B, C, C, C, 1, 5]

B: [6, 8, 7, 7, 3, A, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 2, 4], [2, 0, 1, 0, 4, 0, 2, 1, 0, 2, 2, 2], [2, 0, 0, 0, 2, 0, 2, 1, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 2, 0, 0, 2, 2, 5], [2, 0, 0, 0, 5, 0, 2, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 2, 0, 0, 5, 2, 3], [2, 0, 0, 0, 3, 0, 2, 0, 0, 2, 2, 5], [2, 0, 0, 0, 5, 0, 2, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 2, 0, 0, 5, 2, 3]] \$$

$$[y_4, 0, -y_1 - y_2 - y_5 - y_3 + 5y_4 - y_6, 0, y_1, y_2, y_4, y_5, 0, y_3, y_4, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 2, 0], [0, 3, 0, 2, 0, 0, 3, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 0, 2, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 3, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 2, 3, 0, 3, 3, 0], [0, 3, 0, 3, 0, 0, 3, 2, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 3, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 3, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 0, 2, 3, 0, 3, 2, 0]] \$$

$$[0, y_1, y_3, y_2, 0, y_3, y_4, y_5, 2y_3, y_6, y_7, 0]$$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

131 . Coloring, $\{3, 6, 10\}$

R: [7, 7, 8, 6, A, 3, B, C, B, 2, 1, 5]

B: [6, 8, 7, 7, 3, A, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 9
 See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 0, 4, 1, 0, 2, 2, 1] , [2, 2, 0, 0, 1, 0, 4, 1, 0, 1, 4, 1] , [4, 1, 0, 0, 1, 0, 4, 0, 0, 1, 4, 1] , [4, 1, 0, 0, 1, 0, 5, 0, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 5, 0, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9, y_{10}]$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6
 See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 3, 1, 5] , [0, 0, 0, 1, 0, 0, 1, 0, 5, 3, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$[0, 0, y_3, y_1, 0, y_3, y_2, y_3, y_4, y_5, y_6, y_7]$

$$p = -s^6 + s^8 \quad p' = -s^6 + s^8$$

132 . Coloring, $\{3, 6, 11\}$

R: [7, 7, 8, 6, A, 3, B, C, B, C, 4, 5]

B: [6, 8, 7, 7, 3, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 10

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 9
 See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3] , [0, 0, 1, 3, 3, 2, 0, 1, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 3, 0, 1, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 2, 0, 2, 0, 2, 0, 4] , [0, 0, 2, 0, 4, 0, 0, 3, 0, 3, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 2, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$$

$$[0, 0, y_9, y_7, y_8, y_6, y_5, y_4, 0, y_3, y_1, y_2]$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 2, 1, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 1, 0, 3, 2, 3, 2, 1], [2, 3, 0, 0, 0, 1, 0, 3, 1, 1, 3, 2], [3, 1, 0, 0, 0, 2, 0, 3, 2, 1, 3, 1], [3, 1, 0, 0, 0, 3, 0, 1, 1, 2, 3, 2], [3, 2, 0, 0, 0, 3, 0, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 3, 0, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 1, 0, 3, 2, 3, 2, 1], [2, 3, 0, 0, 0, 1, 0, 3, 1, 1, 3, 2]] \$$$

$$[3 y_1, -3 y_4 - 3 y_5 + 5 y_2 - 3 y_6 + 8 y_7, -3 y_1 - 3 y_3 + 8 y_2 - 3 y_8 + 5 y_7, 0, 0, 3 y_4, 3 y_5, 3 y_3, 3 y_2, 3 y_8, 3 y_6, 3 y_7]$$

$$p' = s^3 - s^9 \quad p = -s^3 + s^9$$

133 . Coloring, {3, 6, 12}

R: [7, 7, 8, 6, A, 3, B, C, B, C, 1, 9]

B: [6, 8, 7, 7, 3, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3], [3, 0, 1, 0, 0, 0, 2, 1, 3, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 1, 2, 0, 5, 1], [5, 0, 0, 0, 0, 4, 0, 1, 0, 5, 1], [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[y_1, 0, y_2, 0, 0, y_4, y_5, y_3, y_6, y_4, y_8, y_7]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 0, 3, 2, 0, 3, 1, 0] , [0, 3, 1, 1, 0, 0, 3, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 3, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 2, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 3, 2, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 3, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 3, 0, 3, 0, 3, 3, 0]] \$

$$[0, y_1 + y_2 - y_3 - y_5 + y_4 + y_6 - y_7, y_1, y_2, y_3, y_8, y_5, y_4, 0, y_6, y_7, y_8]$$

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9 \quad p = -s^4 + s^{10}$$

134 . Coloring, {3, 7, 8}

R: [7, 7, 8, 6, A, A, A, B, B, C, 1, 5]

B: [6, 8, 7, 7, 3, 3, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 0, 2, 0, 0, 5, 1, 4] , [1, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

$$[y_1, 0, 0, 0, y_6, y_7, y_2, y_7, 0, y_3, y_4, y_5]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 2, 2] , [0, 0, 1, 2, 0, 0, 4, 2, 2, 0, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 0, 4, 4] , [0, 0, 0, 4, 0, 0, 2, 0, 4, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 2, 0, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 4, 0, 4, 0, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 0, 4, 4]] \$

$$[0, 14 y_2, 7 y_1, 11 y_1 - 16 y_2 - 7 y_3 + 9 y_4 - 7 y_5 + 9 y_6, 0, 7 y_2, 7 y_3, 14 y_1 - 21 y_2, 7 y_4, 0, 7 y_5, 7 y_6]$$

$$p = s^3 - s^5 - s^6 + s^8 \quad p = -s^3 + s^9 \quad p = -s^3 - s^4 + s^6 + s^7$$

135 . Coloring, {3, 7, 9}

R: [7, 7, 8, 6, A, A, A, C, C, C, 1, 5]

B: [6, 8, 7, 7, 3, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 7	5 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$$

$$[2 y_3, 0, 0, 0, y_1, y_3, y_2, y_3, 0, y_4, 0, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 4, 0], [0, 0, 1, 4, 0, 0, 4, 2, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[0, 2 y_5, y_2, y_1, 0, y_5, y_4, 2 y_2 - 3 y_5, 2 y_5, 0, y_3, 0]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6 \quad p' = -s^4 + s^7$$

136 . Coloring, {3, 7, 10}

R: [7, 7, 8, 6, A, A, A, C, B, 2, 1, 5]

B: [6, 8, 7, 7, 3, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 0, 4, 0, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_6, y_5, 0, 0, y_4, y_3, y_2, y_3, 0, y_1, y_3, y_6 - y_3]$$

$$p = -s^4 + s^7 \quad p' = s^5 - s^8 \quad p'' = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 3, 3] , [0, 0, 1, 3, 0, 0, 4, 0, 3, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 4, 0, 3, 0, 3, 2]] \$

$$[0, 0, -5y_1 - 10y_3 - 5y_2 + 11y_4 - 5y_5 + 11y_6, 5y_1, 0, 5y_3, 5y_2, 5y_3, 5y_4, 0, 5y_5, 5y_6]$$

$$p' = s^3 + s^4 - s^6 - s^7 \quad p'' = s^3 - s^5 - s^6 + s^8$$

137 . Coloring, {3, 7, 11}

R: [7, 7, 8, 6, A, A, A, C, B, C, 4, 5]

B: [6, 8, 7, 7, 3, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

[0, 0, 0, y_6 , y_5 , y_4 , $2y_3$, y_3 , 0, y_2 , y_3 , y_1]

$$p' = -s^4 + s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 7, 11}} order: 10
See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 3, 1] , [3, 0, 1, 0, 0, 2, 2, 2, 1, 0, 3, 2] , [3, 0, 2, 0, 0, 3, 1, 0, 2, 0, 4, 1] , [4, 0, 3, 0, 0, 3, 2, 0, 1, 0, 1, 2] , [1, 0, 3, 0, 0, 4, 3, 0, 2, 0, 2, 1] , [2, 0, 4, 0, 0, 1, 3, 0, 1, 0, 3, 2] , [3, 0, 1, 0, 0, 2, 4, 0, 2, 0, 3, 1] , [3, 0, 2, 0, 0, 3, 1, 0, 1, 0, 4, 2] , [4, 0, 3, 0, 0, 3, 2, 0, 2, 0, 1, 1]] \$

[-3 y_1 - 3 y_2 - 3 y_3 - 3 y_4 - 3 y_5 + 13 y_6 - 3 y_7 + 13 y_8 , 3 y_1 , 3 y_2 , 0, 0, 3 y_3 , 3 y_4 , 3 y_5 , 3 y_6 , 0, 3 y_7 , 3 y_8]

$$p = s^3 + s^4 - s^8 - s^9$$

138 . Coloring, {3, 7, 12}

R: [7, 7, 8, 6, A, A, A, C, B, C, 1, 9]

B: [6, 8, 7, 7, 3, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 5] , [2, 0, 0, 0, 0, 0, 1, 0, 5, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 3, 1, 5, 2] , [5, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 1] , [3, 0, 0, 0, 0, 0, 5, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 3, 0, 2, 5, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 5]] \$

$[y_3, 0, 0, 0, 0, y_2, y_1, y_2, y_4, y_6, y_5, y_7]$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 3, 1] , [0, 0, 3, 3, 1, 0, 4, 2, 0, 0, 3, 0] , [0, 0, 1, 3, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$[0, 2y_6, y_2, y_1, y_3, y_6, y_4, 2y_3 - 3y_6, 0, 0, y_5, y_6]$

$$p' = -s^5 + s^8 \quad p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

139 . Coloring, {3, 8, 9}

R: [7, 7, 8, 6, A, A, B, B, C, C, 1, 5]

B: [6, 8, 7, 7, 3, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	10 vs 10

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2]] \$

$$[y_2, 0, 0, 0, -y_3 + y_1, y_3, y_4, y_3, 0, y_2, y_1, y_3 + y_4]$$

$$p' = -s^3 + s^6 \quad p = -s^2 + s^8 \quad p = -s^2 + s^5 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 1, 1], [0, 2, 1, 1, 0, 0, 4, 2, 1, 2, 2, 1], [0, 2, 0, 2, 0, 0, 2, 2, 1, 4, 1, 2], [0, 4, \\ & 0, 1, 0, 0, 2, 2, 2, 2, 1, 2], [0, 2, 0, 1, 0, 0, 1, 4, 2, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 2, 2, 1, 2, 4], [0, 1, 0, 2, 0, 0, \\ & 2, 2, 4, 1, 2, 2], [0, 1, 0, 2, 0, 0, 2, 1, 2, 2, 4, 2], [0, 2, 0, 4, 0, 0, 2, 1, 2, 2, 2, 1], [0, 2, 0, 2, 0, 0, 4, 2, 1, 2, \\ & 2, 1]] \$ \end{aligned}$$

$$[0, y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, y_8, y_9, y_{10}]$$

140 . Coloring, {3, 8, 10}

R: [7, 7, 8, 6, A, A, B, B, B, 2, 1, 5]

B: [6, 8, 7, 7, 3, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 4, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, \\ & 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, \\ & 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$ \end{aligned}$$

$$[y_1, y_2, 0, 0, 2y_6, y_6, y_3, y_6, 0, y_4, y_5, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 0, 4], [0, 0, 1, 0, 0, 0, 4, 0, 4, 2, 0, 5], [0, 0, 0, 0, 0, 0, 1, 0, 5, 4, 0, 6], [0, 0, \\ & 0, 0, 0, 0, 6, 1, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, \\ & 0, 0, 0, 0, 0, 0]] \$ \end{aligned}$$

$0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$[0, 0, y_1, 2y_4, 0, y_4, y_3, y_4, y_2, y_6, 0, y_5]$

$$p = -s^5 + s^7 \quad p' = -s^5 + s^7$$

141 . Coloring, {3, 8, 11}

R: [7, 7, 8, 6, A, A, B, B, B, C, 4, 5]

B: [6, 8, 7, 7, 3, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 4, 2], [0, 0, 0, 4, 2, 2, 0, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 4, 0, 0, 0, 4, 0, 3], [0, 0, 0, 0, 3, 3, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6]] \$$

$[0, 0, 0, y_7, y_6, y_5, 2y_4, y_4, 0, y_3, y_2, y_1]$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 0, 2], [0, 2, 1, 0, 0, 2, 2, 2, 2, 2, 0, 3], [0, 2, 2, 0, 0, 0, 1, 2, 3, 2, 0, 4], [0, 2, 0, 0, 0, 2, 2, 4, 1, 0, 5], [0, 1, 0, 0, 0, 0, 0, 2, 5, 2, 0, 6], [0, 2, 0, 0, 0, 0, 0, 1, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$[y_1, y_4, y_2, 0, 0, y_3, y_5, y_6, y_7, y_8, 0, y_9]$

142 . Coloring, {3, 8, 12}

R: [7, 7, 8, 6, A, A, B, B, B, C, 1, 9]

B: [6, 8, 7, 7, 3, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 0, 2, 1, 5, 2] , [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$[y_1, 0, 0, 0, 0, y_3, y_2, y_3, y_4, y_5, y_6, y_7]$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 0, 4, 2, 0, 2, 0, 1] , [0, 2, 2, 0, 1, 0, 3, 2, 0, 4, 0, 2] , [0, 4, 1, 0, 2, 0, 2, 2, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 1, 4, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 2, 3, 0, 1, 0, 4] , [0, 1, 2, 0, 4, 0, 2, 2, 0, 2, 0, 3] , [0, 2, 4, 0, 3, 0, 2, 1, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 0, 4, 2, 0, 2, 0, 1]] \$

$[0, y_1, y_2, 2y_3, y_4, y_3, y_5, y_6, 0, y_7, 0, y_8]$

$$p = -s^2 + s^9$$

143 . Coloring, {3, 9, 10}

R: [7, 7, 8, 6, A, A, B, C, C, 2, 1, 5]

B: [6, 8, 7, 7, 3, 3, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 4, 0, 0, 3, 2, 1], [2, 3, 0, 0, 1, 0, 4, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 5, 0, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$

$[y_1, y_2, 0, 0, y_4, y_5, y_6, y_5, 0, y_3, y_7, y_8]$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: $\{\{4, 7, 9, 10, 11, 12\}\}$ order: 6
See Matrix

$\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 2, 2], [0, 0, 1, 2, 0, 0, 4, 0, 2, 2, 3, 2], [0, 0, 0, 3, 0, 0, 3, 0, 2, 4, 2, 2], [0, 0, 0, 2, 0, 0, 3, 0, 2, 3, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 3, 2, 3], [0, 0, 0, 2, 0, 0, 2, 0, 3, 2, 4, 3], [0, 0, 0, 4, 0, 0, 2, 0, 3, 2, 3, 2], [0, 0, 0, 3, 0, 0, 4, 0, 2, 2, 3, 2], [0, 0, 0, 3, 0, 0, 3, 0, 2, 4, 2, 2]] \$$

$[0, 0, y_1, y_2, 0, y_4, y_3, y_4, y_5, y_6, y_7, y_8]$

$$p = -s^3 + s^9$$

144 . Coloring, $\{3, 9, 11\}$

R: [7, 7, 8, 6, A, A, B, C, C, C, 4, 5]

B: [6, 8, 7, 7, 3, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 2, 4] , [0, 0, 0, 2, 4, 2, 0, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 2, 0, 0, 0, 6, 0, 3] , [0, 0, 0, 0, 3, 2, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

[0, 0, 0, y₅, y₆, y₇, 2 y₂, y₂, 0, y₃, y₄, y₁]

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 2, 3, 6, 7, 8, 10, 11}} order: 8

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 2, 0] , [2, 2, 1, 0, 0, 2, 2, 2, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 2, 1, 2, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 3, 2, 2, 0, 1, 2, 0] , [2, 1, 3, 0, 0, 2, 2, 2, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 2, 3, 1, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 2, 2, 0, 3, 1, 0] , [1, 3, 2, 0, 0, 2, 2, 2, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 1, 2, 3, 0, 2, 2, 0]] \$

[y₃, y₂, y₁, 0, 0, y₆, y₅, y₄, y₉, y₈, y₇, 0]

145 . Coloring, {3, 9, 12}

R: [7, 7, 8, 6, A, A, B, C, C, C, 1, 9]

B: [6, 8, 7, 7, 3, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	9 vs 9	9 vs 9	3 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 1, 2, 5] , [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5] , [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5] , [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5] , [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5] , [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5]] \$

$$[2 y_2, 0, 0, 0, 0, 5 y_2 - 2 y_3, 2 y_2, 5 y_2 - 2 y_3, -2 y_1 + 2 y_3, 2 y_1, 2 y_2, 2 y_3]$$

$$p = -s^3 + s^4 \quad p = -s^3 + s^5 \quad p = -s^3 + s^6 \quad p = -s^3 + s^7 \quad p = -s^3 + s^8$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 2, 0], [0, 2, 3, 2, 0, 0, 4, 2, 0, 2, 1, 0], [0, 2, 0, 1, 0, 0, 5, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 1, 2, 0, 5, 2, 0], [0, 5, 0, 2, 0, 0, 2, 4, 0, 1, 2, 0], [0, 1, 0, 2, 0, 0, 2, 5, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 1, 0, 2, 5, 0], [0, 2, 0, 5, 0, 0, 4, 2, 0, 2, 1, 0], [0, 2, 0, 1, 0, 0, 5, 2, 0, 4, 2, 0]] \$$$

$$[0, y_1, y_2, y_3, 2 y_4, y_4, y_5, y_6, 0, y_7, y_8, 0]$$

$$p = -s^3 + s^9$$

146 . Coloring, {3, 10, 11}

R: [7, 7, 8, 6, A, A, B, C, B, 2, 4, 5]

B: [6, 8, 7, 7, 3, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 3, 1], [0, 2, 0, 3, 1, 2, 2, 0, 0, 3, 2, 1], [0, 3, 0, 2, 1, 3, 2, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 3, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 3, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 2, 4, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 2, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 3, 2, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 4, 2, 0, 0, 3, 2, 0]] \$$$

$$[0, y_4, 0, y_1, y_2, y_3, y_5, y_6, 0, y_7, y_8, y_9]$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 1, 3], [1, 0, 1, 0, 0, 2, 2, 0, 3, 2, 1, 4], [1, 0, 2, 0, 0, 1, 1, 0, 4, 2, 0, 5], [0, 0, 1, 0, 0, 1, 2, 0, 5, 1, 0, 6], [0, 0, 1, 0, 0, 0, 1, 0, 6, 2, 0, 6], [0, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

147 . Coloring, {3, 10, 12}

R: [7, 7, 8, 6, A, A, B, C, B, 2, 1, 9]

B: [6, 8, 7, 7, 3, 3, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 4, 0, 1, 1, 4, 1], [4, 1, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[y_1, y_4 + y_3 - 2y_6, 0, 0, 0, y_6, y_5, y_6, y_4, y_3, y_2, -y_6 + y_3]$$

$$p = s^4 - s^7 \quad p' = -s^4 + s^7 \quad p'' = s^5 - s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 1, 3], [0, 0, 3, 1, 3, 0, 4, 0, 0, 2, 1, 2], [0, 0, 3, 1, 2, 0, 4, 0, 0, 4, 0, 2], [0, 0, 2, 0, 2, 0, 4, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0, 2, 0, 0, 4, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 4, 0, 0, 4, 0, 4], [0, 0, 4, 0, 2, 0, 4, 0, 0, 4, 0, 2], [0, 0, 2, 0, 2, 0, 4, 0, 0, 4, 0, 4]] \$$$

$$[0, 0, y_1, y_2, y_3, y_5, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^4 + s^9$$

148 . Coloring, {3, 11, 12}

R: [7, 7, 8, 6, A, A, B, C, B, C, 4, 9]

B: [6, 8, 7, 7, 3, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 4, 3] , [0, 0, 0, 4, 0, 3, 0, 0, 3, 2, 3, 1] , [0, 0, 0, 3, 0, 4, 0, 0, 1, 3, 3, 2] , [0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 1, 0, 0, 4, 3, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 4, 3]] \$

[0, 0, 0, y_2 , 0, y_1 , 2 y_3 , y_3 , y_4 , y_5 , y_6 , y_7]

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 2, 3, 6, 7, 8, 10, 11}} order: 8

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 1, 1] , [1, 2, 3, 0, 1, 2, 2, 2, 0, 2, 1, 0] , [1, 2, 3, 0, 0, 1, 3, 2, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 1, 3, 2, 0, 3, 2, 0] , [2, 3, 1, 0, 0, 2, 1, 2, 0, 3, 2, 0] , [2, 3, 2, 0, 0, 2, 1, 3, 0, 1, 2, 0] , [2, 1, 2, 0, 0, 2, 2, 3, 0, 1, 3, 0] , [3, 1, 2, 0, 0, 2, 2, 1, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 3, 2, 1, 0, 2, 1, 0] , [1, 2, 3, 0, 0, 3, 2, 2, 0, 2, 1, 0]] \$

[$y_1 - y_2 + y_5 + y_6 + y_7 - y_4 - y_3 + y_8 - y_9$, $y_1, y_2, 0, y_5, y_6, y_7, y_4, 0, y_3, y_8, y_9$]

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

149 . Coloring, {4, 5, 6}

$$\Omega p(\Delta)=0: p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, C, B, C, 1, 5]

B: [6, 8, 8, 6, A, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 6	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 2, 0, 4, 0, 0, 0, 3, 3] , [3, 0, 2, 0, 3, 0, 4, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$

[$y_6, 0, y_5, 0, y_4, 0, y_3, 0, 0, 0, y_2, y_1$]

Omega Rank for B : cycles: {{9, 12}, {2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 2, 0, 2, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 0, 2, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 1, 0, 4, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 2, 0, 2, 1, 1, 4, 2] , [0, 1, 0, 4, 0, 2, 0, 2, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 4, 0, 1, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 2, 0, 2, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 0, 2, 1, 2, 2, 2]] \$

[$0, 2y_1, 0, -2y_3 - 2y_4 - 39y_6 + 11y_1 + 11y_2 + 11y_5, 0, 2y_2, 0, 2y_3, 3y_1 + 3y_2 + 3y_5 - 11y_6, 2y_4, 2y_5, 2y_6$]

$$p = -s + s^7 \quad p' = -s + s^7$$

150 . Coloring, {4, 5, 7}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7 \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8$$

R: [7, 7, 7, 7, 3, A, A, C, B, C, 1, 5]

B: [6, 8, 8, 6, A, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 3, 1, 3], [1, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3]] \$$

$$[y_1, 0, y_2, 0, y_3, 0, y_6, 0, 0, y_4, y_5, y_7]$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{3, 4, 6, 8, 11\}\}$ order: 10

See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 1, 3, 1], [0, 1, 2, 3, 0, 2, 0, 3, 1, 0, 2, 2], [0, 0, 2, 2, 0, 3, 0, 3, 2, 0, 3, 1], [0, 0, 3, 3, 0, 2, 0, 2, 1, 0, 3, 2], [0, 0, 2, 3, 0, 3, 0, 3, 2, 0, 2, 1], [0, 0, 3, 2, 0, 3, 0, 2, 1, 0, 3, 2], [0, 0, 3, 3, 0, 2, 0, 3, 0, 2, 0, 3, 2, 1], [0, 0, 2, 2, 0, 3, 0, 3, 1, 0, 3, 2], [0, 0, 3, 3, 0, 2, 0, 2, 2, 0, 3, 1]] \$$

$$[0, -3y_1 - 3y_8 - 3y_4 - 3y_5 + 13y_6 - 3y_7 - 3y_2 + 13y_3, 3y_1, 3y_8, 0, 3y_4, 0, 3y_5, 3y_6, 3y_7, 3y_2, 3y_3]$$

$$p = -s^3 - s^4 + s^8 + s^9$$

151 . Coloring, $\{4, 5, 8\}$

$$\Omega p(\Delta)=0: \quad p' = s^3 - 8s^6 - 16s^7 \quad p = s^3 - 8s^6 - 16s^7$$

R: [7, 7, 7, 7, 3, A, B, B, B, C, 1, 5]

B: [6, 8, 8, 6, A, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 7	6 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 1, 4, 2] , [4, 0, 2, 0, 2, 0, 3, 0, 0, 0, 4, 1] , [4, 0, 2, 0, 1, 0, 6, 0, 0, 0, 3, 0] , [3, 0, 1, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, 0, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 3, 0, 2] , [0, 3, 2, 0, 0, 2, 0, 3, 2, 0, 0, 4] , [0, 0, 2, 0, 0, 0, 0, 5, 4, 0, 0, 5] , [0, 0, 0, 0, 0, 0, 2, 5, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, 2y_6, 2y_5, -4y_6 + 6y_4, 0, 2y_4, 0, 2y_3, 2y_2, -6y_6 + 9y_4, 0, 2y_1]$$

$$p' = s^5 - s^7 \quad p = s^5 - s^7$$

152 . Coloring, {4, 5, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, B, C, C, C, 1, 5]

B: [6, 8, 8, 6, A, 3, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 1, 2, 4] , [2, 0, 2, 0, 4, 0, 3, 0, 0, 0, 4, 1] , [4, 0, 4, 0, 1, 0, 4, 0, 0, 0, 3, 0] , [3, 0, 1, 0, 0, 0, 8, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 4, 0, 0, 0, 8, 0] , [8, 0, 0, 0, 0, 0, 4, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 8, 0, 0, 0, 4, 0]] \$

$$[y_2, 0, y_1, 0, y_4, 0, y_3, 0, 0, y_7, y_6, y_5]$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 3, 2, 0] , [0, 3, 2, 2, 0, 2, 0, 3, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 0, 5, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 4, 0, 2, 0, 0, 5, 0] , [0, 0, 4, 5, 0, 3, 0, 2, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 5, 0, 4, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 2, 0, 3, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 0, 5, 0, 0, 3, 0]] \$

[0, 2 y₇, 2 y₆, 2 y₄, 0, 2 y₅, 0, 2 y₃, 2 y₁, 3 y₁, 2 y₂, 0]

$$p = -s^3 + s^8$$

153 . Coloring, {4, 5, 10}

$$\Omega p(\Delta)=0: \quad p = 3s^2 - 2s^3 + 8s^5 - 32s^7 \quad p' = -3s^2 + 2s^3 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, A, B, C, B, 2, 1, 5]

B: [6, 8, 8, 6, A, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

[y₂, y₃, y₄, 0, y₃, 0, y₁, 0, 0, y₆, y₅, y₆]

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {3, 4, 6, 8, 11}} order: 10

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 3, 1, 3] , [0, 0, 2, 1, 0, 2, 0, 1, 3, 0, 2, 5] , [0, 0, 2, 2, 0, 1, 0, 2, 5, 0, 1, 3] , [0, 0, 1, 1, 0, 2, 0, 2, 3, 0, 2, 5] , [0, 0, 2, 2, 0, 1, 0, 1, 5, 0, 2, 3] , [0, 0, 1, 2, 0, 2, 0, 2, 3, 0, 1, 5] , [0, 0, 2, 1, 0, 2, 0, 1, 5, 0, 2, 3] , [0, 0, 2, 2, 0, 1, 0, 2, 3, 0, 1, 5]] \$

$$[0, 0, -y_1 - y_2 - y_3 + y_7 + y_4 - y_5 + y_6, y_1, 0, y_2, 0, y_3, y_7, y_4, y_5, y_6]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

154 . Coloring, {4, 5, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^2 + 2s^3 - 8s^5 + 32s^7 \quad p' = 3s^2 + 2s^3 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, A, B, C, B, C, 4, 5]

B: [6, 8, 8, 6, A, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 1, 3, 3], [0, 0, 2, 3, 3, 0, 3, 0, 0, 0, 4, 1], [0, 0, 3, 4, 1, 0, 5, 0, 0, 0, 3, 0], [0, 0, 1, 3, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0]] \$$$

$$[0, 0, y_2, y_1, y_4, 0, y_3, 0, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {9, 12}} order: 10

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 3, 1, 1], [1, 3, 2, 0, 0, 2, 0, 3, 1, 0, 2, 2], [2, 0, 2, 0, 0, 1, 0, 5, 2, 0, 3, 1], [3, 0, 1, 0, 0, 2, 0, 2, 1, 0, 5, 2], [5, 0, 2, 0, 0, 3, 0, 1, 2, 0, 2, 1], [2, 0, 3, 0, 0, 5, 0, 2, 1, 0, 1, 2], [1, 0, 5, 0, 0, 2, 0, 3, 2, 0, 2, 1], [2, 0, 2, 0, 0, 1, 0, 5, 1, 0, 3, 2], [3, 0, 1, 0, 0, 2, 0, 2, 2, 0, 5, 1]] \$$$

$$[-3 y_1 - 3 y_2 - 3 y_3 - 3 y_4 + 13 y_5 - 3 y_6 - 3 y_7 + 13 y_8, 3 y_1, 3 y_2, 0, 0, 3 y_3, 0, 3 y_4, 3 y_5, 3 y_6, 3 y_7, 3 y_8]$$

$$p = -s^3 - s^4 + s^8 + s^9$$

155 . Coloring, {4, 5, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^2 - 10s^3 - 40s^5 + 32s^6 - 32s^7 + 128s^8 \quad p' = 3s^2 + 2s^3 + 8s^4 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, A, B, C, B, C, 1, 9]

B: [6, 8, 8, 6, A, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	8 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 6, 1] , [6, 0, 0, 0, 0, 0, 3, 0, 1, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$[y_1, 0, y_4, 0, 0, 0, y_2, 0, y_3, y_4, y_5, y_6]$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 2, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 2, 0, 3, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 1, 0, 5, 0, 1, 3, 0] , [0, 1, 1, 3, 0, 2, 0, 4, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 3, 0, 2, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 5, 0, 2, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 4, 0, 3, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 2, 0, 5, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 2, 0, 4, 0, 0, 5, 0]] \$

$[0, y_3, y_2, y_1, y_9, y_8, 0, y_7, 0, y_6, y_5, y_4]$

156 . Coloring, {4, 6, 7}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7 \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8$$

R: [7, 7, 7, 7, A, 3, A, C, B, C, 1, 5]

B: [6, 8, 8, 6, 3, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 6
See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 3, 1, 3], [1, 0, 0, 0, 3, 0, 3, 0, 0, 6, 0, 3], [0, 0, 0, 0, 3, 0, 1, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$$

$$[y_1, 0, y_5, 0, y_3, 0, y_2, 0, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 4, 6, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 0, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 3, 0, 1, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 0, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 3, 0, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 1, 0, 3, 1, 3, 2, 2], [0, 3, 0, 2, 0, 2, 0, 2, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 0, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 3, 0, 1, 2, 2, 3, 1]] \$$

$$[0, 2y_1, 2y_2, 11y_1 + 11y_2 + 11y_3 - 2y_4 - 39y_6 - 2y_5 + 11y_7, 0, 2y_3, 0, 2y_4, 2y_6, 2y_5, 2y_7, 3y_1 + 3y_2 + 3y_3 - 11y_6 + 3y_7]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

157 . Coloring, $\{4, 6, 8\}$

$$\Omega p(\Delta)=0: \quad p' = s^3 + 4s^4 - 8s^6 - 16s^7 \quad p = s^3 - 16s^5 - 8s^6 + 16s^7 + 64s^8$$

R: [7, 7, 7, 7, A, 3, B, B, B, C, 1, 5]

B: [6, 8, 8, 6, 3, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 1, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 2, 4, 1], [4, 0, 0, 0, 1, 0, 4, 0, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 2, 4, 1], [4, 0, 0, 0, 1, 0, 4, 0, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 4, 2]] \$$

$[2y_1, 0, -2y_1 - 2y_4 + 2y_3 + 2y_2, 0, 2y_4, 0, -9y_4 - 2y_3 + 7y_2, 0, 0, 2y_3, 2y_2, -7y_4 - 2y_3 + 5y_2]$

$$p' = -s^2 + s^5 \quad p = -s^2 + s^5 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 3, 0, 2], [0, 3, 0, 0, 0, 2, 0, 3, 2, 2, 0, 4], [0, 2, 0, 0, 0, 0, 0, 3, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$[0, y_1, y_2, 2y_2, 0, y_3, 0, y_4, y_5, y_6, 0, y_7]$

$$p = -s^6 + s^8$$

158 . Coloring, $\{4, 6, 9\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: $[7, 7, 7, 7, A, 3, B, C, C, C, 1, 5]$

B: $[6, 8, 8, 6, 3, A, A, B, B, 2, 4, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 1, 2, 4], [2, 0, 0, 0, 4, 0, 3, 0, 0, 2, 4, 1], [4, 0, 0, 0, 1, 0, 2, 0, 0, 4, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 2, 4], [2, 0, 0, 0, 4, 0, 3, 0, 0, 2, 4, 1], [4, 0, 0, 0, 1, 0, 2, 0, 0, 4, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 2, 4]] \$$$

$$[16y_1, 0, 16y_3, 0, 16y_2, 0, 20y_1 + 20y_3 + 27y_2 - 25y_4, 0, 0, -20y_2 + 28y_4, 16y_4, 28y_1 + 28y_3 + 25y_2 - 35y_4]$$

$$p' = -s^3 + s^6 \quad p = s^2 - s^5 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 3, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 4, 0, 2, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 3, 0, 2, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 3, 0, 2, 4, 0]] \$$$

$$[0, y_7, y_6, y_5, 0, y_4, 0, y_3, 2y_6, y_1, y_2, 0]$$

$$p = -s^2 + s^8$$

159 . Coloring, $\{4, 6, 10\}$

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 + 32s^7 \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 + 32s^7 + 64s^8$$

R: [7, 7, 7, 7, A, 3, B, C, B, 2, 1, 5]

B: [6, 8, 8, 6, 3, A, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 1, 3, 1], [3, 1, 0, 0, 1, 0, 5, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 4, 0, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]]$$

6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

[y₁, y₂, y₇, 0, y₃, 0, y₄, 0, 0, y₅, y₆, y₇]

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 3, 1, 3], [0, 0, 0, 1, 0, 2, 0, 1, 3, 2, 2, 5], [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 1, 5], [0, 0, 0, 1, 0, 2, 0, 0, 5, 1, 0, 7], [0, 0, 0, 0, 0, 1, 0, 0, 7, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[0, 0, y₁, y₂, 0, y₃, 0, y₆, y₄, y₅, y₇, y₈]

160 . Coloring, {4, 6, 11}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 - 32s^7 \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 - 32s^7 + 64s^8$$

R: [7, 7, 7, 7, A, 3, B, C, B, C, 4, 5]

B: [6, 8, 8, 6, 3, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 7	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 1, 3, 3], [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 4, 1], [0, 0, 0, 4, 1, 0, 3, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 3, 3], [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 4, 1], [0, 0, 0, 4, 1, 0, 3, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 3, 3]] \$

[0, 0, -y₂ - 6 y₁ + 4 y₃ + 5 y₄, y₂, 5 y₁ - 2 y₃ - 4 y₄, 0, y₁, 0, 0, -8 y₁ + 5 y₃ + 6 y₄, y₃, y₄]

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 1, 0, 3, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 0, 2, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 3, 0, 2, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 3, 0, 1, 1, 3, 2, 2] , [2, 3, 0, 0, 0, 2, 0, 2, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 1, 0, 3, 2, 2, 3, 1]] \$

$[-3y_7 + 8y_3 - 3y_4 + 5y_2, -3y_1 - 3y_6 + 5y_3 - 3y_5 + 8y_2, 3y_1, 0, 0, 3y_6, 0, 3y_7, 3y_3, 3y_4, 3y_5, 3y_2]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

161 . Coloring, {4, 6, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, 3, B, C, B, C, 1, 9]

B: [6, 8, 8, 6, 3, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 6, 1] , [6, 0, 0, 0, 0, 0, 3, 0, 1, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$[y_2, 0, y_3, 0, 0, 0, y_1, 0, y_5, y_3, y_4, y_6]$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 2, 0, 3, 0, 2, 2, 0] , [0, 2, 1, 2, 0, 1, 0, 5, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 2, 0, 3, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 3, 0, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 5, 0, 1, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 0, 3, 0, 2, 0, 3]] \$

$0, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 2, 0, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 1, 0, 5, 0, 2, 3, 0]] \$$

$[0, y_1, y_2, y_3, y_4, 0, y_5, 0, y_6, y_7, y_8]$

162 . Coloring, {4, 7, 8}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^5 + 32s^7 \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 + 32s^7 - 64s^8$$

R: [7, 7, 7, 7, A, A, A, B, B, C, 1, 5]

B: [6, 8, 8, 6, 3, 3, B, C, C, 2, 4, 9]

' See graph

' ' See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 6	6 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$\$ [[2, 0, 0, 0, 2, 0, 4, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$$

$[y_1, 0, 0, 0, y_2, 0, y_3, 0, 0, y_4, y_5, y_6]$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$\$ [[0, 2, 2, 2, 0, 2, 0, 2, 2, 0, 2, 2], [0, 0, 2, 2, 0, 2, 0, 4, 2, 0, 0, 4], [0, 0, 2, 0, 0, 2, 0, 2, 4, 0, 0, 6], [0, 0, 2, 0, 0, 0, 2, 6, 0, 0, 6], [0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8], [0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$[0, y_4, y_2, y_1, 0, y_2 + y_1 - y_6 - y_5 + y_3, 0, y_6, y_5, 0, y_4, y_3]$

$$p' = s^6 - s^7 \quad p = s^6 - s^8$$

163 . Coloring, {4, 7, 9}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, A, A, C, C, C, 1, 5]

B: [6, 8, 8, 6, 3, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 5	6 vs 7

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 0, 4, 0, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$$$

$$[y_1, 0, 0, 0, y_2, 0, y_3, 0, 0, y_5, 0, y_4]$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 2, 2, 2, 0, 2, 0, 2, 2, 0, 4, 0], [0, 0, 2, 4, 0, 2, 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 2, 0, 0, 4, 0], [0, 0, 4, 4, 0, 4, 0, 2, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 0, 4, 0, 0, 4, 0]] \$$$

$$[0, y_3, y_1, y_5, 0, y_4, 0, y_2, y_3, 0, y_6, 0]$$

$$p = -s^2 + s^7$$

164 . Coloring, {4, 7, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, A, C, B, 2, 1, 5]

B: [6, 8, 8, 6, 3, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	6 vs 7

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 3

See Matrix

$\$ [[2, 2, 0, 0, 2, 0, 4, 0, 0, 4, 1, 1], [1, 4, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$[y_2, y_1, 0, 0, y_2, 0, y_3, 0, 0, y_4, y_5, y_5]$

$$p' = -s^3 + s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{3, 4, 6, 8, 11\}\}$ order: 10

See Matrix

$\$ [[0, 0, 2, 2, 0, 2, 0, 2, 2, 0, 3, 3], [0, 0, 2, 3, 0, 2, 0, 2, 3, 0, 2, 2], [0, 0, 2, 2, 0, 3, 0, 2, 2, 0, 2, 3], [0, 0, 3, 2, 0, 2, 0, 2, 3, 0, 2, 2], [0, 0, 2, 2, 0, 2, 0, 3, 2, 0, 2, 3], [0, 0, 2, 2, 0, 2, 0, 2, 3, 0, 3, 2], [0, 0, 2, 3, 0, 2, 0, 2, 2, 0, 2, 3]] \$$

$[0, 0, -5y_1 - 5y_2 - 5y_3 + 11y_4 - 5y_5 + 11y_6, 5y_1, 0, 5y_2, 0, 5y_3, 5y_4, 0, 5y_5, 5y_6]$

$$p = -s - s^2 + s^6 + s^7$$

165 . Coloring, $\{4, 7, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, A, C, B, C, 4, 5]

B: [6, 8, 8, 6, 3, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 6	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 0, 4, 0, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

[0, 0, 0, y_1 , y_3 , 0, y_2 , 0, 0, y_4 , y_5 , y_6]

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

\$ [[2, 2, 2, 0, 0, 2, 0, 2, 2, 0, 3, 1] , [3, 0, 2, 0, 0, 2, 0, 4, 1, 0, 2, 2] , [2, 0, 2, 0, 0, 3, 0, 2, 2, 0, 4, 1] , [4, 0, 3, 0, 0, 2, 0, 2, 1, 0, 2, 2] , [2, 0, 2, 0, 0, 4, 0, 3, 2, 0, 2, 1] , [2, 0, 4, 0, 0, 2, 0, 2, 1, 0, 3, 2] , [3, 0, 2, 0, 0, 2, 0, 4, 2, 0, 2, 1] , [2, 0, 2, 0, 0, 3, 0, 2, 1, 0, 4, 2]] \$

$[-3 y_1 - 3 y_2 - 3 y_3 - 3 y_4 + 13 y_5 - 3 y_6 + 13 y_7, 3 y_1, 3 y_2, 0, 0, 3 y_3, 0, 3 y_4, 3 y_5, 0, 3 y_6, 3 y_7]$

$$p = -s^2 - s^3 + s^7 + s^8$$

166 . Coloring, {4, 7, 12}

$$\Omega p(\Delta)=0: p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, A, C, B, C, 1, 9]

B: [6, 8, 8, 6, 3, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 4, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 4, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 0, 4, 2, 3, 4] , [3, 0, 0, 0, 0, 2, 0, 4, 1, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 2, 4, 1] , [4, 0, 0, 0, 0, 0, 4, 0, 1, 3, 2, 2]] \$

$$[y_4, 0, 0, 0, 0, 0, y_3, 0, -y_4 + y_3 - y_1 + y_2 + y_5, y_1, y_2, y_5]$$

$$p = s - s^2 + s^3 - s^4 + s^5 - s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 2, 2, 2, 2, 2, 0, 2, 0, 0, 3, 1], [0, 0, 4, 3, 1, 2, 0, 4, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 0, 3, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0], [0, 0, 4, 3, 0, 3, 0, 4, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0]] \$$$

$$[0, 2y_7, y_3, y_2, y_1, y_4, 0, y_6, 0, 0, y_5, y_7]$$

$$p = -s^3 + s^8$$

167 . Coloring, {4, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, B, B, C, C, 1, 5]

B: [6, 8, 8, 6, 3, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	3 vs 6	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 2]] \$$$

$$[2y_1, 0, 0, 0, 2y_2, 0, -27y_2 + 16y_3 + 7y_1, 0, 0, 3y_1 - 7y_2 + 4y_3, 2y_3, -16y_2 + 10y_3 + 4y_1]$$

$$p' = s^2 - s^5 \quad p = -s + s^4 \quad p' = -s + s^4$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 0, 2, 2, 2, 1, 1] , [0, 2, 2, 1, 0, 2, 0, 4, 1, 0, 2, 2] , [0, 0, 2, 2, 0, 1, 0, 4, 2, 0, 1, 4] , [0, 0, 1, 1, 0, 2, 0, 2, 4, 0, 2, 4] , [0, 0, 2, 2, 0, 1, 0, 1, 4, 0, 4, 2] , [0, 0, 1, 4, 0, 2, 0, 2, 2, 0, 4, 1] , [0, 0, 2, 4, 0, 4, 0, 1, 1, 0, 2, 2] , [0, 0, 4, 2, 0, 4, 0, 2, 2, 0, 1, 1] , [0, 0, 4, 1, 0, 2, 0, 4, 1, 0, 2, 2]] \$

$$[0, y_5, y_6, y_4, 0, y_1, 0, y_2, y_3, y_8, y_9, y_7]$$

168 . Coloring, {4, 8, 10}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, A, B, B, B, 2, 1, 5]

B: [6, 8, 8, 6, 3, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 6	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 0, 4, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$$[y_1, y_2, 0, 0, y_3, 0, y_4, 0, 0, y_5, y_6, 0]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 2, 0, 2, 2, 2, 0, 4] , [0, 0, 2, 0, 0, 2, 0, 2, 4, 0, 0, 6] , [0, 0, 2, 0, 0, 0, 0, 2, 6, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_1 + y_5 + y_2 - y_4, y_3, 0, y_1, 0, y_5, y_2, y_3, 0, y_4]$$

$$p = -s^5 + s^7 \quad p = -s^5 + s^6$$

169 . Coloring, {4, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 + 56s^5 + 16s^6 - 64s^7 - 256s^8 \quad p' = s^2 - 16s^4 - 8s^5 + 16s^6 + 64s^7 \quad p'' = s^3 + 4s^4 - 8s^6 - 16s^7$$

R: [7, 7, 7, 7, A, A, B, B, B, C, 4, 5]

B: [6, 8, 8, 6, 3, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	3 vs 6	5 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 4, 0, 0, 2, 2, 2], [0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 4, 0, 0, 2, 2, 2]] \$$$

$$[0, 0, 0, 5y_3 - y_1 - y_2, y_3, 0, y_1, 0, 0, y_3, y_2, y_3]$$

$$p = -s + s^4 \quad p' = -s^2 + s^5 \quad p'' = -s + s^4$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 2, 0, 2, 2, 2, 0, 2], [0, 2, 2, 0, 0, 2, 0, 4, 2, 0, 0, 4], [0, 0, 2, 0, 0, 0, 0, 4, 4, 0, 0, 6], [0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[y_4, y_1, y_2 + y_3 - y_5, 0, 0, y_1, 0, y_2, y_3, y_4, 0, y_5]$$

$$p = -s^5 + s^7 \quad p' = -s^5 + s^6 \quad p'' = -s^5 + s^8$$

170 . Coloring, {4, 8, 12}

$$\Omega p(\Delta)=0: \quad p = -s^2 + 4s^4 + 8s^5 - 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, A, B, B, B, C, 1, 9]

B: [6, 8, 8, 8, 6, 3, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 6	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 0, 4, 0, 2, 2, 4, 2], [4, 0, 0, 0, 0, 0, 2, 0, 2, 0, 6, 2], [6, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$$

$[y_6, 0, 0, 0, 0, 0, y_5, 0, y_4, y_3, y_2, y_1]$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$\$ [[0, 2, 2, 2, 2, 2, 0, 2, 0, 2, 0, 2], [0, 2, 4, 0, 2, 2, 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6], [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6]] \$$

$[0, y_2, y_1 + y_3 - y_5, y_4, y_1, y_2, 0, y_3, 0, y_4, 0, y_5]$

$p = -s^3 + s^4 - s^5 + s^6 \quad p' = -s^3 + s^7 \quad p = -s^3 + s^7$

171 . Coloring, {4, 9, 10}

$\Omega p(\Delta)=0: \quad p = 3s^2 + 10s^3 + 40s^5 + 32s^6 + 32s^7 + 128s^8 \quad p' = -3s^2 + 2s^3 - 8s^4 - 8s^5 - 32s^7$

R: [7, 7, 7, 7, A, A, B, C, C, 2, 1, 5]

B: [6, 8, 8, 8, 6, 3, 3, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	8 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 0, 0, 2, 0, 4, 0, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 4, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 4, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$$

$[y_7, y_6, 0, 0, y_5, 0, y_4, 0, 0, y_3, y_2, y_1]$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5
See Matrix

$\$ [[0, 0, 2, 2, 0, 2, 0, 2, 2, 2, 2, 2], [0, 0, 2, 2, 0, 2, 0, 2, 2, 0, 4, 2], [0, 0, 2, 4, 0, 2, 0, 2, 2, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 2, 0, 0, 4, 0], [0, 0, 4, 4, 0, 4, 0, 2, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 0, 4, 0, 0, 4, 0]] \$$

$[0, 0, y_6, y_5, 0, y_4, 0, y_3, y_2, y_1, y_8, y_7]$

172 . Coloring, $\{4, 9, 11\}$

$\Omega p(\Delta)=0: p = 3s^2 - 10s^3 - 40s^5 + 32s^6 - 32s^7 + 128s^8 \quad p' = 3s^2 + 2s^3 + 8s^4 - 8s^5 - 32s^7$

R: [7, 7, 7, 7, A, A, B, C, C, C, 4, 5]

B: [6, 8, 8, 6, 3, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	3 vs 6	7 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3
See Matrix

\$ [[0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 2, 4] , [0, 0, 0, 2, 4, 0, 2, 0, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 0, 2, 0, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 2, 4] , [0, 0, 0, 2, 4, 0, 2, 0, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 0, 2, 0, 0, 4, 2, 2]] \$

$$[0, 0, 0, y_1, y_2, 0, y_3, 0, 0, y_1, y_2, y_3]$$

$$p' = -s + s^4 \quad p' = -s^2 + s^5 \quad p = -s + s^4$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 0, 2, 0, 2, 2, 2, 2, 0] , [2, 2, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 2, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 4, 0, 2, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0]] \$

$$[y_1, y_2, y_3, 0, 0, y_4, 0, y_5, y_6, y_6, y_7, 0]$$

$$p = -s^3 + s^8$$

173 . Coloring, {4, 9, 12}

$$\Omega p(\Delta)=0: \quad p = -9s^2 + 4s^4 + 24s^5 - 16s^6 - 96s^7 + 64s^8 \quad p = 3s^2 + 2s^3 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, A, B, C, C, C, 1, 9]

B: [6, 8, 8, 6, 3, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 6	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 4, 0, 2, 2, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 4, 4] , [4, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 4, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 4, 4] , [4, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 4]] \$

$$[-y_1 + 2y_4 - y_3, 0, 0, 0, 0, 0, y_1, 0, -y_2 + y_4, y_2, y_3, y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 2, 2, 2, 2, 2, 0, 2, 0, 2, 2, 0], [0, 2, 4, 2, 0, 2, 0, 4, 0, 0, 2, 0], [0, 0, 2, 2, 0, 2, 0, 6, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 0, 2, 0, 0, 6, 0], [0, 0, 2, 6, 0, 4, 0, 2, 0, 0, 2, 0], [0, 0, 4, 2, 0, 6, 0, 2, 0, 0, 2, 0], [0, 0, 6, 2, 0, 2, 0, 4, 0, 0, 2, 0], [0, 0, 2, 2, 0, 2, 0, 6, 0, 0, 4, 0]] \$$$

$$[0, y_2, y_1, y_3, y_6, y_4, 0, y_5, 0, y_6, y_7, 0]$$

$$p = -s^3 + s^8$$

174 . Coloring, {4, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, B, C, B, 2, 4, 5]

B: [6, 8, 8, 6, 3, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 0, 4, 0, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 4, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 5, 0, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[0, y_1, 0, y_2, y_3, 0, y_5, 0, 0, y_4, y_7, y_6]$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

$$\$ [[2, 0, 2, 0, 0, 2, 0, 2, 2, 2, 1, 3], [1, 0, 2, 0, 0, 2, 0, 2, 3, 0, 2, 4], [2, 0, 2, 0, 0, 1, 0, 2, 4, 0, 2, 3], [2, 0, 1, 0, 0, 2, 0, 2, 3, 0, 2, 4], [2, 0, 2, 0, 0, 2, 0, 1, 4, 0, 2, 3], [2, 0, 2, 0, 0, 2, 0, 2, 3, 0, 1, 4], [1, 0, 2, 0, 0, 2, 0, 2, 4, 0, 2, 3], [2, 0, 2, 0, 0, 1, 0, 2, 3, 0, 2, 4]] \$$$

$$[-7y_1 - 7y_2 - 7y_3 + 9y_7 + 9y_4 - 7y_5 + 9y_6, 0, 7y_1, 0, 0, 7y_2, 0, 7y_3, 7y_7, 7y_4, 7y_5, 7y_6]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

175 . Coloring, {4, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, B, C, B, 2, 1, 9]

B: [6, 8, 8, 6, 3, 3, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 2, 0, 0, 0, 0, 4, 0, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 4, 0, 1, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[y_1, 2y_3 - 2y_5, 0, 0, 0, 0, y_2, 0, y_3, 2y_5, y_4, y_5]$$

$$p = s^3 - s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 2, 0, 2, 0, 2, 1, 3], [0, 0, 4, 1, 3, 2, 0, 2, 0, 0, 2, 2], [0, 0, 5, 2, 2, 1, 0, 4, 0, 0, 2, 0], [0, 0, 3, 2, 0, 2, 0, 5, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 0, 3, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 0, 2, 0, 0, 3, 0], [0, 0, 4, 3, 0, 5, 0, 2, 0, 0, 2, 0], [0, 0, 5, 2, 0, 3, 0, 4, 0, 0, 2, 0]] \$$$

$$[0, 0, y_8, y_7, y_6, y_5, 0, y_4, 0, y_3, y_2, y_1]$$

176 . Coloring, {4, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, B, C, B, C, 4, 9]

B: [6, 8, 8, 6, 3, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 6	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 0, 4, 0, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 3, 0, 2, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, 0, 0, y_1, 0, 0, y_2, 0, y_3, y_4, y_5, y_6]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 0, 2, 0, 2, 1, 1] , [1, 2, 4, 0, 1, 2, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 1, 0, 6, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 0, 3, 0, 0, 6, 0] , [6, 0, 2, 0, 0, 4, 0, 1, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 6, 0, 2, 0, 0, 1, 0] , [1, 0, 6, 0, 0, 3, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 1, 0, 6, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 0, 3, 0, 0, 6, 0]] \$

$$[y_1, 2y_3 - 2y_7, y_2, 0, y_3, y_4, 0, y_5, 0, 2y_7, y_6, y_7]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

177 . Coloring, {5, 6, 7}

R: [7, 7, 7, 6, 3, 3, A, C, B, C, 1, 5]

B: [6, 8, 8, 7, A, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 2, 1, 3], [1, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 3, 0, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3]] \$$

$$[y_1, 0, y_2, 0, y_3, y_5, y_6, 0, 0, y_4, y_5, y_7]$$

$$p = s^3 - s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{4, 7, 11\}\}$ order: 6
See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 2, 3, 1], [0, 2, 0, 3, 0, 0, 2, 2, 1, 1, 3, 2], [0, 1, 0, 3, 0, 0, 3, 2, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 3, 1, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1]] \$$

$$[0, -3y_1 - 3y_2 - 3y_3 - 3y_4 + 13y_5 - 3y_6 - 3y_7 + 13y_8, 0, 3y_1, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

178 . Coloring, $\{5, 6, 8\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 - 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, B, B, C, 1, 5]

B: [6, 8, 8, 7, A, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
 See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 0, 4, 2] , [4, 0, 3, 0, 2, 0, 4, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 0, 7, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0]] \$$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, 0, 0, 0, y_6, 2y_4]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6
 See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 2, 2, 2, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 4, 4, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 2, 4, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$$

$$[0, y_7, 0, 2y_6, 0, y_6, y_5, y_4, y_2, y_3, 0, y_1]$$

$$p = s^6 - s^8$$

179 . Coloring, $\{5, 6, 9\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, C, C, C, 1, 5]

B: [6, 8, 8, 7, A, A, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
 See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 0, 2, 4] , [2, 0, 3, 0, 4, 0, 4, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0]] \$$

$$[y_1, 0, y_2, 0, y_4, y_3, y_5, 0, 0, 0, y_6, 4y_3]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 4, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 4, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 4, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 2, 4, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 2, 0, 2, 4, 0]] \$$$

$$[0, y_1, 0, y_2, 0, y_3, y_4, y_5, 2y_3, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

Â» SYNC'D !RANK'D

180 . Coloring, {5, 6, 10}

R: [7, 7, 7, 6, 3, 3, B, C, B, 2, 1, 5]

B: [6, 8, 8, 7, A, A, A, B, C, C, 4, 9]

' See graph

' ' See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 0, 3, 1], [3, 0, 3, 0, 1, 0, 6, 0, 0, 0, 3, 0], [3, 0, 1, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$$$

$$[y_1, 2y_6, y_3, 0, y_4, y_6, y_2, 0, 0, 0, y_5, y_6]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 2, 2, 6] , [0, 0, 0, 2, 0, 0, 1, 0, 6, 2, 0, 5] , [0, 0, 0, 0, 0, 2, 0, 5, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$

$$[0, 0, 0, y_1, 0, y_7, y_2, 2y_7, y_3, y_4, y_5, y_6]$$

$$p = s^6 - s^8$$

181 . Coloring, {5, 6, 11}

R: [7, 7, 7, 6, 3, 3, B, C, B, C, 4, 5]

B: [6, 8, 8, 7, A, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	7 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 0, 3, 3] , [0, 0, 3, 3, 3, 2, 2, 0, 0, 0, 3, 0] , [0, 0, 5, 3, 0, 3, 3, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 5, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 2, 3, 0, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 3, 3, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 5, 2, 0, 0, 0, 3, 0]] \$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, 0, 0, 0, y_6, y_7]$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 2, 0, 2, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 1, 0, 4, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 2, 0, 2, 1, 1, 4, 2] , [4, 1, 0, 0, 0, 2, 0, 2, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 4, 0, 1, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 2, 0, 2, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 2, 0, 2, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 1, 0, 4, 2, 2, 2, 1]] \$

$$[11y_1 + 11y_2 + 11y_3 - 2y_4 - 2y_5 + 11y_6 - 39y_7, 2y_1, 0, 0, 0, 2y_2, 2y_3, 2y_4, 3y_1 + 3y_2 + 3y_3 + 3y_6 - 11y_7, 2y_5, 2y_6, 2y_7]$$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

182 . Coloring, {5, 6, 12}

R: [7, 7, 7, 6, 3, 3, B, C, B, C, 1, 9]

B: [6, 8, 8, 7, A, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 0, 3, 3] , [3, 0, 1, 0, 0, 0, 4, 0, 3, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$

$$[y_2, 0, y_1, 0, 0, y_4, y_3, 0, 3y_1 - 4y_4, 0, y_5, 3y_4]$$

$$p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 0, 2, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 1, 4, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 4, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 2, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 4, 1, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 2, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 3, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 1, 4, 0, 3, 2, 0]] \$

$$[0, y_1, 0, y_2, y_3, y_8, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^3 + s^9$$

183 . Coloring, {5, 7, 8}

R: [7, 7, 7, 6, 3, A, A, B, B, C, 1, 5]

B: [6, 8, 8, 7, A, 3, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 2, 0, 0, 4, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2] , [0, 0, 4, 0, 2, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4]] \$

$$[y_7, 0, y_6, 0, y_5, y_4, y_3, 0, 0, y_2, 2y_4, y_1]$$

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 2, 2] , [0, 1, 1, 2, 0, 0, 2, 3, 2, 0, 1, 4] , [0, 0, 0, 1, 0, 0, 2, 2, 4, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 1, 5] , [0, 0, 0, 1, 0, 0, 2, 0, 5, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 1, 0, 6, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 1, 6] , [0, 0, 0, 1, 0, 0, 2, 0, 6, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 0, 2, 6]] \$

$$[0, 5y_6, 5y_7, 5y_3, 0, 5y_6 - 5y_7, 5y_4, 5y_5, 5y_2, 5y_6 - 5y_7, 5y_1, 5y_7 + 11y_3 + 11y_4 - 5y_5 - 5y_2 - 15y_6 + 11y_1]$$

$$p' = s^4 + s^5 - s^7 - s^8 \quad p = -s^4 + s^6 + s^7 - s^9 \quad p = -s^4 + s^{10}$$

184 . Coloring, {5, 7, 9}

R: [7, 7, 7, 6, 3, A, A, C, C, C, 1, 5]

B: [6, 8, 8, 7, A, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	6 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 3, 0, 0, 4, 0, 3], [0, 0, 4, 0, 3, 0, 2, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 3, 0, 0, 4, 0, 3]] \$$

$$[2y_3, 0, y_1, 0, y_2, y_3, y_4, 0, 0, y_5, 0, y_6]$$

$$p = -s^2 + s^7$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 6
See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 4, 0], [0, 1, 1, 4, 0, 0, 2, 3, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 2, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 0, 5, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$$[0, y_1, y_1 - y_4, y_3, 0, y_4, y_2, y_5, 2y_4, y_4, y_6, 0]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7 \quad p' = s^5 - s^8$$

185 . Coloring, $\{5, 7, 10\}$

$$\Omega p(\Delta)=0: \quad p = -2s^2 - s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, A, C, B, 2, 1, 5]

B: [6, 8, 8, 7, A, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

[y₃, y₁, y₂, 0, y₃, y₆, y₄, 0, 0, y₅, y₆, y₆]

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 3, 3] , [0, 0, 1, 3, 0, 0, 2, 1, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 1, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3]] \$

[0, 0, -3y₁ - 3y₄ - 3y₂ - 3y₃ + 10y₆ - 3y₅, 3y₁, 0, 3y₄, 3y₂, 3y₃, -3y₄ + 3y₆, 3y₄, 3y₅, 3y₆]

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

186 . Coloring, {5, 7, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, A, C, B, C, 4, 5]

B: [6, 8, 8, 7, A, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5
See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 2, 1, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 1, 2, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4]] \$

$$[0, 0, y_7, y_8, y_6, y_5, y_4, 0, 0, y_3, y_2, y_1]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {9, 12}} order: 10

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 3, 1], [3, 1, 1, 0, 0, 2, 0, 3, 1, 0, 3, 2], [3, 0, 2, 0, 0, 3, 0, 2, 2, 0, 3, 1], [3, 0, 3, 0, 0, 3, 0, 2, 1, 0, 2, 2], [2, 0, 3, 0, 0, 3, 0, 3, 2, 0, 2, 1], [2, 0, 3, 0, 0, 2, 0, 3, 1, 0, 3, 2], [3, 0, 2, 0, 0, 2, 0, 3, 2, 0, 3, 1], [3, 0, 2, 0, 0, 3, 0, 2, 1, 0, 3, 2], [3, 0, 3, 0, 0, 3, 0, 2, 2, 0, 2, 1], [2, 0, 3, 0, 0, 3, 0, 3, 1, 0, 2, 2]] \$$$

$$[3 y_8, 3 y_7, 3 y_6, 0, 0, 3 y_5, 3 y_4, 3 y_3, 3 y_2, 3 y_4, -3 y_8 - 3 y_7 - 3 y_6 - 3 y_5 - 6 y_4 - 3 y_3 + 13 y_2 + 13 y_1, 3 y_1]$$

$$p = s^3 - s^5 - s^8 + s^{10} \quad p' = s^3 + s^4 - s^8 - s^9$$

187 . Coloring, {5, 7, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, A, C, B, C, 1, 9]

B: [6, 8, 8, 7, A, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 10

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 1, 3], [1, 0, 0, 0, 0, 0, 3, 0, 3, 4, 2, 3], [2, 0, 0, 0, 0, 0, 1, 0, 3, 3, 3, 4], [3, 0, 0, 0, 0, 2, 0, 4, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 2, 4, 1], [4, 0, 0, 0, 0, 0, 3, 0, 1, 3, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 3, 1, 3], [1, 0, 0, 0, 0, 0, 3, 0, 3, 4, 2, 3]] \$$$

$$[y_2 - y_3 - y_4 + y_5 + y_6, 0, y_1, 0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p' = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 \quad p = s^2 - s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 3, 1] , [0, 1, 1, 3, 1, 0, 2, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 2, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 3, 2, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, y_1, y_3 - y_8, y_2, y_3, y_8, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p' = -s^6 + s^9 \quad p = -s^6 + s^9$$

188 . Coloring, {5, 8, 9}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 3s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, B, B, C, C, 1, 5]

B: [6, 8, 8, 7, A, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 8	10 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 0, 3, 0, 0, 1, 3, 1] , [3, 0, 3, 0, 1, 0, 5, 0, 0, 0, 3, 1] , [3, 0, 1, 0, 1, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 1, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, 0, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 1, 1] , [0, 3, 1, 1, 0, 0, 2, 3, 1, 1, 2, 2] , [0, 1, 0, 2, 0, 0, 1, 4, 2, 2, 1, 3] , [0, 2, 0, 1, 0, 0, 2, 1, 3, 1, 2, 4] , [0, 1, 0, 2, 0, 0, 1, 2, 4, 2, 3, 1] , [0, 2, 0, 3, 0, 0, 2, 1, 1, 1, 4, 2] , [0, 1, 0, 4, 0, 0, 3, 2, 2, 2, 1, 1] , [0, 2, 0, 1, 0, 0, 4, 1, 1, 3, 2, 2] , [0, 3, 0, 2, 0, 0, 1, 2, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 2, 3, 1, 1, 2, 2]] \$

$$[0, y_{10}, y_9, y_8, 0, y_7, y_6, y_5, y_4, y_3, y_2, y_1]$$

189 . Coloring, {5, 8, 10}

R: [7, 7, 7, 6, 3, A, B, B, B, 2, 1, 5]

B: [6, 8, 8, 7, A, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 4, 0] , [4, 1, 2, 0, 0, 0, 5, 0, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$

$$[y_1, y_4, y_3, 0, -2y_3 + 4y_5, -y_3 + 2y_5, y_2, 0, 0, y_5, y_6, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 0, 4] , [0, 0, 1, 0, 0, 0, 2, 1, 4, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 1, 7, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$

$$[0, 0, 2y_2 - y_4, 8y_2 - 4y_4 - 2y_1, 0, 4y_2 - 2y_4 - y_1, y_1, y_2, y_3, y_4, 0, y_5]$$

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6 \quad p = -s^4 + s^8$$

190 . Coloring, {5, 8, 11}

R: [7, 7, 7, 6, 3, A, B, B, B, C, 4, 5]

B: [6, 8, 8, 7, A, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	5 vs 9

Omega Rank for R : cycles: {{3, 4, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 2, 1, 0, 0, 1, 3, 1] , [0, 0, 2, 3, 1, 4, 2, 0, 0, 2, 1, 1] , [0, 0, 1, 1, 1, 3, 2, 0, 0, 4, 2, 2] , [0, 0, 1, 2, 2, 1, 1, 0, 0, 3, 2, 4] , [0, 0, 2, 2, 4, 2, 1, 0, 0, 1, 1, 3] , [0, 0, 4, 1, 3, 2, 2, 0, 0, 2, 1, 1] , [0, 0, 3, 1, 1, 1, 4, 0, 0, 2, 2, 2]] \$

$$[0, 0, y_4, y_3, y_2, y_1, y_4 - y_3 - y_2 + y_1 - y_7 + y_6 + y_5, 0, 0, y_7, y_6, y_5]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 0, 2] , [0, 3, 1, 0, 0, 2, 0, 3, 2, 1, 0, 4] , [0, 1, 2, 0, 0, 0, 0, 4, 4, 0, 0, 5] , [0, 0, 0, 0, 0, 0, 3, 5, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[8y_1 - 4y_2 - 10y_3, y_1, y_2, 0, 0, y_3, 4y_1 - 2y_2 - 5y_3, y_5, 3y_1 - 4y_3 - y_5 + y_4, 10y_1 - 5y_2 - 12y_3, 0, y_4]$$

$$p' = s^7 - s^8 \quad p' = s^6 - s^8 \quad p' = s^5 - s^8 \quad p = s^5 - s^9$$

191 . Coloring, {5, 8, 12}

R: [7, 7, 7, 6, 3, A, B, B, B, C, 1, 9]

B: [6, 8, 8, 7, A, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 1, 5, 1], [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 1], [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$

$$[y_1, 0, y_2, 0, 0, y_2, y_3, 0, y_5, y_6, y_7, y_4]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 2, 3, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 4, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 3, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 4, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 2, 0, 4, 0, 4], [0, 4, 0, 0, 4, 0, 0, 3, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 4, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 3, 0, 2, 0, 4]] \$$

$$[0, y_1, y_2, 4y_2 - 2y_3, y_5, 2y_2 - y_3, y_3, y_4, 0, y_7, 0, y_6]$$

$$p = -s^3 + s^8 \quad p' = s^3 - s^8$$

192 . Coloring, $\{5, 9, 10\}$

R: [7, 7, 7, 6, 3, A, B, C, C, 2, 1, 5]

B: [6, 8, 8, 7, A, 3, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 0, 5, 0, 0, 1, 3, 0] , [3, 1, 2, 0, 0, 0, 5, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_1, y_2, 2y_2 - 3y_3, 0, 2y_5, y_3, y_4, 0, 0, y_5, y_6, 2y_3]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 2, 2] , [0, 0, 1, 2, 0, 0, 2, 1, 2, 1, 4, 3] , [0, 0, 0, 4, 0, 0, 2, 1, 3, 2, 3, 1] , [0, 0, 0, 3, 0, 0, 4, 0, 1, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 4, 1, 2] , [0, 0, 0, 1, 0, 0, 4, 0, 2, 3, 2, 4] , [0, 0, 0, 2, 0, 0, 1, 0, 4, 4, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 1, 4, 4] , [0, 0, 0, 4, 0, 0, 2, 0, 4, 2, 3, 1]] \$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

193 . Coloring, {5, 9, 11}

R: [7, 7, 7, 6, 3, A, B, C, C, C, 4, 5]

B: [6, 8, 8, 7, A, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{3, 4, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 2, 4] , [0, 0, 2, 2, 4, 2, 1, 0, 0, 1, 3, 1] , [0, 0, 4, 3, 1, 2, 2, 0, 0, 2, 1, 1] , [0, 0, 1, 1, 1, 3, 4, 0, 0, 2, 2, 2] , [0, 0, 1, 2, 2, 1, 1, 0, 0, 3, 4, 2] , [0, 0, 2, 4, 2, 2, 1, 0, 0, 1, 1, 3] , [0, 0, 2, 1, 3, 4, 2, 0, 0, 2, 1, 1] , [0, 0, 3, 1, 1, 1, 2, 0, 0, 4, 2, 2]] \$

$$[0, 0, y_1 + y_7 - y_5 + y_6 + y_2 - y_3 - y_4, y_1, y_7, y_5, y_6, 0, 0, y_2, y_3, y_4]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 2, 0] , [2, 3, 1, 0, 0, 2, 0, 3, 0, 1, 4, 0] , [4, 1, 2, 0, 0, 2, 0, 4, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 4, 0, 3, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 3, 0, 2, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 0, 3, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 0, 4, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 4, 0, 3, 0, 0, 4, 0]] \$$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_8, 2y_5, y_7, y_6, 0]$$

$$p = -s^4 + s^9$$

194 . Coloring, $\{5, 9, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^2 - 3s^3 - 6s^4 - 8s^5 - 24s^6 - 32s^7 - 32s^8$$

R: [7, 7, 7, 6, 3, A, B, C, C, C, 1, 9]

B: [6, 8, 8, 7, A, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	6 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}, \{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 1, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 0, 3, 0, 3, 5] , [3, 0, 0, 0, 0, 0, 3, 0, 5, 0, 2, 3] , [2, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 5] , [3, 0, 0, 0, 0, 0, 2, 0, 5, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 2, 5] , [2, 0, 0, 0, 0, 0, 3, 0, 5, 0, 3, 3]] \$$

$$[-y_2 + y_3 + y_4 - y_5 + y_6, 0, y_1, 0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 2, 0] , [0, 3, 1, 2, 0, 0, 2, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 4, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 2, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 3, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 2, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 3, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 2, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 4, 0, 2, 3, 0]] \$$

$$[0, -y_1 + y_2 - y_3 - y_4 + y_5 + y_6 - y_7, y_1, y_2, 2y_3, y_3, y_4, y_5, 0, y_6, y_7, 0]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p = -s^3 + s^9$$

M \; N

\$ [[0, 0, 0, 0, 0, 270, 0, 0, 402, 168, 0, 892] , [0, 0, 0, 352, 0, 84, 0, 624, 0, 672, 0, 0] , [0, 0, 0, 168, 0, 336, 0, 210, 0, 576, 0, 442] , [0, 352, 168, 0, 402, 0, 270, 0, 0, 0, 540, 0] , [0, 0, 0, 402, 0, 446, 0, 221, 0, 663, 0, 0] , [270, 84, 336, 0, 446, 0, 260, 0, 0, 0, 336, 0] , [0, 0, 0, 270, 0, 260, 0, 260, 667, 681, 0, 1326] , [0, 624, 210, 0, 221, 0, 260, 0, 0, 0, 417, 0] , [402, 0, 0, 0, 0, 0, 667, 0, 0, 0, 663, 0] , [168, 672, 576, 0, 663, 0, 681, 0, 0, 0, 704, 0] , [0, 0, 0, 540, 0, 336, 0, 417, 663, 704, 0, 804] , [892, 0, 442, 0, 0, 0, 1326, 0, 0, 0, 804, 0]]
 \$ \$ [[0, 0, 0, 1, 0, 1, 0, 1, 1, 1, 0, 1] , [0, 0, 0, 1, 0, 1, 0, 1, 1, 1, 0, 1] , [0, 0, 0, 1, 0, 1, 0, 1, 1, 1, 0, 1] , [1, 1, 1, 0, 1, 0, 1, 0, 0, 0, 1, 0] , [0, 0, 0, 1, 0, 1, 0, 1, 1, 1, 0, 1] , [1, 1, 1, 0, 1, 0, 1, 0, 0, 0, 1, 0] , [0, 0, 0, 1, 0, 1, 0, 1, 1, 1, 0, 1] , [1, 1, 1, 0, 1, 0, 1, 0, 0, 0, 1, 0] , [1, 1, 1, 0, 1, 0, 1, 0, 0, 0, 1, 0] , [1, 1, 1, 0, 1, 0, 1, 0, 0, 0, 1, 0]] \$

$$\tau = 72, r' = 1/2$$

R: [7, 7, 7, 6, 3, A, B, C, C, C, 1, 9]

B: [6, 8, 8, 7, A, 3, A, B, B, 2, 4, 5]

Ranges

Action of R on ranges, [[24], [25], [25], [23], [20], [24], [25], [25], [20], [24], [25], [25], [23], [10], [21], [1], [12], [13], [13], [28], [3], [29], [29], [29], [27], [4], [4], [4], [2]]

Action of B on ranges, [[10], [21], [6], [17], [22], [11], [26], [7], [22], [11], [26], [7], [18], [24], [24], [15], [12], [28], [8], [12], [9], [28], [28], [8], [19], [16], [16], [5], [14]]

Cycles: R , {{9, 12}, {1, 7, 11}}, B , {{2, 4, 7, 8, 10, 11}}

$$\beta(\{1, 6\}) = 135/6928$$

$$\beta(\{1, 9\}) = 201/6928$$

$$\beta(\{1, 10\}) = 21/1732$$

$$\beta(\{1, 12\}) = 223/3464$$

$$\beta(\{2, 4\}) = 11/433$$

$$\beta(\{2, 6\}) = 21/3464$$

$$\beta(\{2, 8\}) = 39/866$$

$$\beta(\{2, 10\}) = 21/433$$

$$\beta(\{3, 4\}) = 21/1732$$

$$\beta(\{3, 6\}) = 21/866$$

$$\beta(\{3, 8\}) = 105/6928$$

$$\beta(\{3, 10\}) = 18/433$$

$$\beta(\{3, 12\}) = 221/6928$$

$$\beta(\{4, 5\}) = 201/6928$$

$$\beta(\{4, 7\}) = 135/6928$$

$$\beta(\{4, 11\}) = 135/3464$$

$$\beta(\{5, 6\}) = 223/6928$$

$$\beta(\{5, 8\}) = 221/13856$$

$\beta(\{5, 10\}) = 663/13856$
 $\beta(\{6, 7\}) = 65/3464$
 $\beta(\{6, 11\}) = 21/866$
 $\beta(\{7, 8\}) = 65/3464$
 $\beta(\{7, 9\}) = 667/13856$
 $\beta(\{7, 10\}) = 681/13856$
 $\beta(\{7, 12\}) = 663/6928$
 $\beta(\{8, 11\}) = 417/13856$
 $\beta(\{9, 11\}) = 663/13856$
 $\beta(\{10, 11\}) = 22/433$
 $\beta(\{11, 12\}) = 201/3464$

Partitions

$\alpha(\{\{1, 2, 3, 5, 7, 11\}, \{4, 6, 8, 9, 10, 12\}\}) = 1/1$

$b_1 = \{1, 2, 3, 5, 7, 11\}$, , $b_2 = \{4, 6, 8, 9, 10, 12\}$

Action of R and B on the blocks of the partitions: = [1, 2] [2, 1]
with invariant measure [1, 1]

N by blocks, check: true . ‘ See partition graph.

‘ ‘ See level-2 partition graph.

Right Group	
Coloring	{5, 9, 12}
Rank	2
R,B	[7, 7, 7, 6, 3, A, B, C, C, C, 1, 9], [6, 8, 8, 7, A, 3, A, B, B, 2, 4, 5]
π_2	[0, 0, 0, 0, 270, 0, 0, 402, 168, 0, 892, 0, 352, 0, 84, 0, 624, 0, 672, 0, 0, 168, 0, 336, 0, 210, 0, 576, 0, 442, 402, 0, 270, 0, 0, 0, 540, 0, 446, 0, 221, 0, 663, 0, 0, 260, 0, 0, 0, 336, 0, 260, 667, 681, 0, 1326, 0, 0, 417, 0, 0, 663, 0, 704, 0, 804]
u_2	[0, 0, 1, 0, 1, 0, 1, 1, 1, 0, 1, 0, 1, 0, 1, 0, 1, 1, 1, 0, 1, 1, 0, 1, 0, 1, 1, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1, 0, 1, 0, 1, 1, 0, 0, 0, 1, 0, 1, 1, 1, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1] (dim 1)
wpp	[6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6]

195 . Coloring, {5, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -6s^2 - s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, B, C, B, 2, 4, 5]

B: [6, 8, 8, 7, A, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 3, 0, 0, 1, 3, 0] , [0, 1, 1, 3, 0, 3, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 2, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 3, 2, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 3, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 3, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 2, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 3, 0, 0, 2, 3, 0]] \$

$$[0, y_8, y_7, y_6, y_5, y_4, y_3, 0, 0, y_2, y_1, -y_8 - y_7 + y_6 + y_5 - y_4 + y_3 + y_2 - y_1]$$

$$p = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 1, 3] , [1, 0, 1, 0, 0, 2, 0, 1, 3, 1, 2, 5] , [2, 0, 2, 0, 0, 1, 0, 1, 5, 0, 1, 4] , [1, 0, 1, 0, 0, 2, 0, 2, 4, 0, 1, 5] , [1, 0, 2, 0, 0, 1, 0, 1, 5, 0, 2, 4] , [2, 0, 1, 0, 0, 1, 0, 2, 4, 0, 1, 5] , [1, 0, 1, 0, 0, 2, 0, 1, 5, 0, 2, 4] , [2, 0, 2, 0, 0, 1, 0, 1, 4, 0, 1, 5] , [1, 0, 1, 0, 0, 2, 0, 2, 5, 0, 1, 4]] \$

$$[7y_1, 0, 7y_3, 0, 0, 7y_2, 9y_1 + 9y_3 + 9y_2 + 9y_4 - 7y_5 - 7y_6 + 9y_8 - 7y_7, 7y_4, 7y_5, 7y_6, 7y_8, 7y_7]$$

$$p = s^3 + s^4 - s^8 - s^9$$

196 . Coloring, {5, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, B, C, B, 2, 1, 9]

B: [6, 8, 8, 7, A, 3, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 0, 5, 0, 1, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[y_1, y_2, y_6, 0, 0, y_6, y_3, 0, y_6 + y_4, y_4, y_5, y_6]$$

$$p' = s^5 - s^8 \quad p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 0, 2, 1, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 1, 1, 0, 5, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 4, 1, 5] , [0, 0, 0, 1, 5, 0, 1, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

197 . Coloring, {5, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, B, C, B, C, 4, 9]

B: [6, 8, 8, 7, A, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 2, 1, 0, 3, 1, 5, 1] , [0, 0, 0, 5, 0, 3, 0, 0, 1, 2, 4, 1] , [0, 0, 0, 4, 0, 5, 0, 0, 1, 3, 1, 2] , [0, 0, 0, 1, 0, 4, 0, 0, 2, 5, 1, 3] , [0, 0, 0, 1, 0, 1, 0, 0, 3, 4, 2, 5] , [0, 0, 0, 2, 0, 1, 0, 0, 5, 1, 3, 4] , [0, 0, 0, 3, 0, 2, 0, 0, 4, 1, 5, 1]] \$

[0, 0, y₇, y₇ + y₁ - y₂ - y₃ - y₄ + y₅ + y₆, 0, y₁, y₂, 0, y₃, y₄, y₅, y₆]

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 1, 1] , [1, 3, 1, 0, 1, 2, 0, 3, 0, 3, 2, 0] , [2, 3, 2, 0, 0, 1, 0, 4, 0, 1, 3, 0] , [3, 1, 1, 0, 0, 2, 0, 5, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 0, 2, 0, 0, 5, 0] , [5, 0, 3, 0, 0, 4, 0, 2, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 5, 0, 3, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 2, 0, 4, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 2, 0, 5, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 0, 2, 0, 0, 5, 0]] \$

[y₁, y₂, y₃, 0, y₄, y₅, y₇, y₈, 0, y₉, y₆, y₇]

$$p = -s^5 + s^{10}$$

198 . Coloring, {6, 7, 8}

R: [7, 7, 7, 6, A, 3, A, B, B, C, 1, 5]

B: [6, 8, 8, 7, 3, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 0, 3, 0, 0, 5, 0, 3] , [0, 0, 0, 0, 3, 0, 3, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[2 y_1, 0, y_1, 0, y_2, y_3, y_4, 0, 0, y_5, 2 y_3, y_6]$$

$$p = -s^4 + s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 2, 2], [0, 1, 0, 2, 0, 0, 2, 3, 2, 1, 1, 4], [0, 1, 0, 1, 0, 0, 2, 1, 4, 0, 2, 5], [0, 0, 0, 2, 0, 0, 1, 1, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 1, 6], [0, 0, 0, 1, 0, 0, 2, 0, 6, 0, 2, 5], [0, 0, 0, 2, 0, 0, 1, 0, 5, 0, 2, 6], [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 1, 5], [0, 0, 0, 1, 0, 0, 2, 0, 5, 0, 2, 6], [0, 0, 0, 2, 0, 0, 1, 0, 6, 0, 2, 5]] \$$$

$$[0, 11 y_1 - 10 y_2 + 11 y_3 - 5 y_4 - 5 y_5 - 5 y_6 + 11 y_8 - 5 y_7, 5 y_2, 5 y_1, 0, 5 y_2, 5 y_3, 5 y_4, 5 y_5, 5 y_6, 5 y_8, 5 y_7]$$

$$p = -s^5 - s^6 + s^8 + s^9 \quad p = s^5 - s^7 - s^8 + s^{10}$$

199 . Coloring, {6, 7, 9}

R: [7, 7, 7, 6, A, 3, A, C, C, C, 1, 5]

B: [6, 8, 8, 7, 3, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 0, 4], [0, 0, 1, 0, 4, 0, 3, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 0, 1, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 4, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$$$

$$[2 y_3, 0, y_1, 0, y_2, y_3, y_4, 0, 0, y_5, 0, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 2, 3, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 4, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, y_2, y_7, y_1, 0, y_7, y_6, y_5, 2y_7, y_4, y_3, 0]$$

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

200 . Coloring, {6, 7, 10}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, A, C, B, 2, 1, 5]

B: [6, 8, 8, 7, 3, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 10	9 vs 10	5 vs 9	4 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 1, 1] , [1, 3, 1, 0, 1, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[y_4, y_3, y_4 - y_5, 0, y_4, y_5, y_2, 0, 0, y_1, y_5, y_5]$$

$$p' = -s^4 + s^7 \quad p' = -s^3 + s^6 \quad p = -s^3 + s^6 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 1, 3, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 0, 3, 4]] \$

$$[0, 0, -3y_1 + 3y_2, 3y_3 + 3y_1, 0, -3y_1 + 3y_2, 3y_3, 3y_2, 7y_3 + 4y_2 - 3y_4, 3y_1, 3y_3 + 3y_2, 3y_4]$$

$$p' = -s^3 + s^7 \quad p = -s^3 + s^9 \quad p = -s^3 + s^5 \quad p' = -s^3 + s^5 \quad p = -s^3 + s^7$$

Â» SYNC'D !RANK'D

201 . Coloring, {6, 7, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, A, C, B, C, 4, 5]

B: [6, 8, 8, 7, 3, A, B, B, C, 2, 1, 9]

' See graph

' ' See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	8 vs 8	7 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 1, 3], [0, 0, 1, 1, 3, 2, 1, 0, 0, 5, 0, 3], [0, 0, 2, 0, 3, 1, 1, 0, 0, 4, 0, 5], [0, 0, 1, 0, 5, 0, 2, 0, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 7, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4]] \$$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, 0, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 3, 1], [3, 1, 0, 0, 0, 2, 0, 3, 1, 1, 3, 2], [3, 1, 0, 0, 0, 3, 0, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 3, 0, 1, 1, 3, 1, 2], [1, 3, 0, 0, 0, 3, 0, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 1, 0, 3, 1, 3, 2, 2], [2, 3, 0, 0, 0, 1, 0, 3, 2, 1, 3, 1], [3, 1, 0, 0, 0, 2, 0, 3, 1, 1, 3, 2], [3, 1, 0, 0, 0, 3, 0, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 3, 0, 1, 1, 3, 1, 2]] \$$$

$$[-3y_2 - 3y_3 + 5y_4 - 3y_5 + 8y_7, -3y_2 - 3y_1 + 8y_4 - 3y_6 + 5y_7, 3y_2, 0, 0, 3y_1, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8 \quad p' = -s^3 + s^9$$

202 . Coloring, {6, 7, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, 3, A, C, B, C, 1, 9]

B: [6, 8, 8, 7, 3, A, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 10

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 1, 3] , [1, 0, 1, 0, 0, 0, 3, 0, 3, 3, 2, 3] , [2, 0, 0, 0, 0, 0, 2, 0, 3, 3, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 3, 2, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 2, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 3, 2, 3] , [2, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 3]] \$

$$[-y_1 + y_6 + y_7 - y_2 - y_3 + y_4 + y_5, 0, y_1, 0, 0, y_6, y_7, 0, y_2, y_3, y_4, y_5]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 0, 2, 3, 0, 1, 3, 0] , [0, 1, 1, 3, 0, 0, 3, 3, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 3, 2, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, y_1 + 2y_5 - y_6, y_1, y_2, y_5 + y_6, y_5, y_3, y_4, 0, y_6, y_7, y_5]$$

$$p' = s^6 - s^9 \quad p = -s^5 + s^8 \quad p' = s^5 - s^8$$

203 . Coloring, {6, 8, 9}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + 3s^3 - 2s^4 + 16s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, B, B, C, C, 1, 5]

B: [6, 8, 8, 7, 3, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	9 vs 10

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 3, 3], [3, 0, 1, 0, 3, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 4, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 4, 3], [4, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 4, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 4, 3], [4, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 1]] \$

[$y_1, 0, y_2, 0, -2y_1 - 2y_2 + 5y_3 + 5y_5 - 4y_4, y_3, 4y_1 + 4y_2 - 6y_3 - 6y_5 + 5y_4, 0, 0, 5y_1 + 5y_2 - 8y_3 - 8y_5 + 6y_4, y_5, y_4$]

$$p' = -s^4 + s^7 \quad p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 2, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 3, 2, 2, 1, 3], [0, 2, 0, 1, 0, 0, 2, 2, 3, 1, 2, 3], [0, 1, 0, 2, 0, 0, 1, 2, 3, 2, 3, 2], [0, 2, 0, 3, 0, 0, 2, 1, 2, 1, 3, 2], [0, 1, 0, 3, 0, 0, 3, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 0, 3, 1, 1, 3, 2, 2], [0, 3, 0, 2, 0, 0, 2, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 2, 3, 1, 2, 2, 2]] \$

[0, $y_1, y_9, y_8, 0, y_9, y_7, y_6, y_5, y_4, y_3, y_2$]

$$p = -s^2 + s^{10}$$

204 . Coloring, {6, 8, 10}

R: [7, 7, 7, 6, A, 3, B, B, B, 2, 1, 5]

B: [6, 8, 8, 7, 3, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 4, 0] , [4, 1, 1, 0, 0, 0, 5, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_2, y_3, y_1, 0, 2y_5, y_5, y_6, 0, 0, 2y_1 - y_5, y_4, 0]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 1, 4, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, 0, y_1, 2y_1, 0, y_1, -3y_1 + 2y_2, y_2, y_3, y_4, 0, y_5]$$

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6 \quad p = -s^4 + s^8$$

205 . Coloring, {6, 8, 11}

R: [7, 7, 7, 6, A, 3, B, B, B, C, 4, 5]

B: [6, 8, 8, 7, 3, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}, {3, 4, 6, 7, 11}}

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 4, 2] , [0, 0, 1, 4, 2, 2, 1, 0, 0, 2, 3, 1] , [0, 0, 2, 3, 1, 4, 1, 0, 0, 2, 1, 2] , [0, 0, 4, 1, 2, 3, 2, 0, 0, 1, 1, 2] , [0, 0, 3, 1, 2, 1, 4, 0, 0, 2, 2, 1] , [0, 0, 1, 2, 1, 1, 3, 0, 0, 2, 4, 2] , [0, 0, 1, 4, 2, 2, 1, 0, 0, 1, 3, 2] , [0, 0, 2, 3, 2, 4, 1, 0, 0, 2, 1, 1]] \$

[0, 0, -5 y₁ + 11 y₂ - 5 y₃ - 5 y₄ + 11 y₅ - 5 y₆ + 11 y₇, 5 y₁, 5 y₂, 5 y₃, 5 y₄, 0, 0, 5 y₅, 5 y₆, 5 y₇]

$$p = s + s^2 + s^3 - s^6 - s^7 - s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 2, 0, 3, 2, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 3, 4, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[2 y₅, y₄, y₅, 0, 0, y₃, y₅, y₂, y₁, y₆, 0, y₇]

$$p = s^6 - s^8 \quad p' = s^6 - s^8$$

206 . Coloring, {6, 8, 12}

R: [7, 7, 7, 6, A, 3, B, B, B, C, 1, 9]

B: [6, 8, 8, 7, 3, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 4, 2] , [4, 0, 1, 0, 0, 0, 3, 0, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_6, 0, y_5, 0, 0, y_4, y_3, 0, y_2, y_4, y_1, y_5 + y_4]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 2, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 0, 5, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4]] \$$$

$$[0, y_1, y_2, 2y_4, y_3, y_4, y_5, y_6, 0, y_7, 0, y_8]$$

$$p = -s^5 + s^9$$

207 . Coloring, {6, 9, 10}

R: [7, 7, 7, 6, A, 3, B, C, C, 2, 1, 5]

B: [6, 8, 8, 7, 3, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 2, 2], [2, 1, 1, 0, 2, 0, 5, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 4, 0, 0, 2, 5, 0], [5, 2, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0]] \$$$

$$[y_1, y_2, y_3, 0, 2y_3, y_4, y_6, 0, 0, y_5, y_7, 2y_4]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 1, 2, 2, 4, 3] , [0, 0, 0, 4, 0, 0, 2, 0, 3, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 3, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 2, 4, 3] , [0, 0, 0, 4, 0, 0, 2, 0, 3, 2, 3, 2]] \$

$$[0, 0, y_8, y_5, 0, y_8, y_6, y_7, y_4, y_2, y_3, y_1]$$

$$p = -s^3 + s^9$$

208 . Coloring, {6, 9, 11}

R: [7, 7, 7, 6, A, 3, B, C, C, C, 4, 5]

B: [6, 8, 8, 7, 3, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}, {3, 4, 6, 7, 11}}

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 2, 4] , [0, 0, 1, 2, 4, 2, 1, 0, 0, 2, 3, 1] , [0, 0, 2, 3, 1, 2, 1, 0, 0, 4, 1, 2] , [0, 0, 2, 1, 2, 3, 2, 0, 0, 1, 1, 4] , [0, 0, 3, 1, 4, 1, 2, 0, 0, 2, 2, 1] , [0, 0, 1, 2, 1, 1, 3, 0, 0, 4, 2, 2] , [0, 0, 1, 2, 2, 2, 1, 0, 0, 1, 3, 4] , [0, 0, 2, 3, 4, 2, 1, 0, 0, 2, 1, 1]] \$

$$[0, 0, -7y_1 + 9y_2 - 7y_3 - 7y_4 + 9y_5 - 7y_6 + 9y_7, 7y_1, 7y_2, 7y_3, 7y_4, 0, 0, 7y_5, 7y_6, 7y_7]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 0, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 4, 0, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 0, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 3, 0, 2, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 0, 4, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 0, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 3, 0, 2, 3, 0]] \$

$$[y_2, y_3, y_6, 0, 0, y_1, y_6, y_4, 2y_6, y_5, y_7, 0]$$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

209 . Coloring, {6, 9, 12}

R: [7, 7, 7, 6, A, 3, B, C, C, C, 1, 9]

B: [6, 8, 8, 7, 3, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 2, 4] , [2, 0, 1, 0, 0, 0, 3, 0, 4, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3]] \$

$$[3y_3, 0, 3y_2, 0, 0, 3y_1, 3y_3 + 3y_2, 0, 7y_3 + 7y_2 - 3y_1 - 3y_4, 3y_1, 3y_3 + 3y_2 - 3y_1, 3y_4]$$

$$p = -s^3 + s^5 \quad p = -s^3 + s^7 \quad p' = -s^3 + s^7 \quad p' = -s^3 + s^5$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 0, 2, 3, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 0, 2, 5, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 2, 2, 0, 2, 5, 0] , [0, 2, 0, 5, 0, 0, 3, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 0, 5, 2, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 2, 0, 5, 2, 0] , [0, 5, 0, 2, 0, 0, 2, 3, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 0, 2, 5, 0, 2, 3, 0]] \$

$$[0, y_3, y_1, y_2, 2y_4, y_4, y_5, y_7, 0, y_6, y_8, 0]$$

$$p = -s^3 + s^9$$

210 . Coloring, {6, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + 5s^3 + 2s^4 - 16s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, B, C, B, 2, 4, 5]

B: [6, 8, 8, 8, 7, 3, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 3, 1] , [0, 1, 1, 3, 1, 2, 3, 0, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 3, 2, 0, 0, 1, 3, 0] , [0, 1, 3, 3, 0, 3, 4, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 4, 0, 0, 0, 2, 0]] \$

[0, y₆, y₇, y₄, y₅, y₁, y₂, 0, 0, y₃, y₉, y₈]

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 1, 3, 2, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 1, 5] , [1, 0, 0, 0, 0, 2, 0, 0, 5, 1, 0, 7] , [0, 0, 0, 0, 0, 1, 0, 0, 7, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[y₁, 0, y₃, 0, 0, y₂, y₃, y₇, y₄, y₈, y₅, y₆]

$$p = -s^7 + s^9$$

211 . Coloring, {6, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, 3, B, C, B, 2, 1, 9]

B: [6, 8, 8, 8, 7, 3, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	5 vs 9	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 3
See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 3, 1] , [3, 1, 1, 0, 0, 0, 5, 0, 1, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_5, y_2, y_2 - y_4, 0, 0, y_4, y_1, 0, y_2, y_4, y_3, y_4]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7 \quad p''' = -s^3 + s^9$$

Omega Rank for B : cycles: {{3, 4, 5, 7, 8, 10, 11, 12}} order: 8
See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 0, 2, 1, 0, 2, 2, 3] , [0, 0, 3, 2, 3, 0, 1, 2, 0, 2, 1, 2] , [0, 0, 3, 1, 2, 0, 2, 3, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 0, 1, 3, 0, 2, 3, 1] , [0, 0, 2, 3, 1, 0, 2, 2, 0, 1, 3, 2] , [0, 0, 1, 3, 2, 0, 3, 2, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 0, 3, 1, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 0, 2, 2, 0, 3, 1, 3]] \$

$$[0, 0, y_2, y_1, y_6, y_7, y_5, y_4, 0, y_3, y_8, y_9]$$

212 . Coloring, {6, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, B, C, B, C, 4, 9]

B: [6, 8, 8, 7, 3, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	8 vs 8	9 vs 10

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 3, 3], [0, 0, 1, 3, 0, 2, 1, 0, 3, 0, 5, 1], [0, 0, 2, 5, 0, 3, 1, 0, 1, 0, 4, 0], [0, 0, 3, 4, 0, 5, 2, 0, 0, 0, 2, 0], [0, 0, 5, 2, 0, 4, 3, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 5, 0, 0, 0, 3, 0], [0, 0, 2, 3, 0, 2, 4, 0, 0, 0, 5, 0], [0, 0, 2, 5, 0, 3, 2, 0, 0, 0, 4, 0]] \$$

$[0, 0, y_2, y_1, 0, y_4, y_5, 0, y_8, y_3, y_7, y_6]$

Omega Rank for B : cycles: $\{\{1, 2, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 1, 1], [1, 3, 2, 0, 1, 2, 0, 3, 0, 2, 2, 0], [2, 2, 1, 0, 0, 1, 0, 5, 0, 2, 3, 0], [3, 2, 0, 0, 0, 2, 0, 3, 0, 1, 5, 0], [5, 1, 0, 0, 0, 3, 0, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 5, 0, 1, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 0, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 2, 0, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 1, 0, 5, 0, 2, 3, 0], [3, 2, 0, 0, 0, 2, 0, 3, 0, 1, 5, 0]] \$$

$[y_1, y_2, y_6, 0, y_5, y_4, y_7, y_3, 0, y_8, y_9, y_7]$

$$p = -s^4 + s^{10}$$

213 . Coloring, {7, 8, 9}

R: [7, 7, 7, 6, A, A, A, B, C, C, 1, 5]

B: [6, 8, 8, 7, 3, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	8 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 4, 1, 3], [1, 0, 0, 0, 3, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$

$$[y_1, 0, 0, 0, y_2, y_6, y_3, 0, 0, y_4, y_6, y_5]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 0, 3, 1], [0, 0, 1, 3, 0, 0, 2, 4, 1, 0, 3, 2], [0, 0, 0, 3, 0, 0, 3, 1, 2, 0, 3, 4], [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 5, 1], [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$$$

$$[0, 2 y_6, y_7, y_8, 0, y_6, y_5, y_3, y_4, 0, y_2, y_1]$$

$$p = -s^6 + s^9$$

214 . Coloring, {7, 8, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, A, B, B, 2, 1, 5]

B: [6, 8, 8, 7, 3, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$$$

$$[y_4, y_5, 0, 0, 2 y_1, y_1, y_2, 0, 0, y_3, 2 y_1, 0]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 0, 2, 4] , [0, 0, 1, 2, 0, 0, 2, 2, 4, 0, 1, 4] , [0, 0, 0, 1, 0, 0, 2, 1, 4, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 1, 0, 6, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 1, 6] , [0, 0, 0, 1, 0, 0, 2, 0, 6, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 1, 5]] \$

$[0, 0, 5 y_6, 5 y_7, 0, 5 y_3, 5 y_4, 5 y_5, 5 y_1, 0, 5 y_2, -5 y_6 + 11 y_7 - 5 y_3 + 11 y_4 - 5 y_5 - 5 y_1 + 11 y_2]$

$$p = s^4 + s^5 - s^7 - s^8$$

Â» SYNC'D !RANK'D

215 . Coloring, {7, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, A, A, B, B, C, 4, 5]

B: [6, 8, 8, 7, 3, 3, B, C, C, 2, 1, 9]

' See graph

' ' See pair graph

'

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

$[0, 0, 0, 2 y_1, 2 y_2, 2 y_3, 3 y_5, 0, 0, 2 y_4, 2 y_5, 2 y_6]$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 0, 2, 2] , [2, 0, 1, 0, 0, 2, 0, 4, 2, 0, 1, 4] , [1, 0, 2, 0, 0, 2, 0, 1, 4, 0, 0, 6] , [0, 0, 2, 0, 0, 1, 0, 2, 6, 0, 0, 5] , [0, 0, 1, 0, 0, 0, 0, 2, 5, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 1, 8, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[y_1, 2y_4, y_3, 0, 0, y_2, y_4, y_5, y_6, 0, y_7, y_8]$$

$$p = s^7 - s^9$$

216 . Coloring, {7, 8, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 5s^3 - 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, A, B, B, C, 1, 9]

B: [6, 8, 8, 7, 3, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 4, 2, 2], [2, 0, 0, 0, 0, 0, 2, 0, 2, 4, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 2, 2, 4], [2, 0, 0, 0, 0, 2, 0, 4, 2, 4, 2], [4, 0, 0, 0, 0, 0, 2, 0, 2, 2, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 2, 2, 2], [2, 0, 0, 0, 0, 0, 4, 0, 2, 4, 2, 2]] \$$$

$$[y_1 + y_2 - y_3 - y_4 + y_5 + y_6, 0, 0, 0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {4, 7, 11}} order: 12

See Matrix

$$\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 0, 2, 2], [0, 0, 3, 2, 2, 0, 2, 4, 0, 0, 1, 2], [0, 0, 2, 1, 2, 0, 2, 3, 0, 0, 2, 4], [0, 0, 2, 2, 4, 0, 1, 2, 0, 0, 2, 3], [0, 0, 4, 2, 3, 0, 2, 2, 0, 0, 1, 2], [0, 0, 3, 1, 2, 0, 2, 4, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 1, 3, 0, 0, 2, 4], [0, 0, 2, 2, 4, 0, 2, 2, 0, 0, 1, 3], [0, 0, 4, 1, 3, 0, 2, 2, 0, 0, 2, 2]] \$$$

$$[0, 10y_3, 11y_1 - 5y_2 - 15y_3 + 11y_4 - 5y_5 + 11y_6 - 5y_7, 5y_1, 5y_2, 5y_3, 5y_4, 5y_5, 0, 0, 5y_6, 5y_7]$$

$$p = s^2 - s^5 - s^6 + s^9 \quad p' = s^2 + s^3 + s^4 - s^6 - s^7 - s^8$$

217 . Coloring, {7, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, A, C, C, 2, 1, 5]

B: [6, 8, 8, 7, 3, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$$$

$$[2y_3, y_1, 0, 0, y_2, y_3, y_4, 0, 0, y_5, 0, 2y_3]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 0, 4, 2], [0, 0, 1, 4, 0, 0, 2, 2, 2, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 1, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, 2y_1 - 2y_3, 0, y_6, 2y_3]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

218 . Coloring, {7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, A, A, C, C, C, 4, 5]

B: [6, 8, 8, 8, 7, 3, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	5 vs 6	6 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

[0, 0, 0, 2 y₁, 2 y₂, 2 y₃, 3 y₁, 0, 0, 2 y₄, 0, 2 y₅]

$$p = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 0, 4, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 1, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 5, 0, 2, 0, 0, 1, 0] , [1, 0, 5, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 1, 0, 5, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 0, 4, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 1, 0, 0, 4, 0]] \$

[y₁, 2 y₄, y₂, 0, 0, y₃, y₄, y₅, 2 y₄, 0, y₆, 0]

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7$$

Â» SYNC'D !RANK'D

219 . Coloring, {7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 3s^3 + 2s^4 + 16s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, A, C, C, C, 1, 9]

B: [6, 8, 8, 8, 7, 3, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	4 vs 6	6 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 0, 4, 4, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[2y_1 - 2y_2 - 2y_3 + 2y_4, 0, 0, 0, 0, y_1 - y_2 - y_3 + y_4, y_1, 0, y_2, y_3, 0, y_4]$$

$$p' = s^4 - s^5 \quad p = s^4 - s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 0, 2, 4, 0, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 4, 3, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 6, 0, 0, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 7, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 6, 0, 0, 0, 3, 0]] \$

$$[0, 2y_4, y_2, y_3, 2y_4, y_4, y_5, y_6, 0, 0, y_1, 0]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Â» SYNC'D !RANK'D

220 . Coloring, {7, 10, 11}

R: [7, 7, 7, 6, A, A, A, C, B, 2, 4, 5]

B: [6, 8, 8, 7, 3, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 2, 2, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_1, 0, y_4, y_4, y_5, y_6, 0, 0, y_2, y_3, y_3]$$

$$p' = -s^4 + s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 0, 3, 3] , [3, 0, 1, 0, 0, 2, 0, 2, 3, 0, 3, 2] , [3, 0, 2, 0, 0, 3, 0, 1, 2, 0, 2, 3] , [2, 0, 3, 0, 0, 3, 0, 2, 3, 0, 1, 2] , [1, 0, 3, 0, 0, 2, 0, 3, 2, 0, 2, 3] , [2, 0, 2, 0, 0, 1, 0, 3, 3, 0, 3, 2] , [3, 0, 1, 0, 0, 2, 0, 2, 2, 0, 3, 3] , [3, 0, 2, 0, 0, 3, 0, 1, 3, 0, 2, 2]] \$

$$[-5 y_1 - 5 y_2 - 5 y_3 - 5 y_7 + 11 y_4 - 5 y_5 + 11 y_6, 0, 5 y_1, 0, 0, 5 y_2, 5 y_3, 5 y_7, 5 y_4, 0, 5 y_5, 5 y_6]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

221 . Coloring, {7, 10, 12}

R: [7, 7, 7, 6, A, A, A, C, B, 2, 1, 9]

B: [6, 8, 8, 7, 3, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 0, 4, 0, 1, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 5, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[y_1, y_2, 0, 0, 0, y_5, y_3, 0, y_6, y_7, y_4, y_5]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 0, 3, 3] , [0, 0, 3, 3, 3, 0, 2, 2, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 0, 3, 3, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 3, 3, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, 0, y_7, 3y_4]$$

$$p = -s^5 + s^8$$

222 . Coloring, {7, 11, 12}

R: [7, 7, 7, 6, A, A, A, C, B, C, 4, 9]

B: [6, 8, 8, 7, 3, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	7 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 4, 2, 4] , [0, 0, 0, 2, 0, 1, 0, 0, 4, 2, 3, 4] , [0, 0, 0, 3, 0, 2, 0, 0, 4, 1, 4, 2] , [0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 4, 1] , [0, 0, 0, 4, 0, 4, 0, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 1, 3]] \$

$$[0, 0, 0, y_2, 0, y_3, y_1, 0, -y_2 + y_3 + y_1 - y_4 + y_5 + y_6, y_4, y_5, y_6]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 0, 3, 1], [3, 0, 3, 0, 1, 2, 0, 4, 0, 0, 3, 0], [3, 0, 3, 0, 0, 3, 0, 3, 0, 0, 4, 0], [4, 0, 3, 0, 0, 3, 0, 3, 0, 0, 3, 0], [3, 0, 3, 0, 0, 4, 0, 3, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 0, 3, 0, 0, 3, 0], [3, 0, 3, 0, 0, 3, 0, 4, 0, 0, 3, 0], [3, 0, 3, 0, 0, 3, 0, 3, 0, 0, 4, 0], [4, 0, 3, 0, 0, 3, 0, 3, 0, 0, 3, 0]] \$$$

$$[y_1, 2y_7, y_2, 0, y_3, y_4, y_7, y_5, 0, 0, y_6, y_7]$$

$$p' = -s^3 + s^8 \quad p = -s^3 + s^8$$

223 . Coloring, {8, 9, 10}

R: [7, 7, 7, 6, A, A, B, B, C, 2, 1, 5]

B: [6, 8, 8, 7, 3, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 4, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 5, 0, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[y_1, y_2, 0, 0, y_3, y_7, y_4, 0, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 2, 1, 3], [0, 0, 1, 1, 0, 0, 2, 2, 3, 1, 2, 4], [0, 0, 0, 2, 0, 0, 1, 1, 4, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 3, 1, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 2, 3, 1], [0, 0, 0, 3, 0, 0, 4, 0, 1, 3, 3, 2], [0, 0, 0, 3, 0, 0, 3, 0, 2, 4, 1, 3], [0, 0, 0, 1, 0, 0, 3, 0, 3, 3, 2, 4], [0, 0, 0, 2, 0, 0, 1, 0, 4, 3, 3, 3]] \$$$

$[0, 0, y_1, y_4, 0, y_5, y_3, y_2, y_7, y_8, y_9, y_6]$

224 . Coloring, {8, 9, 11}

R: [7, 7, 7, 6, A, A, B, B, C, C, 4, 5]

B: [6, 8, 8, 7, 3, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	10 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 2, 0, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 3, 0, 0, 0, 5, 0, 3] , [0, 0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$[0, 0, 0, y_1, y_2, y_3, y_4, 0, 0, y_5, y_6, y_7]$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 2, 1, 1] , [1, 2, 1, 0, 0, 2, 0, 4, 1, 1, 2, 2] , [2, 1, 2, 0, 0, 1, 0, 3, 2, 0, 1, 4] , [1, 0, 1, 0, 0, 2, 0, 3, 4, 0, 2, 3] , [2, 0, 2, 0, 0, 1, 0, 1, 3, 0, 4, 3] , [4, 0, 1, 0, 0, 2, 0, 2, 3, 0, 3, 1] , [3, 0, 2, 0, 0, 4, 0, 1, 1, 0, 3, 2] , [3, 0, 4, 0, 0, 3, 0, 2, 2, 0, 1, 1] , [1, 0, 3, 0, 0, 3, 0, 4, 1, 0, 2, 2] , [2, 0, 3, 0, 0, 1, 0, 3, 2, 0, 1, 4]] \$

$[y_3, y_2, y_1, 0, 0, y_{10}, y_9, y_8, y_7, y_6, y_5, y_4]$

225 . Coloring, {8, 9, 12}

R: [7, 7, 7, 6, A, A, B, B, C, C, 1, 9]

B: [6, 8, 8, 7, 3, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	9 vs 10

Omega Rank for R : cycles: $\{\{9, 12\}, \{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 1, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4], [2, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4]] \$$

$$[-y_1 + 2y_5 + 2y_2 - y_3, 0, 0, 0, 0, y_5 + y_2 - y_4, y_1, 0, y_5, y_2, y_3, y_4]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8
See Matrix

$\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 2, 1, 1], [0, 2, 3, 1, 1, 0, 2, 4, 0, 1, 0, 2], [0, 1, 1, 0, 2, 0, 1, 5, 0, 2, 0, 4], [0, 2, 2, 0, 4, 0, 0, 2, 0, 1, 0, 5], [0, 1, 4, 0, 5, 0, 0, 4, 0, 0, 0, 2], [0, 0, 5, 0, 2, 0, 0, 5, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 5, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 2, 0, 0, 0, 5], [0, 0, 5, 0, 5, 0, 0, 4, 0, 0, 0, 2], [0, 0, 5, 0, 2, 0, 0, 5, 0, 0, 0, 0, 4]] \$$

$$[0, y_1, y_3, y_2, y_4, y_7, y_5, y_6, 0, y_8, y_7, y_9]$$

$$p = s^6 - s^{10}$$

226 . Coloring, $\{8, 10, 11\}$

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 16s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, B, B, B, 2, 4, 5]

B: [6, 8, 8, 7, 3, 3, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	6 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 6, 7, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 2, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 4, 2, 0, 0, 2, 2, 0], [0, 2, 0, 2, 0, 3, 3, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 2, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 4, 0, 0, 2, 2, 0], [0, 2, 0, 2, 0, 3, 3, 0, 0, 2, 4, 0]] \$$

$$[0, y_4, 0, y_3, y_1, y_7, y_2, 0, 0, y_5, y_6, 0]$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 2, 0, 4], [0, 0, 1, 0, 0, 2, 0, 2, 4, 1, 0, 6], [0, 0, 2, 0, 0, 0, 0, 1, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$$[2y_2, 0, y_1, 0, 0, -3y_2 + 2y_5, y_2, y_3, y_4, y_5, 0, y_6]$$

$$p = s^5 - s^7 \quad p' = -s^5 + s^7$$

227 . Coloring, $\{8, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = 2s^2 + s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, A, B, B, B, 2, 1, 9]

B: [6, 8, 8, 7, 3, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 0, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[y_1, y_2, 0, 0, 0, y_3, y_4, 0, 2y_3, y_5, y_6, 0]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 2, 2, 0, 1, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 2, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5]] \$

$$[0, 0, y_1, 2y_3, y_2, y_3, y_4, y_5, 0, y_6, 0, y_7]$$

$$p = -s^4 + s^8$$

228 . Coloring, {8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, B, B, B, C, 4, 9]

B: [6, 8, 8, 7, 3, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 7	7 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 1, 5, 2] , [0, 0, 0, 5, 0, 4, 0, 0, 2, 2, 2, 1] , [0, 0, 0, 2, 0, 5, 0, 0, 1, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 5, 1, 4] , [0, 0, 0, 1, 0, 2, 0, 0, 4, 2, 2, 5] , [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 4, 2]] \$

$$[0, 0, 0, y_1, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 2, 0, 2], [0, 2, 3, 0, 2, 2, 0, 4, 0, 1, 0, 2], [0, 1, 4, 0, 2, 0, 0, 5, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 5, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 2, 0, 0, 0, 5], [0, 0, 5, 0, 5, 0, 0, 4, 0, 0, 0, 2], [0, 0, 5, 0, 2, 0, 0, 5, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 5, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 2, 0, 0, 0, 5]] \$$$

$$[2 y_4, y_1, y_2, 0, y_3, -3 y_4 + 2 y_6, y_4, y_5, 0, y_6, 0, y_7]$$

$$p = s^4 - s^8 \quad p' = s^4 - s^8$$

229 . Coloring, {9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 9s^3 - 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, B, C, C, 2, 4, 5]

B: [6, 8, 8, 7, 3, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 2, 2, 2], [0, 2, 0, 2, 2, 2, 2, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 2, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 3, 3, 0, 0, 2, 2, 0], [0, 2, 0, 2, 0, 2, 4, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 2, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 3, 3, 0, 0, 2, 2, 0], [0, 2, 0, 2, 0, 4, 2, 0, 0, 3, 3, 0]] \$$$

$$[0, y_7, 0, y_8, y_4, y_5, y_6, 0, 0, y_3, y_1, y_2]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 2, 2, 2], [2, 0, 1, 0, 0, 2, 0, 2, 2, 1, 4, 2], [4, 0, 2, 0, 0, 2, 0, 1, 2, 0, 4, 1], [4, 0, 2, 0, 0, 4, 0, 2, 1, 0, 3, 0], [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 0, 4, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 0, 3, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0]] \$$$

$$[y_4, 0, y_3, 0, 0, y_1, y_2, y_7, y_8, y_9, y_5, y_6]$$

230 . Coloring, {9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 6s^2 - 5s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, B, C, C, 2, 1, 9]

B: [6, 8, 8, 7, 3, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 2, 2, 2], [2, 2, 0, 0, 0, 0, 4, 0, 2, 1, 3, 2], [3, 1, 0, 0, 0, 0, 4, 0, 2, 0, 4, 2], [4, 0, 0, 0, 0, 4, 0, 2, 0, 4, 2], [4, 0, 0, 0, 0, 4, 0, 2, 0, 4, 2], [4, 0, 0, 0, 0, 4, 0, 2, 0, 4, 2], [4, 0, 0, 0, 0, 4, 0, 2, 0, 4, 2], [4, 0, 0, 0, 0, 4, 0, 2, 0, 4, 2]] \$$$

$$[-y_1 + 2y_4, y_1, 0, 0, 0, -y_2 + 2y_4, y_2, 0, y_4, -y_3 + 2y_4, y_3, y_4]$$

$$p = -s^4 + s^6 \quad p = -s^4 + s^7 \quad p = -s^4 + s^8 \quad p = -s^4 + s^5$$

Omega Rank for B : cycles: {{3, 4, 5, 7, 8, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 2, 2, 2], [0, 0, 3, 2, 2, 0, 2, 2, 0, 1, 2, 2], [0, 0, 2, 2, 2, 0, 2, 3, 0, 2, 2, 1], [0, 0, 2, 2, 1, 0, 2, 2, 0, 2, 3, 2], [0, 0, 1, 3, 2, 0, 2, 2, 0, 2, 2, 2], [0, 0, 2, 2, 2, 0, 3, 1, 0, 2, 2, 2], [0, 0, 2, 2, 2, 0, 2, 2, 0, 3, 1, 2], [0, 0, 2, 1, 2, 0, 2, 2, 0, 2, 2, 3], [0, 0, 2, 2, 3, 0, 1, 2, 0, 2, 2, 2]] \$$$

$$[0, 0, y_6, y_7, y_8, y_9, y_1, y_2, 0, y_3, y_4, y_5]$$

231 . Coloring, {9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 6s^2 + 5s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, B, C, C, C, 4, 9]

B: [6, 8, 8, 7, 3, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 2, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 1, 3, 4] , [0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 0, 5] , [0, 0, 0, 0, 3, 0, 0, 5, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[0, 0, 0, y_1 , 0, y_2 , y_3 , 0, y_4 , y_5 , y_6 , y_7]

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 2, 2, 0] , [2, 2, 3, 0, 0, 2, 0, 4, 0, 1, 2, 0] , [2, 1, 2, 0, 0, 2, 0, 5, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 3, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 5, 0, 2, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 3, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 2, 0, 5, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 3, 0, 0, 5, 0]] \$

[y_2 , y_3 , y_1 , 0, 2 y_5 , y_4 , y_5 , y_6 , 0, y_7 , y_8 , 0]

$$p = -s^4 + s^9$$

232 . Coloring, {10, 11, 12}

R: [7, 7, 7, 6, A, A, B, C, B, 2, 4, 9]

B: [6, 8, 8, 7, 3, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 6, 7, 10, 11\}\}$ order: 6
See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 2, 0, 1, 1, 5, 0], [0, 1, 0, 5, 0, 3, 2, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 5, 1, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 2, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 2, 3, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 1, 5, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 2, 3, 0, 0, 1, 5, 0]] \$$

$[0, y_1, 0, y_2, 0, y_3, y_4, 0, y_5, y_6, y_7, y_8]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}\}$ order: 5
See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 2, 1, 3], [1, 0, 3, 0, 3, 2, 0, 2, 0, 1, 2, 2], [2, 0, 5, 0, 2, 1, 0, 3, 0, 0, 2, 1], [2, 0, 3, 0, 1, 2, 0, 5, 0, 0, 3, 0], [3, 0, 3, 0, 0, 2, 0, 3, 0, 0, 5, 0], [5, 0, 2, 0, 0, 3, 0, 3, 0, 0, 3, 0], [3, 0, 3, 0, 0, 5, 0, 2, 0, 0, 3, 0], [3, 0, 5, 0, 0, 3, 0, 3, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 0, 5, 0, 0, 3, 0]] \$$

$[y_4, 0, y_3, 0, y_1, y_2, y_5, y_6, 0, y_7, y_8, y_9]$

233 . Coloring, $\{2, 3, 4, 5\}$

$$\Omega p(\Delta)=0: \quad p' = 3s^2 + 2s^3 - 8s^4 + 8s^5 - 32s^7 \quad p = 3s^2 + 14s^3 - 24s^5 + 32s^6 - 32s^7 - 128s^8$$

R: [7, 8, 8, 7, 3, A, B, C, B, C, 1, 5]

B: [6, 7, 7, 6, A, 3, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{3, 5, 8, 12\}\}$ order: 12
See Matrix

\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 0, 2, 1, 0, 0, 2, 3] , [2, 0, 3, 0, 3, 0, 3, 2, 0, 0, 2, 1] , [2, 0, 3, 0, 1, 0, 2, 3, 0, 0, 3, 2] , [3, 0, 1, 0, 2, 0, 2, 3, 0, 0, 2, 3] , [2, 0, 2, 0, 3, 0, 3, 1, 0, 0, 2, 3] , [2, 0, 3, 0, 3, 0, 2, 2, 0, 0, 3, 1] , [3, 0, 3, 0, 1, 0, 2, 3, 0, 0, 2, 2]] \$

$$[7y_1, 0, 9y_1 - 7y_2 + 9y_3 - 7y_4 - 7y_5 + 9y_6 - 7y_7, 0, 7y_2, 0, 7y_3, 7y_4, 0, 7y_5, 7y_6, 7y_7]$$

$$p = -s^2 - s^3 - s^4 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 3, 1, 1] , [0, 3, 2, 1, 0, 2, 3, 0, 1, 2, 0, 2] , [0, 2, 2, 0, 0, 1, 5, 0, 2, 3, 0, 1] , [0, 3, 1, 0, 0, 0, 4, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1]] \$

$$[0, 3y_1, -3y_1 - 3y_4 - 3y_3 - 3y_2 + 13y_5 - 3y_6 - 3y_7 + 13y_8, 3y_4, 0, 3y_3, 3y_2, 0, 3y_5, 3y_6, 3y_7, 3y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

234 . Coloring, {2, 3, 4, 6}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 - 8s^5 + 32s^7$$

R: [7, 8, 8, 7, A, 3, B, C, B, C, 1, 5]

B: [6, 7, 7, 6, 3, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 8	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 1, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 1, 0, 2, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3]] \$

$$[7y_5 - 3y_2 - 3y_4, 0, -3y_1 + 3y_5, 0, 3y_1, 0, 3y_2, 3y_5 - 3y_3, 0, 3y_3, 3y_4, 3y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 3, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 1, 3, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1]] \$$$

$$[0, -6y_5 - 3y_3 - 3y_1 - 3y_7 + 13y_2 - 3y_6 + 13y_4, 3y_5, 3y_3, 0, 3y_1, 3y_7, 0, 3y_2, 3y_6, 3y_5, 3y_4]$$

$$p = -s^4 - s^5 + s^7 + s^8 \quad p = s^4 - s^6 - s^7 + s^9$$

235 . Coloring, {2, 3, 4, 7}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, A, A, C, B, C, 1, 5]

B: [6, 7, 7, 6, 3, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 0, 2, 2, 0, 4, 1, 3], [1, 0, 0, 0, 3, 0, 2, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 1, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5]] \$$$

$$[y_1, 0, 0, 0, y_2, 0, y_3, 2y_5, 0, y_6, y_5, y_4]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 2, 0, 2, 0, 3, 1] , [0, 0, 2, 3, 0, 2, 4, 0, 1, 0, 2, 2] , [0, 0, 2, 2, 0, 3, 2, 0, 2, 0, 4, 1] , [0, 0, 3, 4, 0, 2, 2, 0, 1, 0, 2, 2] , [0, 0, 2, 2, 0, 4, 3, 0, 2, 0, 2, 1] , [0, 0, 4, 2, 0, 2, 2, 0, 1, 0, 3, 2] , [0, 0, 2, 3, 0, 2, 4, 0, 2, 0, 2, 1] , [0, 0, 2, 2, 0, 3, 2, 0, 1, 0, 4, 2]] \$

$$[0, 3y_2, 3y_1, -3y_2 - 3y_1 - 3y_7 - 3y_6 + 13y_5 - 3y_4 + 13y_3, 0, 3y_7, 3y_6, 0, 3y_5, 0, 3y_4, 3y_3]$$

$$p = s^2 + s^3 - s^7 - s^8$$

236 . Coloring, {2, 3, 4, 8}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7$$

R: [7, 8, 8, 7, A, A, B, B, B, C, 1, 5]

B: [6, 7, 7, 6, 3, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	4 vs 8

Omega Rank for R : cycles: {{5, 10, 12}, {1, 7, 11}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 0, 2, 2, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 2] , [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 2] , [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2]] \$

$$[-y_3 - y_2 - y_1 + 5y_4, 0, 0, 0, y_4, 0, y_3, y_2, 0, y_4, y_1, y_4]$$

$$p' = -s^3 + s^6 \quad p' = -s^2 + s^5 \quad p = s^2 - s^5$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 2, 0, 2, 2, 0, 2] , [0, 2, 2, 0, 0, 2, 4, 0, 2, 2, 0, 2] , [0, 2, 2, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2]] \$

$$[0, y_4, -y_4 + 2y_1, y_3, 0, y_2, -y_3 + 2y_1, 0, y_1, -y_2 + 2y_1, 0, y_1]$$

$$p' = s^6 - s^7 \quad p' = s^5 - s^7 \quad p' = s^4 - s^7 \quad p = s^4 - s^8$$

237 . Coloring, {2, 3, 4, 9}

$$\Omega p(\Delta)=0: \quad p = 3s^2 + 2s^3 + 8s^5 + 32s^7 \quad p = -9s^2 + 4s^4 - 24s^5 + 16s^6 - 96s^7 + 64s^8$$

R: [7, 8, 8, 7, A, A, B, C, C, C, 1, 5]

B: [6, 7, 7, 6, 3, 3, A, B, B, 2, 4, 9]

' See graph

' ' See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	8 vs 8

Omega Rank for R : cycles: {{5, 10, 12}, {1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 0, 2, 2, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 4]] \$$$

$$[y_3, 0, 0, 0, 5y_3 - y_1 - y_2 - y_4, 0, y_3, y_1, 0, y_2, y_3, y_4]$$

$$p' = -s^3 + s^6 \quad p' = -s^2 + s^5 \quad p = -s^2 + s^5$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 2, 2, 0, 2, 2, 2, 0], [0, 2, 2, 2, 0, 2, 4, 0, 0, 2, 2, 0], [0, 2, 2, 2, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$$$

$$[0, y_1, y_3, y_2, 0, y_4, y_5, 0, y_6, y_7, y_8, 0]$$

238 . Coloring, {2, 3, 4, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 8s^6 + 16s^7 \quad p' = s^3 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, A, A, B, C, B, 2, 1, 5]

B: [6, 7, 7, 6, 3, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}, {1, 7, 11}}

See Matrix

\$ [[2, 2, 0, 0, 2, 0, 2, 2, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 2, 2, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 0, 3, 2, 0, 1, 2, 2] , [2, 1, 0, 0, 2, 0, 2, 2, 0, 2, 3, 2] , [3, 2, 0, 0, 2, 0, 2, 1, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 0, 3, 2, 0, 2, 2, 1] , [2, 2, 0, 0, 1, 0, 2, 2, 0, 2, 3, 2] , [3, 2, 0, 0, 2, 0, 2, 2, 0, 1, 2, 2]] \$

$$[7y_1, 9y_1 - 7y_7 + 9y_6 - 7y_5 - 7y_4 + 9y_3 - 7y_2, 0, 0, 7y_7, 0, 7y_6, 7y_5, 0, 7y_4, 7y_3, 7y_2]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 2, 2, 0, 2, 2, 0, 2, 2, 1, 3] , [0, 0, 2, 1, 0, 2, 2, 0, 3, 2, 0, 4] , [0, 0, 2, 0, 0, 1, 2, 0, 4, 2, 0, 5] , [0, 0, 1, 0, 0, 0, 2, 0, 5, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, -y_1 + y_2 + y_3 - y_4 - y_5 + y_6 + y_7, y_1, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = -s^7 + s^8$$

239 . Coloring, {2, 3, 4, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, A, B, C, B, C, 4, 5]

B: [6, 7, 7, 6, 3, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	8 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 0, 2, 2, 0, 2, 2, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 3, 0, 0, 3, 2, 2], [0, 0, 0, 2, 2, 0, 2, 0, 0, 4, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 3, 0, 0, 3, 2, 2], [0, 0, 0, 2, 2, 0, 2, 0, 0, 4, 3, 3]] \$$

$[0, 0, 0, 2y_1, 2y_2, 0, -7y_1 + 3y_2 + 4y_4, -27y_1 + 7y_2 - 2y_3 + 16y_4, 0, 2y_3, -16y_1 + 4y_2 + 10y_4, 2y_4]$

$$p' = -s^3 + s^6 \quad p' = -s^2 + s^5 \quad p = -s^2 + s^5$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 2, 0, 0, 2, 2, 0, 2, 2, 1, 1], [1, 2, 2, 0, 0, 2, 4, 0, 1, 2, 0, 2], [0, 2, 2, 0, 0, 1, 4, 0, 2, 4, 0, 1], [0, 4, 1, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1]] \$$

$[-3y_1 - 3y_2 - 3y_3 - 3y_4 + 13y_5 - 3y_6 - 3y_7 + 13y_8, 3y_1, 3y_2, 0, 0, 3y_3, 3y_4, 0, 3y_5, 3y_6, 3y_7, 3y_8]$

$$p = -s^5 - s^6 + s^8 + s^9$$

240 . Coloring, $\{2, 3, 4, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, A, B, C, B, C, 1, 9]

B: [6, 7, 7, 6, 3, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 0, 2, 2, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 0, 4, 4], [4, 0, 0, 0, 0, 0, 3, 0, 4, 0, 5, 0], [5, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0]] \$$

$[y_1, 0, 0, 0, 0, 0, y_2, y_5, y_3, y_5, y_6, y_4]$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 2, 2, 2, 2, 0, 0, 2, 1, 1], [0, 2, 4, 1, 1, 2, 4, 0, 0, 2, 0, 0], [0, 2, 3, 0, 0, 1, 6, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$[0, y_1, y_2, y_3, y_3, y_4, y_5, 0, 0, y_6, y_7, y_7]$

$$p = s^5 - s^8 \quad p' = s^5 - s^8$$

241 . Coloring, $\{2, 3, 5, 6\}$

R: [7, 8, 8, 6, 3, 3, B, C, B, C, 1, 5]

B: [6, 7, 7, 7, A, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	9 vs 10	6 vs 8	6 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{3, 5, 8, 12\}\}$ order: 12
 See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 0, 3, 3], [3, 0, 3, 0, 3, 0, 2, 2, 0, 0, 1, 2], [1, 0, 3, 0, 2, 0, 3, 3, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 1, 3, 0, 0, 3, 3], [3, 0, 2, 0, 3, 0, 2, 2, 0, 0, 1, 3], [1, 0, 3, 0, 3, 0, 3, 2, 0, 0, 2, 2], [2, 0, 3, 0, 2, 0, 1, 3, 0, 0, 3, 2], [3, 0, 2, 0, 2, 0, 2, 3, 0, 0, 1, 3]] \$$

$$[6y_1 + 6y_2 - 5y_3 + 6y_4 - 5y_5, 0, 5y_1 + 5y_2 + 5y_4 - 5y_6, 0, 5y_1, 5y_2, 5y_3, 5y_4, 0, 0, 5y_5, 5y_6]$$

$$p = -s^2 - s^3 - s^4 + s^6 + s^7 + s^8 \quad p = -s^2 - s^4 + s^5 + s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6
 See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2]] \$$

$$[0, -3y_1 - 6y_5 - 3y_2 + 13y_3 - 3y_4 + 13y_6, 0, 3y_1, 0, 3y_5, 3y_2, 0, 3y_3, 3y_4, 3y_5, 3y_6]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

242 . Coloring, $\{2, 3, 5, 7\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, A, C, B, C, 1, 5]

B: [6, 7, 7, 7, A, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8
 See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 1, 3], [1, 0, 2, 0, 3, 0, 2, 1, 0, 2, 0, 5], [0, 0, 3, 0, 5, 0, 1, 2, 0, 2, 0, 3], [0, 0, 5, 0, 3, 0, 0, 3, 0, 1, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0,$

0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4]] \$

$[y_1, 0, y_2, 0, y_3, y_8, y_6, y_5, 0, y_4, y_8, y_7]$

$$p = -s^5 + s^9$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 3, 1] , [0, 1, 1, 3, 0, 0, 5, 0, 1, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 5, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 5, 0, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 5, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 5, 0, 2, 0, 5, 1]] \$

$[0, 3 y_1 + 3 y_4, 3 y_1, -6 y_1 - 9 y_4 - 3 y_2 + 13 y_3 - 3 y_5 + 13 y_6, 0, 3 y_4, 3 y_2, 0, 3 y_3, 3 y_4, 3 y_5, 3 y_6]$

$$p = s^3 - s^5 - s^6 + s^8 \quad p = -s^3 + s^9 \quad p = -s^3 - s^4 + s^6 + s^7$$

243 . Coloring, {2, 3, 5, 8}

R: [7, 8, 8, 6, 3, A, B, B, B, C, 1, 5]

B: [6, 7, 7, 7, A, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 9

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 4, 2] , [4, 0, 2, 0, 2, 0, 2, 1, 0, 1, 3, 1] , [3, 0, 2, 0, 1, 0, 4, 2, 0, 0, 3, 1] , [3, 0, 1, 0, 1, 0, 3, 2, 0, 0, 6, 0] , [6, 0, 1, 0, 0, 0, 3, 1, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 1, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0]] \$

$[y_1, 0, y_8, 0, y_6, y_7, y_2, y_3, 0, y_4, y_5, y_9]$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 0, 2] , [0, 3, 1, 0, 0, 0, 5, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 3, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 3, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 3, 0, 2]] \$

$$[0, -y_1 - 3y_2 - y_3 + 6y_5 - y_4, y_1, 2y_2, 0, y_2, y_3, 0, y_5, y_4, 0, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

244 . Coloring, {2, 3, 5, 9}

R: [7, 8, 8, 6, 3, A, B, C, C, C, 1, 5]

B: [6, 7, 7, 7, A, 3, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 2, 4] , [2, 0, 2, 0, 4, 0, 2, 1, 0, 1, 1, 3] , [1, 0, 4, 0, 3, 0, 2, 2, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 0, 1, 4, 0, 0, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 3, 0, 0, 1, 4] , [1, 0, 2, 0, 4, 0, 2, 2, 0, 0, 2, 3] , [2, 0, 4, 0, 3, 0, 1, 2, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 0, 2, 4, 0, 0, 1, 2] , [1, 0, 2, 0, 2, 0, 2, 3, 0, 0, 2, 4]] \$

$$[5y_1, 0, 11y_1 - 5y_2 - 5y_7 + 11y_8 - 5y_5 - 5y_6 + 11y_3 - 5y_4, 0, 5y_2, 5y_7, 5y_8, 5y_5, 0, 5y_6, 5y_3, 5y_4]$$

$$p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 2, 0] , [0, 3, 1, 2, 0, 0, 5, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_1, y_2, y_4, 0, y_3, y_5, 0, 2y_3, y_6, 2y_2, 0]$$

$$p = -s^4 + s^7 \quad p' = s^4 - s^7$$

245 . Coloring, {2, 3, 5, 10}

$$\Omega p(\Delta)=0: \quad p = -9s^3 + 2s^4 + 16s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, B, C, B, 2, 1, 5]

B: [6, 7, 7, 7, A, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 10	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 3, 1], [3, 1, 2, 0, 1, 0, 2, 3, 0, 1, 1, 2], [1, 1, 1, 0, 2, 0, 3, 3, 0, 0, 2, 3], [2, 0, \\ & 2, 0, 3, 0, 1, 2, 0, 0, 3, 3], [3, 0, 3, 0, 3, 0, 2, 2, 0, 0, 1, 2], [1, 0, 3, 0, 2, 0, 3, 3, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, \\ & 1, 3, 0, 0, 3, 3], [3, 0, 2, 0, 3, 0, 2, 2, 0, 0, 1, 3], [1, 0, 3, 0, 3, 0, 3, 2, 0, 0, 2, 2], [2, 0, 3, 0, 2, 0, 1, 3, 0, 0, \\ & 3, 2]] \$ \end{aligned}$$

$$[6y_1 + 6y_2 + 6y_6 + 6y_8 - 5y_4 - 5y_7, 5y_1, 5y_2, 0, 5y_1 + 5y_2 + 5y_6 - 5y_5 - 5y_3 + 5y_8, 5y_6, 5y_4, 5y_5, 0, 5y_3, 5y_7, 5y_8]$$

$$p = -s^4 - s^6 + s^7 + s^9 \quad p = -s^4 - s^5 - s^6 + s^8 + s^9 + s^{10}$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 1, 3], [0, 0, 1, 1, 0, 0, 3, 0, 3, 3, 0, 5], [0, 0, 0, 0, 0, 0, 2, 0, 5, 3, 0, 6], [0, 0, \\ & 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, \\ & 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$ \end{aligned}$$

$$[0, 0, y_1 - y_4, y_1, 0, y_4, y_5, 0, -2y_1 + 3y_4 + y_5 - y_2 + y_3, y_2, y_4, y_3]$$

$$p = -s^5 + s^7 \quad p = -s^5 + s^8 \quad p = -s^5 + s^6$$

246 . Coloring, {2, 3, 5, 11}

$$\Omega p(\Delta)=0: \quad p = 9s^3 + 2s^4 - 16s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, B, C, B, C, 4, 5]

B: [6, 7, 7, 7, A, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 0, 1, 0, 1, 1, 3], [0, 0, 3, 1, 3, 3, 0, 2, 0, 2, 0, 2], [0, 0, \\ & 3, 0, 2, 1, 0, 3, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 0, 3, 0, 1, 0, 6], [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, \\ & 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6]] \$ \end{aligned}$$

$$[0, 0, y_1 + y_2 - y_3 + y_4 + y_5 + y_6 - y_7 - y_8, y_1, y_2, y_3, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 1, 1], [1, 3, 1, 0, 0, 2, 3, 0, 1, 3, 0, 2], [0, 3, 2, 0, 0, 1, 4, 0, 2, 3, 0, 1], [0, 3, \\ & 1, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, \\ & 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1]] \$ \end{aligned}$$

$$[-3 y_1 - 3 y_2 - 3 y_3 - 3 y_4 + 13 y_5 - 3 y_6 - 3 y_7 + 13 y_8, 3 y_1, 3 y_2, 0, 0, 3 y_3, 3 y_4, 0, 3 y_5, 3 y_6, 3 y_7, 3 y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

247 . Coloring, {2, 3, 5, 12}

$$\Omega p(\Delta)=0: \quad p = 6s^2 + 5s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, B, C, B, C, 1, 9]

B: [6, 7, 7, 7, A, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 1, 3, 1, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 5, 2] , [5, 0, 0, 0, 0, 3, 0, 2, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_1, 0, y_6, 0, 0, y_6, y_7, y_4, y_5, -y_6 + y_4, y_3, y_2]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 1, 1] , [0, 3, 1, 1, 1, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[0, y_1, y_2 - y_5, y_2, y_2, y_5, y_3, 0, 0, y_4, y_5, y_5]$$

$$p = -s^3 + s^9 \quad p' = -s^3 + s^6 \quad p' = s^4 - s^7 \quad p = -s^3 + s^6$$

248 . Coloring, {2, 3, 6, 7}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, A, C, B, C, 1, 5]

B: [6, 7, 7, 7, 3, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	6 vs 9	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 1, 3] , [1, 0, 1, 0, 3, 0, 2, 1, 0, 3, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 1, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 6, 0, 4]] \$

$$[y_6, 0, y_5, 0, y_4, y_6 - y_5, 3y_5 - 2y_6 + y_3, y_3, 0, y_2, y_6 - y_5, y_1]$$

$$p' = -s^5 + s^8 \quad p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 5, 0, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 0, 4, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1]] \$

$$[0, -3y_1 - 6y_2 - 3y_3 + 13y_5 - 3y_4 - 3y_7 + 13y_6, 3y_2, 3y_1, 0, 3y_2, 3y_3, 0, 3y_5, 3y_4, 3y_7, 3y_6]$$

$$p = s^4 + s^5 - s^7 - s^8 \quad p' = s^4 + s^5 - s^7 - s^8$$

Â» SYNC'D !RANK'D

249 . Coloring, {2, 3, 6, 8}

R: [7, 8, 8, 6, A, 3, B, B, B, C, 1, 5]

B: [6, 7, 7, 7, 3, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	4 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 6
See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 4, 2], [4, 0, 1, 0, 2, 0, 2, 1, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 4, 1, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 5, 2], [5, 0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 5, 0, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 5, 2], [5, 0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 5, 0, 0, 2, 3, 2]] \$$

$[3 y_1, 0, 3 y_3, 0, 3 y_2, -7 y_1 - 7 y_3 + 14 y_2 + 8 y_5 - 3 y_4, 3 y_6, -7 y_1 - 7 y_3 + 8 y_2 - 3 y_6 + 14 y_5, 0, 3 y_5, 3 y_4, -5 y_1 - 5 y_3 + 7 y_2 + 7 y_5]$

$$p' = -s^4 + s^7 \quad p = s^4 - s^7 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2]] \$$

$[0, y_3, y_4, 2 y_4, 0, y_4, y_2, 0, y_1, -y_3 - 4 y_4 - y_2 + 6 y_1, 0, y_1]$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p = s^2 - s^8 \quad p' = s^2 - s^5$$

250 . Coloring, $\{2, 3, 6, 9\}$

R: $[7, 8, 8, 6, A, 3, B, C, C, C, 1, 5]$

B: $[6, 7, 7, 7, 3, A, A, B, B, 2, 4, 9]$

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 2, 4], [2, 0, 1, 0, 4, 0, 2, 1, 0, 2, 1, 3], [1, 0, 0, 0, 3, 0, 2, 1, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 1, 0, 0, 3, 2, 5], [2, 0, 0, 0, 5, 0, 2, 0, 0, 3, 1, 3], [1, 0, 0, 0, 3, 0, 2, 0, 0, 5, 2, 3], [2, 0, 0, 0, 3, 0, 1, 0, 0, 3, 2, 5], [2, 0, 0, 0, 5, 0, 2, 0, 0, 3, 1, 3], [1, 0, 0, 0, 3, 0, 2, 0, 0, 5, 2, 3]] \$$

$[3y_1, 0, 3y_2, 0, 3y_5, 3y_6, 3y_3, 3y_4, 0, 8y_1 - 7y_2 - 7y_5 + 14y_3 - 3y_4, 7y_1 - 5y_2 - 5y_5 + 7y_3, 14y_1 - 7y_2 - 7y_5 - 3y_6 + 8y_3]$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 2, 0], [0, 3, 0, 2, 0, 0, 5, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$

$[0, y_1, y_3, y_2, 0, y_3, y_4, 0, 2y_3, y_6, y_5, 0]$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

251 . Coloring, $\{2, 3, 6, 10\}$

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, B, C, B, 2, 1, 5]

B: [6, 7, 7, 7, 3, A, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 10	5 vs 8

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}, \{1, 7, 11\}\}$

See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 3, 1], [3, 1, 1, 0, 1, 0, 2, 3, 0, 2, 1, 2], [1, 2, 0, 0, 2, 0, 3, 2, 0, 1, 2, 3], [2, 1, 0, 0, 3, 0, 1, 2, 0, 2, 3, 2], [3, 2, 0, 0, 2, 0, 2, 1, 0, 3, 1, 2], [1, 3, 0, 0, 2, 0, 3, 2, 0, 2, 2, 1], [2, 2, 0, 0, 1, 0,$

1, 3, 0, 2, 3, 2], [3, 2, 0, 0, 2, 0, 2, 2, 0, 1, 1, 3], [1, 1, 0, 0, 3, 0, 3, 2, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 1, 1, 0, 3, 3, 2]] \$

$$[3 y_2, 5 y_2 - 3 y_1 - 3 y_3 - 3 y_4 + 5 y_5 - 3 y_6 - 3 y_7 + 5 y_8 - 3 y_9, 3 y_1, 0, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 0, 3 y_7, 3 y_8, 3 y_9]$$

$$p = -s^3 - s^4 - s^5 + s^8 + s^9 + s^{10}$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 1, 3], [0, 0, 0, 1, 0, 0, 3, 0, 3, 4, 0, 5], [0, 0, 0, 0, 0, 0, 1, 0, 5, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_4, y_4 + y_1 - y_3 - y_2 + y_5, 0, y_4, y_1, 0, y_3, y_2, y_4, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7 \quad p = -s^5 + s^8$$

252 . Coloring, {2, 3, 6, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, B, C, B, C, 4, 5]

B: [6, 7, 7, 7, 3, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 3, 3], [0, 0, 1, 3, 3, 2, 0, 1, 0, 2, 1, 3], [0, 0, 2, 1, 3, 3, 0, 1, 0, 3, 0, 3], [0, 0, 3, 0, 3, 1, 0, 2, 0, 3, 0, 4], [0, 0, 1, 0, 4, 0, 0, 3, 0, 3, 0, 5], [0, 0, 0, 0, 5, 0, 0, 1, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[0, 0, y_1, y_2, y_3, y_5, y_6, y_4, 0, y_7, y_8, y_9]$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 1, 1], [1, 3, 0, 0, 0, 2, 3, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 1, 3, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1]] \$$$

$$[-3 y_1 - 6 y_4 - 3 y_6 - 3 y_7 + 13 y_2 - 3 y_3 + 13 y_5, 3 y_1, 3 y_4, 0, 0, 3 y_6, 3 y_7, 0, 3 y_2, 3 y_3, 3 y_4, 3 y_5]$$

$$p = s^4 + s^5 - s^7 - s^8 \quad p' = -s^4 - s^5 + s^7 + s^8$$

253 . Coloring, {2, 3, 6, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 7s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, B, C, B, C, 1, 9]

B: [6, 7, 7, 7, 3, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	8 vs 9	6 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 3, 3], [3, 0, 1, 0, 0, 0, 2, 1, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 1, 3, 0, 5, 1], [5, 0, 0, 0, 0, 0, 3, 0, 1, 0, 6, 1], [6, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$$

$$[y_8, 0, y_7, 0, 0, y_6, y_5, y_4, y_3, y_6, y_2, y_1]$$

$$p = s^6 - s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[0, y_1, y_2, y_3, y_3, y_6, y_4, 0, 0, y_5, y_6, y_6]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7 \quad p' = -s^5 + s^8$$

Â» SYNC'D !RANK'D

254 . Coloring, {2, 3, 7, 8}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 7s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, A, B, B, C, 1, 5]

B: [6, 7, 7, 7, 3, 3, B, C, C, 2, 4, 9]

' See graph

' ' See pair graph

'

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	5 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 4] , [2, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

$$[y_1, 0, 0, 0, y_2, y_6, y_7, 2y_6, 0, y_5, y_4, y_3]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 0, 2, 2] , [0, 0, 1, 2, 0, 0, 6, 0, 2, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 3, 0, 2, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 6, 0, 2, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 3, 0, 2, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 6, 0, 2, 0, 3, 2]] \$

$$[0, 2y_1, -y_3 - 3y_1 - y_2 + 6y_5 - y_4, y_3, 0, y_1, y_2, 0, y_5, 0, y_4, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

255 . Coloring, {2, 3, 7, 9}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, A, C, C, C, 1, 5]

B: [6, 7, 7, 7, 3, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	5 vs 7	5 vs 7

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$$$

$$[2y_4, 0, 0, 0, y_5, y_4, y_3, 2y_4, 0, y_2, 0, y_1]$$

$$p = s^3 - s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 0, 4, 0], [0, 0, 1, 4, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[0, 2y_4, y_1, y_2, 0, y_4, y_3, 0, 2y_4, 0, y_5, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Â» SYNC'D !RANK'D

256 . Coloring, {2, 3, 7, 10}

R: [7, 8, 8, 6, A, A, A, C, B, 2, 1, 5]

B: [6, 7, 7, 7, 3, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 7

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 0, 2, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 1, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4]] \$

$[y_1, y_2, 0, 0, y_3, y_7, y_4, y_5, 0, y_6, y_7, y_8]$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 0, 3, 3] , [0, 0, 1, 3, 0, 0, 4, 0, 3, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4, 3]] \$

$[0, 0, -5y_1 - 5y_2 - 5y_3 + 11y_4 - 5y_6 + 11y_5, 5y_1, 0, 5y_2, 5y_3, 0, 5y_4, 0, 5y_6, 5y_5]$

$$p = -s^3 - s^4 + s^6 + s^7$$

257 . Coloring, {2, 3, 7, 11}

R: [7, 8, 8, 6, A, A, A, C, B, C, 4, 5]

B: [6, 7, 7, 7, 3, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 4, 1, 3], [0, 0, 0, 1, 3, 2, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 1, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$$

$[0, 0, 0, y_1, y_2, y_3, y_5, 2y_5, 0, y_4, y_5, y_6]$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 7, 11}} order: 10

See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 0, 3, 1], [3, 0, 1, 0, 0, 2, 4, 0, 1, 0, 3, 2], [3, 0, 2, 0, 0, 3, 1, 0, 2, 0, 4, 1], [4, 0, 3, 0, 0, 3, 2, 0, 1, 0, 1, 2], [1, 0, 3, 0, 0, 4, 3, 0, 2, 0, 2, 1], [2, 0, 4, 0, 0, 1, 3, 0, 1, 0, 3, 2], [3, 0, 1, 0, 0, 2, 4, 0, 2, 0, 3, 1], [3, 0, 2, 0, 0, 3, 1, 0, 1, 0, 4, 2]] \$$

$[-3y_1 - 3y_2 - 3y_6 - 3y_3 + 13y_4 - 3y_5 + 13y_7, 3y_1, 3y_2, 0, 0, 3y_6, 3y_3, 0, 3y_4, 0, 3y_5, 3y_7]$

$$p = -s^2 - s^3 + s^7 + s^8$$

258 . Coloring, {2, 3, 7, 12}

R: [7, 8, 8, 6, A, A, A, C, B, C, 1, 9]

B: [6, 7, 7, 7, 3, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 2, 2, 6] , [2, 0, 0, 0, 0, 0, 1, 0, 6, 2, 3, 2] , [3, 0, 0, 0, 0, 2, 0, 2, 1, 6, 2] , [6, 0, 0, 0, 0, 0, 3, 0, 2, 2, 2, 1] , [2, 0, 0, 0, 0, 0, 6, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 0, 2, 6, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 2, 2, 6]] \$

$[y_1, 0, 0, 0, 0, y_7, y_6, 2y_7, y_5, y_3, y_4, y_2]$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 0, 3, 1] , [0, 0, 3, 3, 1, 0, 6, 0, 0, 0, 3, 0] , [0, 0, 1, 3, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$[0, 2y_6, y_2, y_3, y_4, y_6, y_1, 0, 0, 0, y_5, y_6]$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

259 . Coloring, {2, 3, 8, 9}

R: [7, 8, 8, 6, A, A, B, B, C, C, 1, 5]

B: [6, 7, 7, 7, 3, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2]] \$

$$[y_4, 0, 0, 0, y_3, y_2, y_1, 2y_2, 0, y_4, y_3 + y_2, 2y_2 + y_1]$$

$$p' = -s^4 + s^7 \quad p' = -s^3 + s^6 \quad p' = s^2 - s^5 \quad p = s^2 - s^5$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 2, 1, 1], [0, 2, 1, 1, 0, 0, 6, 0, 1, 3, 2, 0], [0, 3, 0, 2, 0, 0, 4, 0, 0, 6, 1, 0], [0, 6, 0, 1, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0]] \$$$

$$[0, y_2, y_4, y_1, 0, y_6, y_5, 0, y_4, y_3, y_7, y_6]$$

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

260 . Coloring, {2, 3, 8, 10}

$$\Omega p(\Delta)=0: \quad p = -2s^2 - 3s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, B, B, B, 2, 1, 5]

B: [6, 7, 7, 7, 3, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 4, 2, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 3, 3, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$$$

$$[y_1, y_2, 0, 0, 2y_3, y_3, y_4, y_5, 0, y_6, y_7, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 2, 0, 4] , [0, 0, 1, 0, 0, 0, 4, 0, 4, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 1, 0, 4, 4, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, -y_2 + y_3 - y_4 - y_1 + y_5, 2y_2, 0, y_2, y_3, 0, y_4, y_1, 0, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7$$

261 . Coloring, {2, 3, 8, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 3s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, B, B, B, C, 4, 5]

B: [6, 7, 7, 7, 3, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 2, 0, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 4, 0, 0, 0, 4, 0, 3] , [0, 0, 0, 0, 3, 3, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

$$[0, 0, 0, y_1, y_2, y_3, y_4, 2y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 2, 0, 2] , [0, 2, 1, 0, 0, 2, 4, 0, 2, 3, 0, 2] , [0, 3, 2, 0, 0, 0, 3, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 3, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 5, 0, 2]] \$

$$[y_2, y_1, -y_2 - y_1 - y_3 - y_4 + 6y_5 - y_6, 0, 0, y_3, y_4, 0, y_5, y_6, 0, y_5]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Â» SYNC'D !RANK'D

262 . Coloring, {2, 3, 8, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, B, B, B, C, 1, 9]

B: [6, 7, 7, 7, 3, 3, A, C, C, 2, 4, 5]

' See graph

' ' See pair graph

,

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 2, 4, 2], [4, 0, 0, 0, 0, 0, 2, 0, 2, 1, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 5, 0, 1, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$$$

$$[y_1, 0, 0, 0, 0, y_2, y_3, 2y_2, y_4, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 6, 0, 0, 3, 0, 0], [0, 3, 2, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[0, y_1, y_2, 2y_4, y_5, y_4, y_3, 0, 0, y_6, 0, 2y_4]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Â» SYNC'D !RANK'D

263 . Coloring, {2, 3, 9, 10}

$$\Omega p(\Delta)=0: \quad p = 6s^2 + s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, B, C, C, 2, 1, 5]

B: [6, 7, 7, 7, 3, 3, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}, {1, 7, 11}}

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 2, 2, 0, 3, 1, 2], [1, 3, 0, 0, 2, 0, 2, 2, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 1, 3, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 2, 2, 0, 2, 1, 3], [1, 2, 0, 0, 3, 0, 2, 2, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 1, 2, 0, 3, 2, 2], [2, 3, 0, 0, 2, 0, 2, 2, 0, 2, 1, 2], [1, 2, 0, 0, 2, 0, 2, 3, 0, 2, 2, 2]] \$

$$[5y_1, 11y_1 - 5y_2 - 5y_3 + 11y_4 - 5y_5 - 5y_6 + 11y_7 - 5y_8, 0, 0, 5y_2, 5y_3, 5y_4, 5y_5, 0, 5y_6, 5y_7, 5y_8]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 2, 2, 2], [0, 0, 1, 2, 0, 0, 4, 0, 2, 3, 2, 2], [0, 0, 0, 2, 0, 0, 3, 0, 2, 4, 2, 3], [0, 0, 0, 2, 0, 0, 2, 0, 3, 3, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 2, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 2, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 2, 3, 2], [0, 0, 0, 3, 0, 0, 4, 0, 2, 3, 2, 2]] \$

$$[0, 0, -y_3 + y_1 + y_2 - y_4 - y_5 + y_6 + y_7, y_3, 0, y_1, y_2, 0, y_4, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

264 . Coloring, {2, 3, 9, 11}

$$\Omega p(\Delta)=0: \quad p = -6s^2 + s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, B, C, C, C, 4, 5]

B: [6, 7, 7, 7, 3, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 2, 2, 4] , [0, 0, 0, 2, 4, 2, 0, 0, 0, 3, 1, 4] , [0, 0, 0, 1, 4, 2, 0, 0, 0, 6, 0, 3] , [0, 0, 0, 0, 3, 1, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$

$$[0, 0, 0, y_1, y_2, y_3, y_4, 2y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 2, 2, 0] , [2, 2, 1, 0, 0, 2, 4, 0, 0, 3, 2, 0] , [2, 3, 2, 0, 0, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 2, 5, 0, 0, 3, 0, 0] , [0, 3, 2, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, 0, y_7, y_8, y_6, 0]$$

265 . Coloring, {2, 3, 9, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, B, C, C, C, 1, 9]

B: [6, 7, 7, 7, 3, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	5 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 2, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 1, 1, 6], [1, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 5], [2, 0, 0, 0, 0, 0, 1, 0, 5, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 1, 5], [1, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 6], [2, 0, 0, 0, 0, 0, 1, 0, 6, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 1, 6]] \$$

$[5 y_1, 0, 0, 0, 0, 5 y_2, 5 y_3, 10 y_2, 11 y_1 - 15 y_2 + 11 y_3 - 5 y_4 + 11 y_5 - 5 y_6, 5 y_4, 5 y_5, 5 y_6]$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p' = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 3

See Matrix

$\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 2, 2, 0], [0, 2, 3, 2, 0, 0, 6, 0, 0, 3, 0, 0], [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 3, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0], [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 3, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0]] \$$

$[0, 2 y_1, 2 y_5, 2 y_4, -4 y_5 + 6 y_4, -2 y_5 + 3 y_4, 2 y_3, 0, 0, 2 y_2, -4 y_5 + 6 y_4, 0]$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

266 . Coloring, $\{2, 3, 10, 11\}$

R: [7, 8, 8, 6, A, A, B, C, B, 2, 4, 5]

B: [6, 7, 7, 7, 3, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 2, 3, 1], [0, 2, 0, 3, 1, 2, 0, 2, 0, 3, 1, 2], [0, 3, 0, 1, 2, 3, 0, 2, 0, 3, 0, 2], [0, 3, 0, 0, 2, 1, 0, 3, 0, 5, 0, 2], [0, 5, 0, 0, 2, 0, 0, 3, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 5, 0, 2, 0, 3], [0, 2, 0, 0, 3, 0, 0, 3, 0, 3, 0, 5], [0, 3, 0, 0, 5, 0, 0, 2, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 3, 0, 5, 0, 2]] \$$

$[0, y_4, 0, y_2, y_3, y_1, y_5, y_6, 0, y_8, y_9, y_7]$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 2, 1, 3], [1, 0, 1, 0, 0, 2, 2, 0, 3, 3, 0, 4], [0, 0, 2, 0, 0, 1, 1, 0, 4, 2, 0, 6], [0, 0, 1, 0, 0, 0, 2, 0, 6, 1, 0, 6], [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$[-y_1 + y_2 + y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, 0, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$

$$p = -s^7 + s^8$$

267 . Coloring, $\{2, 3, 10, 12\}$

R: $[7, 8, 8, 6, A, A, B, C, B, 2, 1, 9]$

B: $[6, 7, 7, 7, 3, 3, A, B, C, C, 4, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 9

See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 2, 2, 1, 1, 3, 2], [3, 1, 0, 0, 0, 0, 3, 2, 2, 0, 3, 2], [3, 0, 0, 0, 0, 3, 1, 2, 0, 5, 2], [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$$[y_1, y_2, 0, 0, 0, y_8, y_3, y_4, y_5, y_6, y_7, y_9]$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 2, 1, 3], [0, 0, 3, 1, 3, 0, 4, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 3, 0, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3]] \$$$

$$[0, 0, y_4, y_1, y_2, y_6, y_3, 0, 0, y_5, y_6, y_7]$$

$$p = -s^3 + s^8$$

268 . Coloring, {2, 3, 11, 12}

R: [7, 8, 8, 6, A, A, B, C, B, C, 4, 9]

B: [6, 7, 7, 7, 3, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 3, 4], [0, 0, 0, 3, 0, 3, 0, 0, 4, 2, 3, 1], [0, 0, 0, 3, 0, 3, 0, 0, 1, 3, 4, 2], [0, 0, 0, 4, 0, 3, 0, 0, 2, 3, 1, 3], [0, 0, 0, 1, 0, 4, 0, 0, 3, 3, 2, 3], [0, 0, 0, 2, 0, 1, 0, 0, 3, 4, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 3, 4]] \$$$

$$[0, 0, 0, y_1, 0, y_2, y_4, 2y_4, y_3, y_5, y_6, y_7]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 2, 1, 1], [1, 2, 3, 0, 1, 2, 4, 0, 0, 3, 0, 0], [0, 3, 3, 0, 0, 1, 5, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$$

$$[y_2, y_3, y_4, 0, y_2, y_1, y_5, 0, 0, y_6, y_7, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

269 . Coloring, {2, 4, 5, 6}

R: [7, 8, 7, 7, 3, 3, B, C, B, C, 1, 5]

B: [6, 7, 8, 6, A, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 0, 3, 3], [3, 0, 2, 0, 3, 0, 4, 0, 0, 0, 3, 1], [3, 0, 3, 0, 1, 0, 5, 0, 0, 0, 4, 0], [4, 0, 1, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[y_7, 0, y_6, 0, y_5, 0, y_4, y_3, 0, 0, y_1, y_2]$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 4, 1, 1], [0, 4, 0, 1, 0, 2, 2, 0, 1, 3, 1, 2], [0, 3, 0, 1, 0, 1, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 1, 3, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1]] \$$$

$$[0, 3y_1, 0, -3y_1 - 3y_2 - 3y_3 - 3y_4 + 13y_5 - 3y_6 - 3y_7 + 13y_8, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

270 . Coloring, {2, 4, 5, 7}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, A, C, B, C, 1, 5]

B: [6, 7, 8, 6, A, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3]] \$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_6, 0, y_5, y_6, y_7]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {3, 4, 6, 8, 11}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 3, 1] , [0, 1, 2, 3, 0, 2, 2, 1, 1, 0, 2, 2] , [0, 0, 2, 2, 0, 3, 1, 2, 2, 0, 3, 1] , [0, 0, 3, 3, 0, 2, 0, 2, 1, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 0, 3, 2, 0, 2, 1] , [0, 0, 3, 2, 0, 3, 0, 2, 1, 0, 3, 2] , [0, 0, 3, 3, 0, 2, 0, 2, 2, 0, 3, 1] , [0, 0, 2, 3, 0, 3, 0, 3, 1, 0, 2, 2]] \$

$$[0, -3y_1 - 3y_2 - 3y_3 - 3y_4 - 3y_5 + 13y_6 - 3y_7 - 3y_8 + 13y_9, 3y_1, 3y_2, 0, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8, 3y_9]$$

$$p = -s^4 - s^5 + s^9 + s^{10}$$

271 . Coloring, {2, 4, 5, 8}

R: [7, 8, 7, 7, 3, A, B, B, B, C, 1, 5]

B: [6, 7, 8, 6, A, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 4, 2], [4, 0, 2, 0, 2, 0, 3, 0, 0, 0, 4, 1], [4, 0, 2, 0, 1, 0, 6, 0, 0, 0, 3, 0], [3, 0, 1, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_5, 0, y_5, y_6, y_7]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 0, 2], [0, 3, 2, 0, 0, 2, 2, 1, 2, 1, 0, 3], [0, 1, 2, 0, 0, 0, 3, 2, 3, 2, 0, 3], [0, 2, 0, 0, 0, 0, 1, 2, 3, 3, 0, 5], [0, 3, 0, 0, 0, 0, 2, 0, 5, 1, 0, 5], [0, 1, 0, 0, 0, 0, 3, 0, 5, 2, 0, 5], [0, 2, 0, 0, 0, 0, 1, 0, 5, 3, 0, 5], [0, 3, 0, 0, 0, 0, 2, 0, 5, 1, 0, 5], [0, 1, 0, 0, 0, 0, 3, 0, 5, 2, 0, 5]] \$$

$$[0, 6y_2 + 6y_4 + 6y_5 - 5y_3 - 5y_6, -5y_1 + 5y_2 + 5y_4 + 5y_5 - 5y_7, 5y_1, 0, 5y_2, 5y_3, 5y_4, 5y_5, 5y_6, 0, 5y_7]$$

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

272 . Coloring, $\{2, 4, 5, 9\}$

R: [7, 8, 7, 7, 3, A, B, C, C, C, 1, 5]

B: [6, 7, 8, 6, A, 3, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 2, 4] , [2, 0, 2, 0, 4, 0, 3, 0, 0, 0, 3, 2] , [3, 0, 4, 0, 2, 0, 4, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 0, 7, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0]] \$

$[y_1, 0, y_3, 0, y_2, 0, y_6, y_5, 0, y_5, y_4, y_7]$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}, {2, 7, 10}}

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 2, 0] , [0, 3, 2, 2, 0, 2, 2, 1, 0, 1, 3, 0] , [0, 1, 2, 3, 0, 2, 3, 2, 0, 2, 1, 0] , [0, 2, 2, 1, 0, 3, 1, 2, 0, 3, 2, 0] , [0, 3, 3, 2, 0, 1, 2, 2, 0, 1, 2, 0] , [0, 1, 1, 2, 0, 2, 3, 3, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 2, 1, 1, 0, 3, 3, 0] , [0, 3, 2, 3, 0, 2, 2, 2, 0, 1, 1, 0] , [0, 1, 2, 1, 0, 3, 3, 2, 0, 2, 2, 0]] \$

$[0, 3y_1, 3y_2, 5y_1 - 3y_2 - 3y_3 + 5y_4 - 3y_5 - 3y_6 + 5y_7 - 3y_8, 0, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8, 0]$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

273 . Coloring, {2, 4, 5, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, B, C, B, 2, 1, 5]

B: [6, 7, 8, 6, A, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 9
 See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 0, 3, 2, 0, 0, 3, 1] , [3, 0, 1, 0, 1, 0, 5, 1, 0, 0, 3, 2] , [3, 0, 1, 0, 2, 0, 4, 0, 0, 0, 5, 1] , [5, 0, 2, 0, 1, 0, 4, 0, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 0, 7, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0]] \$$

$$[y_1, y_2, y_3, 0, y_9, 0, y_6, y_7, 0, y_8, y_5, y_4]$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{3, 4, 6, 8, 11\}\}$ order: 10
 See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 1, 3] , [0, 0, 2, 1, 0, 2, 0, 1, 3, 1, 1, 5] , [0, 0, 2, 1, 0, 1, 0, 2, 5, 0, 1, 4] , [0, 0, 1, 1, 0, 1, 0, 2, 4, 0, 2, 5] , [0, 0, 1, 2, 0, 1, 0, 1, 5, 0, 2, 4] , [0, 0, 1, 2, 0, 2, 0, 1, 4, 0, 1, 5] , [0, 0, 2, 1, 0, 2, 0, 1, 0, 2, 1, 0, 2, 0, 1, 5, 0, 1, 4] , [0, 0, 2, 1, 0, 1, 0, 2, 4, 0, 1, 5] , [0, 0, 1, 1, 0, 1, 0, 2, 5, 0, 2, 4]] \$$

$$[0, 0, 7y_7, 7y_6, 0, 7y_5, 7y_4, 7y_3, 7y_2, 9y_7 + 9y_6 + 9y_5 - 7y_4 + 9y_3 - 7y_2 + 9y_1 - 7y_8, 7y_1, 7y_8]$$

$$p = -s^3 - s^4 + s^8 + s^9$$

274 . Coloring, $\{2, 4, 5, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, B, C, B, C, 4, 5]

B: [6, 7, 8, 6, A, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 10

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6
 See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 0, 3, 0, 0, 0, 3, 2] , [0, 0, 3, 3, 2, 0, 5, 0, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$

$$[0, 0, y_2, y_1, y_5, 0, y_6, y_7, 0, y_7, y_4, y_3]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}, {2, 7, 10}}

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 1, 1], [1, 3, 2, 0, 0, 2, 2, 1, 1, 1, 1, 2], [1, 1, 2, 0, 0, 1, 3, 2, 2, 2, 1, 1], [1, 2, 1, 0, 0, 1, 1, 2, 1, 3, 2, 2], [2, 3, 1, 0, 0, 1, 2, 1, 2, 1, 2, 1], [2, 1, 1, 0, 0, 2, 3, 1, 1, 2, 1, 2], [1, 2, 2, 0, 0, 2, 1, 1, 2, 3, 1, 1], [1, 3, 2, 0, 0, 1, 2, 2, 1, 1, 1, 2], [1, 1, 1, 0, 0, 1, 3, 2, 2, 2, 2, 1], [2, 2, 1, 0, 0, 1, 1, 1, 1, 3, 2, 2]] \$$$

$$[-3y_1 - 3y_2 - 3y_4 + 7y_5 - 3y_7 + 7y_8, -3y_3 + 6y_5 - 3y_6 + 6y_8, 3y_1, 0, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8]$$

$$p = -s - 2s^2 - 2s^3 - s^4 + s^6 + 2s^7 + 2s^8 + s^9 \quad p' = -s - 2s^2 - 2s^3 - s^4 + s^6 + 2s^7 + 2s^8 + s^9$$

275 . Coloring, {2, 4, 5, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, B, C, B, C, 1, 9]

B: [6, 7, 8, 6, A, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 5, 2], [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[y_6, 0, y_5, 0, 0, 0, y_4, y_5, y_3, y_5, y_2, y_1]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}, {2, 7, 10}}

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 2, 2, 1, 0, 3, 1, 0] , [0, 3, 2, 1, 0, 1, 3, 2, 0, 3, 1, 0] , [0, 3, 1, 1, 0, 1, 3, 2, 0, 3, 2, 0] , [0, 3, 1, 2, 0, 1, 3, 1, 0, 3, 2, 0] , [0, 3, 1, 2, 0, 2, 3, 1, 0, 3, 1, 0] , [0, 3, 2, 1, 0, 2, 3, 1, 0, 3, 1, 0] , [0, 3, 2, 1, 0, 1, 3, 2, 0, 3, 1, 0] , [0, 3, 1, 1, 0, 1, 3, 2, 0, 3, 2, 0] , [0, 3, 1, 2, 0, 1, 3, 1, 0, 3, 2, 0]] \$

[0, 3 y₇ + 3 y₆ - 3 y₅, 7 y₇ + 7 y₆ - 3 y₁ - 3 y₂ - 3 y₃ - 3 y₄, 3 y₁, 3 y₇, 3 y₂, 3 y₆, 3 y₃, 0, 3 y₇ + 3 y₆, 3 y₄, 3 y₅]

$$p' = s^4 - s^9 \quad p' = s^3 - s^8 \quad p = -s^3 + s^8$$

276 . Coloring, {2, 4, 6, 7}

$$\Omega p(\Delta)=0: \quad p = 3s^3 - 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, A, C, B, C, 1, 5]

B: [6, 7, 8, 6, 3, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 1, 3] , [1, 0, 0, 0, 3, 0, 3, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

[y₁, 0, y₅, 0, y₆, 0, y₄, y₅, 0, y₃, y₅, y₂]

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 2, 2, 1, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 3, 1, 0, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 2, 0, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 3, 2, 0, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 1, 3, 0, 1, 3, 2, 2] , [0, 3, 0, 2, 0, 2, 2, 0, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 2, 3, 0, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 3, 1, 0, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 2, 0, 1, 3, 1, 2]] \$

[0, 2 y₈, 2 y₇, 2 y₆, 0, 2 y₅, 2 y₄, 2 y₃, 2 y₂, -2 y₆ - 2 y₄ - 2 y₃ - 39 y₂ + 11 y₈ + 11 y₇ + 11 y₅ + 11 y₁, 2 y₁, 3 y₈ + 3 y₇ + 3 y₅ - 11 y₂ + 3 y₁]

$$p' = -s^3 + s^9 \quad p = s^3 - s^9$$

277 . Coloring, {2, 4, 6, 8}

R: [7, 8, 7, 7, A, 3, B, B, B, C, 1, 5]

B: [6, 7, 8, 6, 3, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	5 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 4, 2] , [4, 0, 0, 0, 2, 0, 3, 0, 0, 2, 4, 1] , [4, 0, 0, 0, 1, 0, 4, 0, 0, 2, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 4, 2] , [4, 0, 0, 0, 2, 0, 3, 0, 0, 2, 4, 1] , [4, 0, 0, 0, 1, 0, 4, 0, 0, 2, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 4, 2] , [4, 0, 0, 0, 2, 0, 3, 0, 0, 2, 4, 1]] \$

[9 y₁ - 11 y₄ + 7 y₂ - 2 y₃, 0, 2 y₂, 0, -2 y₁ + 2 y₄ - 2 y₂ + 2 y₃, 0, 2 y₁, 2 y₂, 0, 7 y₁ - 9 y₄ + 7 y₂ - 2 y₃, 2 y₃, 2 y₄]

$$p' = -s^2 + s^5 \quad p = -s^2 + s^8 \quad p = -s^2 + s^5 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 2, 2, 1, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3]] \$

$$[0, 2y_1, -3y_1 + 6y_2 + 4y_5 - 3y_4 - 3y_3, -6y_1 + 12y_2 + 8y_5 - 6y_4 - 6y_3, 0, -6y_1 + 8y_2 + 12y_5 - 6y_4 - 6y_3, 2y_4, -3y_1 + 4y_2 + 6y_5 - 3y_4 - 3y_3, 2y_2, 2y_3, 0, 2y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p = -s^3 + s^9 \quad p' = -s^3 + s^6$$

278 . Coloring, {2, 4, 6, 9}

R: [7, 8, 7, 7, A, 3, B, C, C, C, 1, 5]

B: [6, 7, 8, 6, 3, A, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 2, 4], [2, 0, 0, 0, 4, 0, 3, 0, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 2, 0, 0, 4, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 3, 0, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 2, 0, 0, 4, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 3, 0, 0, 2, 3, 2]] \$$$

$$[y_1 + y_2 - y_4, 0, -2y_1 - y_2 + 2y_4 + y_3, 0, -y_3 + 2y_1, 0, y_1, -2y_1 - y_2 + 2y_4 + y_3, 0, y_2, y_4, y_3]$$

$$p = -s^2 + s^8 \quad p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 2, 0], [0, 3, 0, 2, 0, 2, 2, 1, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 3, 0, 0, 4, 1, 0], [0, 4, 0, 1, 0, 3, 3, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 1, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$$

$$[0, y_1, y_3, y_2, 0, y_5, y_4, y_6, 2y_3, y_7, y_8, 0]$$

$$p = s^6 - s^9$$

279 . Coloring, {2, 4, 6, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, B, C, B, 2, 1, 5]

B: [6, 7, 8, 6, 3, A, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 9

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}, {1, 7, 11}}

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 3, 1] , [3, 1, 0, 0, 1, 0, 3, 2, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 3, 1, 0, 1, 3, 2] , [3, 1, 0, 0, 2, 0, 3, 2, 0, 1, 3, 1] , [3, 1, 0, 0, 1, 0, 3, 1, 0, 2, 3, 2] , [3, 2, 0, 0, 2, 0, 3, 1, 0, 1, 3, 1] , [3, 1, 0, 0, 1, 0, 3, 2, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 3, 1, 0, 1, 3, 2] , [3, 1, 0, 0, 2, 0, 3, 2, 0, 1, 3, 1]] \$

$$[3y_2, 3y_1, -3y_2 + 3y_4, 0, -3y_1 + 7y_4 - 3y_6 - 3y_5 - 3y_3, 0, 3y_4, 3y_6, 0, 3y_5, 3y_4, 3y_3]$$

$$p' = s^3 - s^8 \quad p' = s^2 - s^7 \quad p = s^2 - s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 1, 3, 3, 1, 5] , [0, 0, 0, 1, 0, 1, 0, 0, 5, 2, 1, 6] , [0, 0, 0, 1, 0, 1, 0, 0, 6, 1, 0, 7] , [0, 0, 0, 0, 0, 1, 0, 0, 7, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_7, y_1, 0, y_1 - 2y_7 + y_6 + y_5 + y_4 - y_3 - y_2, y_7, y_6, y_5, y_4, y_3, y_2]$$

$$p' = s^7 - s^8 \quad p = s^7 - s^9$$

280 . Coloring, {2, 4, 6, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, 3, B, C, B, C, 4, 5]

B: [6, 7, 8, 6, 3, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	4 vs 8	9 vs 10

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 3, 3], [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 3, 2]] \$$

$$[0, 0, 3y_4, 3y_3, 3y_2, 0, 3y_4 + 3y_3, 3y_4, 0, 3y_1, 3y_4 + 3y_3, 4y_4 + 7y_3 - 3y_2 - 3y_1]$$

$$p' = s^3 - s^6 \quad p' = s^4 - s^7 \quad p' = s^2 - s^5 \quad p = s^2 - s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 2, 2, 1, 1, 3, 1, 2], [1, 3, 0, 0, 0, 1, 3, 0, 2, 4, 1, 1], [1, 4, 0, 0, 0, 1, 3, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 1, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2]] \$$

$$[-3y_1 - 3y_2 - 3y_5 - 3y_3 - 3y_4 + 13y_6 - 3y_8 - 3y_9 + 13y_7, 3y_1, 3y_2, 0, 0, 3y_5, 3y_3, 3y_4, 3y_6, 3y_8, 3y_9, 3y_7]$$

$$p = -s^6 - s^7 + s^9 + s^{10}$$

281 . Coloring, $\{2, 4, 6, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, B, C, B, C, 1, 9]

B: [6, 7, 8, 6, 3, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 5, 2], [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 0], [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$[y_1, 0, y_5, 0, 0, 0, y_2, y_5, y_4, y_5, y_6, y_3]$

$$p' = -s^4 + s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 9

See Matrix

$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 2, 1, 0, 3, 1, 0], [0, 3, 1, 1, 0, 1, 3, 2, 0, 4, 1, 0], [0, 4, 0, 1, 0, 1, 3, 1, 0, 4, 2, 0], [0, 4, 0, 2, 0, 1, 4, 0, 0, 4, 1, 0], [0, 4, 0, 1, 0, 2, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 1, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$

$[0, y_1, y_2, y_3, y_4, y_7, y_5, y_6, 0, y_{10}, y_8, y_9]$

282 . Coloring, $\{2, 4, 7, 8\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, A, B, B, C, 1, 5]

B: [6, 7, 8, 6, 3, 3, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 0, 2, 0, 0, 5, 1, 4] , [1, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

$$[y_1, 0, 0, 0, y_4, 0, y_3, y_2, 0, y_7, y_6, y_5]$$

Omega Rank for B : cycles: {{9, 12}} order: 8
See Matrix

\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 0, 2, 2] , [0, 0, 2, 2, 0, 2, 2, 2, 0, 1, 3] , [0, 0, 2, 1, 0, 2, 0, 2, 3, 0, 2, 4] , [0, 0, 2, 2, 0, 1, 0, 2, 4, 0, 0, 5] , [0, 0, 1, 0, 0, 2, 0, 2, 5, 0, 0, 6] , [0, 0, 2, 0, 0, 0, 0, 1, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, y_1, y_3, y_2, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9]$$

283 . Coloring, {2, 4, 7, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, A, C, C, C, 1, 5]

B: [6, 7, 8, 6, 3, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3
See Matrix

\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[2 y_3, 0, 0, 0, y_1, 0, y_2, y_3, 0, y_4, 0, y_5]$$

$$p = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5

See Matrix

$$\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 0, 4, 0], [0, 0, 2, 4, 0, 2, 2, 2, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 2, 0, 0, 4, 0], [0, 0, 4, 4, 0, 4, 0, 2, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 2, 0, 0, 4, 0]] \$$$

$$[0, y_6, y_2, y_1, 0, y_3, y_5, y_4, y_6, 0, y_7, 0]$$

$$p = s^3 - s^8$$

284 . Coloring, $\{2, 4, 7, 10\}$

R: [7, 8, 7, 7, A, A, A, C, B, 2, 1, 5]

B: [6, 7, 8, 6, 3, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5

See Matrix

$$\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 4, 1, 1], [1, 4, 0, 0, 1, 0, 2, 2, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 1, 4, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5], [0, 2, 0, 0, 5, 0, 0, 2, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2], [0, 5, 0, 0, 2, 0, 0, 4, 0, 3, 0, 2]] \$$$

$$[y_1, y_2, 0, 0, y_8, 0, y_6, y_7, 0, y_3, y_4, y_5]$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{3, 4, 6, 8, 11\}\}$ order: 10

See Matrix

$$\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 0, 3, 3], [0, 0, 2, 3, 0, 2, 0, 2, 3, 0, 2, 2], [0, 0, 2, 2, 0, 3, 0, 2, 2, 0, 2, 3], [0, 0, 3, 2, 0, 2, 0, 2, 3, 0, 2, 2], [0, 0, 2, 2, 0, 2, 0, 3, 2, 0, 2, 3], [0, 0, 2, 2, 0, 2, 0, 2, 3, 0, 3, 2], [0, 0, 2, 3, 0, 2, 0, 2, 2, 0, 2, 3], [0, 0, 2, 2, 0, 3, 0, 2, 3, 0, 2, 2]] \$$$

$$[0, 0, 5 y_1, -5 y_1 - 5 y_6 - 5 y_7 - 5 y_4 + 11 y_5 - 5 y_3 + 11 y_2, 0, 5 y_6, 5 y_7, 5 y_4, 5 y_5, 0, 5 y_3, 5 y_2]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

285 . Coloring, {2, 4, 7, 11}

R: [7, 8, 7, 7, A, A, A, C, B, C, 4, 5]

B: [6, 7, 8, 6, 3, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 4, 1, 3], [0, 0, 0, 1, 3, 0, 2, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$$

$$[0, 0, 0, y_2, y_3, 0, y_4, y_6, 0, y_5, y_6, y_1]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

$$\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 0, 3, 1], [3, 0, 2, 0, 0, 2, 2, 2, 1, 0, 2, 2], [2, 0, 2, 0, 0, 3, 0, 2, 2, 0, 4, 1], [4, 0, 3, 0, 0, 2, 0, 2, 1, 0, 2, 2], [2, 0, 2, 0, 0, 4, 0, 3, 2, 0, 2, 1], [2, 0, 4, 0, 0, 2, 0, 2, 1, 0, 3, 2], [3, 0, 2, 0, 0, 2, 0, 4, 2, 0, 2, 1], [2, 0, 2, 0, 0, 3, 0, 2, 1, 0, 4, 2], [4, 0, 3, 0, 0, 2, 0, 2, 2, 0, 2, 1]] \$$$

$$[3 y_5, 3 y_6, 3 y_7, 0, 0, -3 y_5 - 3 y_6 - 3 y_7 - 3 y_1 - 3 y_2 + 13 y_3 - 3 y_8 + 13 y_4, 3 y_1, 3 y_2, 3 y_3, 0, 3 y_8, 3 y_4]$$

$$p = -s^3 - s^4 + s^8 + s^9$$

286 . Coloring, {2, 4, 7, 12}

R: [7, 8, 7, 7, A, A, A, C, B, C, 1, 9]

B: [6, 7, 8, 6, 3, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	7 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 5] , [2, 0, 0, 0, 0, 0, 1, 0, 5, 2, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 0, 3, 1, 5, 2] , [5, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 1] , [3, 0, 0, 0, 0, 0, 5, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 3, 0, 2, 5, 1, 3]] \$

$$[y_1, 0, 0, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 0, 3, 1] , [0, 0, 4, 3, 1, 2, 2, 2, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 0, 3, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 0, 4, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 0, 3, 0, 0, 4, 0]] \$

$$[0, 2y_7, y_1, y_2, y_3, y_4, 2y_3 - 3y_7, y_5, 0, 0, y_6, y_7]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

287 . Coloring, {2, 4, 8, 9}

R: [7, 8, 7, 7, A, A, B, B, C, C, 1, 5]

B: [6, 7, 8, 6, 3, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	9 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 3, 3]] \$$

$[2y_1, 0, 0, 0, 10y_1 + 4y_3 + 4y_2 - 16y_4, 0, 2y_3, 2y_2, 0, 2y_4, 16y_1 + 7y_3 + 7y_2 - 27y_4, 4y_1 + 3y_3 + 3y_2 - 7y_4]$

$$p' = s^3 - s^6 \quad p' = s^2 - s^5 \quad p = s^2 - s^5$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}, \{3, 4, 6, 8, 9, 11, 12\}\}$

See Matrix

$\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 2, 1, 1], [0, 2, 2, 1, 0, 2, 2, 2, 1, 1, 2, 1], [0, 1, 2, 2, 0, 1, 2, 2, 1, 2, 1, 2], [0, 2, 1, 1, 0, 2, 1, 2, 2, 1, 2], [0, 2, 2, 1, 0, 1, 2, 1, 2, 1, 2, 2], [0, 1, 1, 2, 0, 1, 2, 2, 2, 2, 2, 1], [0, 2, 1, 2, 0, 2, 1, 1, 1, 2, 2, 2], [0, 2, 2, 2, 0, 2, 2, 1, 2, 1, 1, 1], [0, 1, 2, 1, 0, 2, 2, 2, 1, 2, 2, 1], [0, 2, 2, 2, 0, 1, 1, 2, 1, 2, 1, 2], [0, 2, 2, 2, 0, 1, 1, 2, 1, 2, 1, 2]] \$$

$[0, 5y_1, 11y_1 - 5y_2 - 5y_3 + 11y_4 - 5y_5 - 5y_6 + 11y_7 - 5y_8 - 5y_9, 5y_2, 0, 5y_3, 5y_4, 5y_5, 5y_6, 5y_7, 5y_8, 5y_9]$

$$p = -s - s^2 - s^3 + s^8 + s^9 + s^{10}$$

288 . Coloring, $\{2, 4, 8, 10\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, B, B, B, 2, 1, 5]

B: [6, 7, 8, 6, 3, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	7 vs 7	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
See Matrix

\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 2, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 2, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 4, 2, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[y_1, y_2, 0, 0, y_3, 0, y_4, y_5, 0, y_6, y_7, 0]$$

Omega Rank for B : cycles: {{9, 12}} order: 6
See Matrix

\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 2, 0, 4] , [0, 0, 2, 0, 0, 2, 0, 2, 4, 1, 0, 5] , [0, 0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, y_6, 2 y_5, 0, -2 y_5 + 2 y_2, y_5, y_4, y_3, y_2, 0, y_1]$$

$$p' = s^5 - s^7 \quad p = s^5 - s^7$$

289 . Coloring, {2, 4, 8, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, B, B, B, C, 4, 5]

B: [6, 7, 8, 6, 3, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	8 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3
See Matrix

\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 0, 2, 0, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 0, 4, 0, 0, 2, 2, 2] , [0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 0, 2, 0, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 0, 4, 0, 0, 2, 2, 2] , [0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 4, 2]] \$

$$[0, 0, 0, 5y_4 - y_1 - y_2 - y_3, y_4, 0, y_1, y_2, 0, y_4, y_3, y_4]$$

$$p' = s^2 - s^5 \quad p = -s^2 + s^5 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 2, 0, 2], [0, 2, 2, 0, 0, 2, 2, 2, 2, 1, 0, 3], [0, 1, 2, 0, 0, 0, 2, 2, 3, 2, 0, 4], [0, 2, 0, 0, 0, 0, 1, 2, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 2, 0, 5, 1, 0, 6], [0, 1, 0, 0, 0, 0, 2, 0, 6, 2, 0, 5], [0, 2, 0, 0, 0, 0, 1, 0, 5, 2, 0, 6], [0, 2, 0, 0, 0, 0, 2, 0, 6, 1, 0, 5], [0, 1, 0, 0, 0, 0, 2, 0, 5, 2, 0, 6]] \$$$

$$[5y_7, 5y_5, 5y_6, 0, 0, 5y_3, 5y_4, -5y_7 + 11y_5 - 5y_6 - 5y_3 + 11y_4 - 5y_1 + 11y_2 - 5y_8, 5y_1, 5y_2, 0, 5y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

290 . Coloring, {2, 4, 8, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, B, B, B, C, 1, 9]

B: [6, 7, 8, 6, 3, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 2, 4, 2], [4, 0, 0, 0, 0, 0, 2, 0, 2, 0, 6, 2], [6, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$$

$$[y_1, 0, 0, 0, 0, 0, y_2, y_3, y_4, 2y_3, y_5, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}, \{2, 7, 10\}\}$ order: 12

See Matrix

$\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 2, 0, 2], [0, 2, 4, 0, 2, 2, 2, 2, 0, 1, 0, 1], [0, 1, 4, 0, 1, 0, 2, 4, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 1, 4, 0, 2, 0, 4], [0, 2, 2, 0, 4, 0, 2, 1, 0, 1, 0, 4], [0, 1, 4, 0, 4, 0, 2, 2, 0, 2, 0, 1], [0, 2, 4, 0, 1, 0, 1, 4, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 2, 4, 0, 1, 0, 4], [0, 1, 2, 0, 4, 0, 2, 1, 0, 2, 0, 4]] \$$

$[0, 5y_1, 11y_1 - 5y_2 - 5y_3 - 5y_4 + 11y_5 - 5y_6 + 11y_7 - 5y_8, 5y_2, 5y_3, 5y_4, 5y_5, 5y_6, 0, 5y_7, 0, 5y_8]$

$$p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9$$

291 . Coloring, $\{2, 4, 9, 10\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: $[7, 8, 7, 7, A, A, B, C, C, 2, 1, 5]$

B: $[6, 7, 8, 6, 3, 3, A, B, B, C, 4, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{2, 5, 8, 10, 12\}\}$

See Matrix

$\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 2, 2, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 2, 2, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 3, 2, 0, 1, 2, 2], [2, 1, 0, 0, 2, 0, 2, 2, 0, 2, 3, 2], [3, 2, 0, 0, 2, 0, 2, 1, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 3, 2, 0, 2, 2, 1], [2, 2, 0, 0, 1, 0, 2, 2, 0, 2, 3, 2]] \$$

$[7y_1, 9y_1 - 7y_4 + 9y_5 - 7y_6 - 7y_7 + 9y_2 - 7y_3, 0, 0, 7y_4, 0, 7y_5, 7y_6, 0, 7y_7, 7y_2, 7y_3]$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 2, 2, 2], [0, 0, 2, 2, 0, 2, 0, 2, 2, 1, 3, 2], [0, 0, 2, 3, 0, 2, 0, 2, 2, 0, 4, 1], [0, 0, 2, 4, 0, 3, 0, 2, 1, 0, 4, 0], [0, 0, 3, 4, 0, 4, 0, 2, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 0, 3, 0, 0, 2, 0], [0, 0, 4, 2, 0, 3,$

$0, 4, 0, 0, 3, 0], [0, 0, 3, 3, 0, 2, 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 3, 0, 3, 0, 0, 4, 0]] \$$

$[0, 0, y_9, y_8, 0, y_7, y_5, y_6, y_4, y_2, y_3, y_1]$

292 . Coloring, $\{2, 4, 9, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: $[7, 8, 7, 7, A, A, B, C, C, C, 4, 5]$

B: $[6, 7, 8, 6, 3, 3, A, B, B, 2, 1, 9]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
$7 \vee_S 8$	$9 \vee_S 9$	$9 \vee_S 9$	$4 \vee_S 7$	$8 \vee_S 9$

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 0, 3, 0, 0, 3, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 0, 3, 0, 0, 3, 2, 4]] \$$

$[0, 0, 0, 2 y_1, 2 y_2, 0, -16 y_1 + 4 y_2 + 10 y_3 + 10 y_4, 2 y_3, 0, 2 y_4, -7 y_1 + 3 y_2 + 4 y_3 + 4 y_4, -27 y_1 + 7 y_2 + 16 y_3 + 16 y_4]$

$$p' = s^2 - s^5 \quad p' = s^3 - s^6 \quad p = -s^2 + s^5$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}, \{2, 7, 10\}\}$

See Matrix

$\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 2, 2, 0], [2, 2, 2, 0, 0, 2, 2, 2, 0, 1, 3, 0], [3, 1, 2, 0, 0, 2, 2, 2, 0, 2, 2, 0], [2, 2, 2, 0, 0, 3, 1, 2, 0, 2, 2, 0], [2, 2, 3, 0, 0, 2, 2, 2, 0, 1, 2, 0], [2, 1, 2, 0, 0, 2, 2, 3, 0, 2, 2, 0], [2, 2, 2, 0, 0, 2, 1, 2, 0, 2, 3, 0], [3, 2, 2, 0, 0, 2, 2, 2, 0, 1, 2, 0], [2, 1, 2, 0, 0, 3, 2, 2, 0, 2, 2, 0]] \$$

$[11 y_1 - 5 y_4 - 5 y_2 + 11 y_3 - 5 y_6 - 5 y_7 + 11 y_5 - 5 y_8, 5 y_1, 5 y_4, 0, 0, 5 y_2, 5 y_3, 5 y_6, 5 y_7, 5 y_5, 5 y_8, 0]$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

293 . Coloring, {2, 4, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, B, C, C, C, 1, 9]

B: [6, 7, 8, 6, 3, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 2, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 5], [3, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 3, 0, 5, 0, 2, 4]] \$$$

$$[7 y_1, 0, 0, 0, 0, 0, 7 y_5, 7 y_3, 7 y_4, 14 y_3, 7 y_2, 9 y_1 + 9 y_5 - 21 y_3 - 7 y_4 + 9 y_2]$$

$$p = -s^2 - s^3 + s^5 + s^6 \quad p = s^2 - s^4 - s^5 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}, {2, 7, 10}}

See Matrix

$$\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 2, 2, 0], [0, 2, 4, 2, 0, 2, 2, 2, 0, 1, 1, 0], [0, 1, 2, 1, 0, 2, 2, 4, 0, 2, 2, 0], [0, 2, 2, 0, 1, 1, 2, 0, 2, 4, 0], [0, 2, 1, 4, 0, 2, 2, 2, 0, 1, 2, 0], [0, 1, 2, 2, 0, 4, 2, 1, 0, 2, 2, 0], [0, 2, 4, 2, 0, 2, 1, 2, 0, 2, 1, 0], [0, 2, 2, 1, 0, 2, 2, 4, 0, 1, 2, 0], [0, 1, 2, 2, 0, 1, 2, 2, 0, 2, 4, 0]] \$$$

$$[0, 5 y_1, 5 y_6, 5 y_4, 5 y_5, 5 y_3, 5 y_2, 11 y_1 - 5 y_6 - 5 y_4 - 5 y_5 - 5 y_3 + 11 y_2 + 11 y_7 - 5 y_8, 0, 5 y_7, 5 y_8, 0]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

294 . Coloring, {2, 4, 10, 11}

R: [7, 8, 7, 7, A, A, B, C, B, 2, 4, 5]

B: [6, 7, 8, 6, 3, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {2, 5, 8, 10, 12}}

See Matrix

\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 2, 2, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 3, 2, 0, 1, 2, 2] , [0, 1, 0, 2, 2, 0, 3, 2, 0, 1, 3, 2] , [0, 1, 0, 3, 2, 0, 2, 1, 0, 2, 3, 2] , [0, 2, 0, 3, 2, 0, 3, 1, 0, 2, 2, 1] , [0, 2, 0, 2, 1, 0, 3, 2, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 2, 2, 0, 1, 3, 2]] \$

$$[0, y_1 - y_7 + y_2 - y_3 - y_4 + y_5 - y_6, 0, y_1, y_7, 0, y_2, y_3, 0, y_4, y_5, y_6]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 2, 1, 3] , [1, 0, 2, 0, 0, 2, 0, 2, 3, 1, 1, 4] , [1, 0, 2, 0, 0, 1, 0, 2, 4, 0, 2, 4] , [2, 0, 1, 0, 0, 1, 0, 2, 4, 0, 2, 4] , [2, 0, 1, 0, 0, 2, 0, 1, 4, 0, 2, 4] , [2, 0, 2, 0, 0, 2, 0, 1, 4, 0, 1, 4] , [1, 0, 2, 0, 0, 2, 0, 2, 4, 0, 1, 4] , [1, 0, 2, 0, 0, 1, 0, 2, 4, 0, 2, 4] , [2, 0, 1, 0, 0, 1, 0, 2, 4, 0, 2, 4]] \$

$$[y_1, 0, -y_1 - y_7 - y_5 - y_2 + 2y_4 + 2y_3, 0, 0, y_7, y_6, y_5, y_4, y_3, y_2, -y_6 + y_4 + y_3]$$

$$p' = -s^3 + s^8 \quad p = -s^3 + s^8$$

295 . Coloring, {2, 4, 10, 12}

R: [7, 8, 7, 7, A, A, B, C, B, 2, 1, 9]

B: [6, 7, 8, 6, 3, 3, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 2, 2, 1, 0, 5, 1], [5, 0, 0, 0, 0, 0, 3, 2, 1, 0, 3, 2], [3, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 7, 0], [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0]] \$$

$[y_1, y_2, 0, 0, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8]$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5
See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 2, 1, 3], [0, 0, 4, 1, 3, 2, 0, 2, 0, 1, 1, 2], [0, 0, 5, 1, 2, 1, 0, 4, 0, 0, 2, 1], [0, 0, 3, 2, 1, 1, 0, 5, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 0, 3, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 0, 2, 0, 0, 3, 0], [0, 0, 4, 3, 0, 5, 0, 2, 0, 0, 2, 0], [0, 0, 5, 2, 0, 3, 0, 4, 0, 0, 2, 0], [0, 0, 3, 2, 0, 2, 0, 5, 0, 0, 4, 0]] \$$

$[0, 0, y_1, y_9, y_2, y_3, y_4, y_5, 0, y_6, y_7, y_8]$

296 . Coloring, $\{2, 4, 11, 12\}$

R: [7, 8, 7, 7, A, A, B, C, B, C, 4, 9]

B: [6, 7, 8, 6, 3, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	9 vs 10

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6
See Matrix

$\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 2, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 0, 5, 3], [0, 0, 0, 5, 0, 0, 3, 0, 3, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$

$$[0, 0, 0, y_1, 0, 0, y_3, y_2, y_5, 2y_2, y_4, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {2, 7, 10}}

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 2, 1, 1], [1, 2, 4, 0, 1, 2, 2, 2, 0, 1, 1, 0], [1, 1, 3, 0, 0, 1, 2, 4, 0, 2, 2, 0], [2, 2, 1, 0, 0, 1, 1, 3, 0, 2, 4, 0], [4, 2, 1, 0, 0, 2, 2, 1, 0, 1, 3, 0], [3, 1, 2, 0, 0, 4, 2, 1, 0, 2, 1, 0], [1, 2, 4, 0, 0, 3, 1, 2, 0, 2, 1, 0], [1, 2, 3, 0, 0, 1, 2, 4, 0, 1, 2, 0], [2, 1, 1, 0, 0, 1, 2, 3, 0, 2, 4, 0], [4, 2, 1, 0, 0, 2, 1, 1, 0, 2, 3, 0]] \$$$

$$[11y_1 - 5y_5 - 5y_6 - 5y_2 + 11y_3 - 5y_4 + 11y_7 - 5y_8 - 5y_9, 5y_1, 5y_5, 0, 5y_6, 5y_2, 5y_3, 5y_4, 0, 5y_7, 5y_8, 5y_9]$$

$$p = -s^3 - s^4 - s^5 + s^8 + s^9 + s^{10}$$

297 . Coloring, {2, 5, 6, 7}

R: [7, 8, 7, 6, 3, 3, A, C, B, C, 1, 5]

B: [6, 7, 8, 7, A, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 1, 3], [1, 0, 3, 0, 3, 0, 4, 0, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4]] \$$$

$$[y_2, 0, y_1, 0, y_4, y_6, y_3, y_6, 0, y_5, y_6, y_7]$$

$$p = -s^3 + s^8 \quad p' = s^3 - s^8$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 0, 4, 0, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 0, 5, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1]] \$

[0, 3 y₇, 0, 3 y₆, 0, 3 y₅, 3 y₄, 3 y₅, 3 y₃, 3 y₂, -3 y₇ - 3 y₆ - 6 y₅ - 3 y₄ + 13 y₃ - 3 y₂ + 13 y₁, 3 y₁]

$$p = -s^4 + s^6 + s^7 - s^9 \quad p' = -s^4 - s^5 + s^7 + s^8$$

298 . Coloring, {2, 5, 6, 8}

R: [7, 8, 7, 6, 3, 3, B, B, B, C, 1, 5]

B: [6, 7, 8, 7, A, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 4, 2] , [4, 0, 3, 0, 2, 0, 4, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 0, 7, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0]] \$

[y₁, 0, y₂, 0, y₃, y₅, y₄, y₅, 0, 0, y₆, 2 y₅]

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 4, 0, 3, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 3, 0, 2, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 4, 0, 3, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 3, 0, 3, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 3, 0, 3]] \$

$$[0, 4y_1, 0, -10y_1 - 10y_3 + 22y_2 - 10y_5 + 22y_4, 0, -5y_1 - 5y_3 + 11y_2 - 5y_5 + 11y_4, 4y_3, -5y_1 - 5y_3 + 11y_2 - 5y_5 + 11y_4, 4y_2, 4y_5, 0, 4y_4]$$

$$p = -s^2 - s^3 + s^5 + s^6 \quad p = s^2 - s^4 - s^5 + s^7 \quad p = -s^2 + s^8$$

299 . Coloring, {2, 5, 6, 9}

R: [7, 8, 7, 6, 3, 3, B, C, C, C, 1, 5]

B: [6, 7, 8, 7, A, A, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 2, 4], [2, 0, 3, 0, 4, 0, 4, 0, 0, 0, 2, 1], [2, 0, 4, 0, 1, 0, 5, 0, 0, 0, 4, 0], [4, 0, 1, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[y_2, 0, y_1, 0, y_3, y_5, y_4, y_5, 0, 0, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 2, 0], [0, 4, 0, 2, 0, 0, 4, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$$$

$$[0, y_3, 0, y_2, 0, y_6, y_1, y_6, 2y_6, y_5, y_4, 0]$$

$$p' = s^4 - s^7 \quad p = -s^4 + s^7$$

300 . Coloring, {2, 5, 6, 10}

R: [7, 8, 7, 6, 3, 3, B, C, B, 2, 1, 5]
B: [6, 7, 8, 7, A, A, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
 See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 3, 1] , [3, 0, 3, 0, 1, 0, 4, 2, 0, 0, 2, 1] , [2, 0, 1, 0, 1, 0, 6, 0, 0, 0, 4, 2] , [4, 0, 1, 0, 2, 0, 3, 0, 0, 0, 6, 0] , [6, 0, 2, 0, 0, 0, 5, 0, 0, 0, 3, 0] , [3, 0, 0, 0, 0, 0, 8, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 3, 0, 0, 0, 8, 0] , [8, 0, 0, 0, 0, 0, 5, 0, 0, 0, 3, 0] , [3, 0, 0, 0, 0, 0, 8, 0, 0, 0, 5, 0]] \$

$$[y_1, 2y_4, y_2, 0, y_3, y_4, y_5, y_6, 0, 0, y_7, y_8]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 6
 See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 3, 1, 6] , [0, 0, 0, 1, 0, 0, 1, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, 0, 0, y_7, 0, y_5, y_6, y_5, y_4, y_3, y_2, y_1]$$

$$p = -s^6 + s^8$$

301 . Coloring, {2, 5, 6, 11}

R: [7, 8, 7, 6, 3, 3, B, C, B, C, 4, 5]
B: [6, 7, 8, 7, A, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5
See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 3, 3], [0, 0, 3, 3, 3, 2, 2, 0, 0, 0, 2, 1], [0, 0, 5, 2, 1, 3, 3, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 5, 0, 0, 0, 3, 0], [0, 0, 2, 3, 0, 2, 4, 0, 0, 0, 5, 0], [0, 0, 2, 5, 0, 3, 2, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 5, 2, 0, 0, 0, 2, 0], [0, 0, 5, 2, 0, 4, 3, 0, 0, 0, 2, 0]] \$$

$[0, 0, y_2, y_3, y_1, y_6, y_7, y_8, 0, 0, y_4, y_5]$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 1, 1], [1, 4, 0, 0, 0, 2, 2, 0, 1, 3, 1, 2], [1, 3, 0, 0, 0, 1, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 1, 3, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1]] \$$

$[-3 y_1 - 3 y_2 - 3 y_3 - 3 y_4 + 13 y_5 - 3 y_6 - 3 y_7 + 13 y_8, 3 y_1, 0, 0, 0, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7, 3 y_8]$

$$p = s^5 + s^6 - s^8 - s^9$$

302 . Coloring, $\{2, 5, 6, 12\}$

R: $[7, 8, 7, 6, 3, 3, B, C, B, C, 1, 9]$

B: $[6, 7, 8, 7, A, A, A, B, C, 2, 4, 5]$

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 3, 3] , [3, 0, 1, 0, 0, 0, 4, 0, 3, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 7, 0] , [7, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0]] \$

$$[y_1, 0, -y_6 + y_2, 0, 0, y_6, y_5, y_6, y_4, 0, y_3, y_2]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 0, 4, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_5, 0, y_4, y_3, y_6, y_2, y_6, 0, y_1, y_3 - y_6, y_6]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

303 . Coloring, {2, 5, 7, 8}

R: [7, 8, 7, 6, 3, A, A, B, B, C, 1, 5]

B: [6, 7, 8, 7, A, 3, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 0, 3, 0, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3]] \$

$$[y_7, 0, y_6, 0, y_5, y_4, y_3, y_4, 0, y_2, y_1, y_8]$$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\begin{aligned} & \$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 2, 2], [0, 1, 1, 2, 0, 0, 4, 1, 2, 0, 2, 3], [0, 0, 0, 2, 0, 0, 3, 1, 3, 0, 4, 3], [0, 0, \\ & 0, 4, 0, 0, 2, 0, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 4, 0, 4, 0, 2, 3], [0, 0, 0, 2, 0, 0, 3, 0, 3, 0, 4, 4], [0, 0, 0, 4, 0, 0, \\ & 2, 0, 4, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 4, 3], [0, 0, 0, 4, 0, 0, 2, 0, 3, 0, \\ & 3, 4]] \$ \end{aligned}$$

$$[0, 7y_1 + 7y_5 + 7y_2 - 9y_3 - 9y_4 + 7y_6 - 9y_7, 7y_1 + 5y_5 + 7y_2 - 9y_3 - 9y_4 + 7y_6 - 9y_7, 2y_1, \\ 0, 2y_5, 2y_2, 2y_3, 2y_4, 2y_5, 2y_6, 2y_7]$$

$$p = s^4 - s^6 - s^7 + s^9 \quad p = -s^4 + s^{10} \quad p = -s^4 - s^5 + s^7 + s^8$$

304 . Coloring, {2, 5, 7, 9}

R: [7, 8, 7, 6, 3, A, A, C, C, C, 1, 5]

B: [6, 7, 8, 7, A, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\begin{aligned} & \$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3], [0, 0, \\ & 4, 0, 3, 0, 4, 0, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0, \\ & 3, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3]] \$ \end{aligned}$$

$$[2y_4, 0, y_1, 0, y_2, y_4, y_3, y_4, 0, y_6, 0, y_5]$$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 4, 0] , [0, 1, 1, 4, 0, 0, 4, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, y_1, y_1 - y_5, y_2, 0, y_5, y_3, y_4, 2y_5, y_5, y_6, 0]$$

$$p' = -s^4 + s^7 \quad p' = -s^5 + s^8 \quad p = s^4 - s^7$$

305 . Coloring, {2, 5, 7, 10}

R: [7, 8, 7, 6, 3, A, A, C, B, 2, 1, 5]

B: [6, 7, 8, 7, A, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	6 vs 9

Omega Rank for R : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 0, 3, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 3, 3, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 1, 3, 0, 3, 0, 3] , [0, 3, 2, 0, 3, 0, 1, 3, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 2, 3, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 3, 1, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 3, 1, 0, 3, 0, 1] , [0, 3, 3, 0, 1, 0, 3, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 3, 3, 0, 3, 0, 2]] \$

$$[y_1, y_2, y_3, 0, y_5, y_8, y_4, y_6, 0, y_7, y_8, y_9]$$

$$p = -s^3 + s^{10}$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3] , [0, 0, 1, 3, 0, 0, 2, 1, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 1, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3]] \$

$$[0, 0, 3 y_3, 3 y_2, 0, 3 y_4, 3 y_1, -3 y_3 - 3 y_2 - 3 y_4 - 3 y_1 + 10 y_6 - 3 y_5, -3 y_4 + 3 y_6, 3 y_4, 3 y_5, 3 y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

306 . Coloring, {2, 5, 7, 11}

R: [7, 8, 7, 6, 3, A, A, C, B, C, 4, 5]

B: [6, 7, 8, 7, A, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 1, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 1, 2, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3]] \$$$

$$[0, 0, y_6, y_5, y_7, y_4, y_2, y_3, 0, y_1, y_3, y_8]$$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1], [3, 1, 1, 0, 0, 2, 2, 1, 1, 0, 3, 2], [3, 0, 2, 0, 0, 3, 1, 1, 2, 0, 3, 1], [3, 0, 3, 0, 0, 3, 0, 2, 1, 0, 2, 2], [2, 0, 3, 0, 0, 3, 0, 3, 2, 0, 2, 1], [2, 0, 3, 0, 0, 2, 0, 3, 1, 0, 3, 2], [3, 0, 2, 0, 0, 2, 0, 3, 2, 0, 3, 1], [3, 0, 2, 0, 0, 3, 0, 2, 1, 0, 3, 2], [3, 0, 3, 0, 0, 3, 0, 2, 2, 0, 2, 1], [2, 0, 3, 0, 0, 3, 0, 3, 1, 0, 2, 2]] \$$$

$$[-3 y_1 - 3 y_2 - 3 y_3 - 3 y_4 - 3 y_5 + 13 y_6 - 3 y_7 - 3 y_8 + 13 y_9, 3 y_1, 3 y_2, 0, 0, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7, 3 y_8, 3 y_9]$$

$$p = s^4 + s^5 - s^9 - s^{10}$$

307 . Coloring, {2, 5, 7, 12}

R: [7, 8, 7, 6, 3, A, A, C, B, C, 1, 9]

B: [6, 7, 8, 7, A, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 10

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 0, 4, 3, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 0, 3, 1, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 2, 3, 1] , [3, 0, 0, 0, 0, 0, 4, 0, 1, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 0, 4, 3, 3, 3]] \$

$$[y_1, 0, y_3, 0, 0, y_3, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1] , [0, 1, 1, 3, 1, 0, 4, 1, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 1, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, y_1, y_7 - y_4 + y_5, y_2, 2y_7 - y_4 + y_5, y_7, y_3, y_4, 0, y_5, y_6, y_7]$$

$$p' = s^6 - s^9 \quad p = s^5 - s^8 \quad p' = s^5 - s^8$$

308 . Coloring, {2, 5, 8, 9}

R: [7, 8, 7, 6, 3, A, B, B, C, C, 1, 5]

B: [6, 7, 8, 7, A, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	10 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 0, 3, 0, 0, 1, 3, 1] , [3, 0, 3, 0, 1, 0, 5, 0, 0, 0, 3, 1] , [3, 0, 1, 0, 1, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 1, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$

[$y_8, 0, y_7, 0, y_6, y_5, y_4, y_5, 0, y_3, y_2, y_1$]

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1] , [0, 3, 1, 1, 0, 0, 4, 1, 1, 2, 2, 1] , [0, 2, 0, 2, 0, 0, 4, 1, 1, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 4, 0, 1, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 5, 0, 1, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 5, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0, 5, 0, 0]] \$

[$0, y_{10}, y_9, y_8, 0, y_7, y_6, y_5, y_4, y_3, y_2, y_1$]

309 . Coloring, {2, 5, 8, 10}

R: [7, 8, 7, 6, 3, A, B, B, B, 2, 1, 5]

B: [6, 7, 8, 7, A, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 4, 0] , [4, 1, 2, 0, 0, 0, 3, 2, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 0, 6, 1, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 3, 1, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0]] \$

$$[y_1, y_2, -y_4 + 2y_6, 0, 2y_4, y_4, y_3, y_7, 0, y_6, y_5, 0]$$

$$p = -s^5 + s^8 \quad p' = s^5 - s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 0, 4] , [0, 0, 1, 0, 0, 0, 2, 1, 4, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 1, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, 0, y_1, 2y_4, 0, y_4, 2y_1, y_5, y_3, y_4 + 2y_5, 0, y_2]$$

$$p' = -s^4 + s^6 \quad p = -s^4 + s^6 \quad p = -s^4 + s^8$$

310 . Coloring, {2, 5, 8, 11}

R: [7, 8, 7, 6, 3, A, B, B, B, C, 4, 5]

B: [6, 7, 8, 7, A, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 4, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 2, 1, 0, 0, 1, 3, 1] , [0, 0, 2, 3, 1, 4, 2, 0, 0, 2, 1, 1] , [0, 0, 1, 1, 1, 3, 2, 0, 0, 4, 2, 2] , [0, 0, 1, 2, 2, 1, 1, 0, 0, 3, 2, 4] , [0, 0, 2, 2, 4, 2, 1, 0, 0, 1, 1, 3] , [0, 0, 4, 1, 1, 3, 2, 0, 0, 2, 1, 1] , [0, 0, 3, 1, 1, 1, 4, 0, 0, 2, 2, 2] , [0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 4, 2]] \$

$$[0, 0, y_8, y_7, y_6, y_5, y_4, y_3, 0, y_2, y_1, -y_8 + y_7 + y_6 - y_5 + y_4 + y_3 + y_2 - y_1]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 0, 2], [0, 3, 1, 0, 0, 2, 2, 1, 2, 2, 0, 3], [0, 2, 2, 0, 0, 0, 3, 1, 3, 2, 0, 3], [0, 2, 0, 0, 0, 2, 2, 3, 3, 0, 4], [0, 3, 0, 0, 0, 0, 2, 0, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 3, 0, 5, 2, 0, 4], [0, 2, 0, 0, 0, 0, 2, 0, 4, 3, 0, 5], [0, 3, 0, 0, 0, 0, 2, 0, 5, 2, 0, 4], [0, 2, 0, 0, 0, 0, 3, 0, 4, 2, 0, 5]] \$$$

$$[7 y_8, 7 y_7, 7 y_6, 0, 0, 7 y_5, 7 y_4, 7 y_3, 7 y_2, 7 y_1, 0, -7 y_8 + 9 y_7 - 7 y_6 - 7 y_5 + 9 y_4 - 7 y_3 - 7 y_2 + 9 y_1]$$

$$p = s^5 + s^6 - s^8 - s^9$$

311 . Coloring, {2, 5, 8, 12}

R: [7, 8, 7, 6, 3, A, B, B, B, C, 1, 9]

B: [6, 7, 8, 7, A, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 1, 5, 1], [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 1], [5, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 0, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[y_1, 0, y_3, 0, 0, y_3, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 4, 1, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 3, 1, 0, 6, 0, 1] , [0, 6, 0, 0, 1, 0, 4, 0, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0]] \$

$$[0, y_1, y_2, 2y_4, y_3, y_4, y_5, y_6, 0, y_7, 0, y_8]$$

$$p = s^6 - s^9$$

312 . Coloring, {2, 5, 9, 10}

R: [7, 8, 7, 6, 3, A, B, C, C, 2, 1, 5]

B: [6, 7, 8, 7, A, 3, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 9

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 0, 3, 2, 0, 1, 2, 1] , [2, 1, 2, 0, 1, 0, 4, 1, 0, 0, 3, 2] , [3, 0, 1, 0, 2, 0, 4, 1, 0, 0, 4, 1] , [4, 0, 2, 0, 1, 0, 4, 0, 0, 0, 4, 1] , [4, 0, 1, 0, 1, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9, y_{10}]$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 2, 2] , [0, 0, 1, 2, 0, 0, 2, 1, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 1, 3, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 0, 2, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 4, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 2, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 2, 3, 2]] \$

$$[0, 0, y_1, y_2, 0, y_4, y_3, y_5, y_9, y_6, y_7, y_8]$$

313 . Coloring, {2, 5, 9, 11}

R: [7, 8, 7, 6, 3, A, B, C, C, C, 4, 5]

B: [6, 7, 8, 7, A, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 4, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 2, 4] , [0, 0, 2, 2, 4, 2, 1, 0, 0, 1, 2, 2] , [0, 0, 4, 2, 2, 2, 2, 0, 0, 2, 1, 1] , [0, 0, 2, 1, 1, 2, 4, 0, 0, 2, 2, 2] , [0, 0, 1, 2, 2, 1, 2, 0, 0, 2, 4, 2] , [0, 0, 2, 4, 2, 2, 1, 0, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 2, 4, 2, 0, 0, 2, 1, 1] , [0, 0, 2, 1, 1, 2, 2, 0, 0, 4, 2, 2] , [0, 0, 1, 2, 2, 1, 2, 0, 0, 2, 2, 4]] \$

$$[0, 0, y_2, y_2 - y_1 + y_3 - y_4 - y_5 - y_6 + y_7 + y_8, y_1, y_3, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {2, 7, 10}}

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 2, 0] , [2, 3, 1, 0, 0, 2, 2, 1, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 2, 3, 1, 0, 2, 1, 0] , [1, 2, 2, 0, 0, 3, 2, 2, 0, 3, 1, 0] , [1, 3, 3, 0, 0, 1, 2, 2, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 1, 3, 3, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 2, 2, 1, 0, 3, 3, 0] , [3, 3, 2, 0, 0, 2, 2, 1, 0, 2, 1, 0] , [1, 2, 2, 0, 0, 3, 3, 2, 0, 2, 1, 0]] \$

$$[9y_1 - 7y_2 - 7y_3 + 9y_4 - 7y_5 - 7y_6 + 9y_7 - 7y_8, 7y_1, 7y_2, 0, 0, 7y_3, 7y_4, 7y_5, 7y_6, 7y_7, 7y_8, 0]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

314 . Coloring, {2, 5, 9, 12}

R: [7, 8, 7, 6, 3, A, B, C, C, C, 1, 9]

B: [6, 7, 8, 7, A, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}, \{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 1, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 5], [3, 0, 0, 0, 0, 2, 0, 5, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 3, 0, 5, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 5]] \$$

$[5 y_1, 0, 9 y_1 + 9 y_2 - 7 y_3 - 7 y_4 + 9 y_5 - 7 y_6, 0, 0, 9 y_1 + 9 y_2 - 7 y_3 - 7 y_4 + 9 y_5 - 7 y_6, 5 y_2, 9 y_1 + 9 y_2 - 7 y_3 - 7 y_4 + 9 y_5 - 7 y_6, 5 y_3, 5 y_4, 5 y_5, 5 y_6]$

$$p = -s^3 + s^9 \quad p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 2, 0], [0, 3, 1, 2, 0, 0, 4, 1, 0, 4, 1, 0], [0, 4, 0, 1, 0, 0, 5, 1, 0, 4, 1, 0], [0, 4, 0, 1, 0, 0, 5, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$[0, y_2, y_1, y_3, 2 y_6, y_6, y_7, y_8, 0, y_4, y_5, 0]$

$$p = -s^6 + s^9$$

315 . Coloring, $\{2, 5, 10, 11\}$

R: [7, 8, 7, 6, 3, A, B, C, B, 2, 4, 5]

B: [6, 7, 8, 7, A, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{2, 3, 4, 5, 6, 7, 8, 10, 11, 12\}\}$ order: 10

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1], [0, 1, 2, 3, 1, 2, 1, 2, 0, 1, 2, 1], [0, 1, 1, 2, 1, 3, 2, 1, 0, 2, 1, 2], [0, 2, 1, 1, 2, 2, 1, 1, 0, 3, 2, 1], [0, 3, 2, 2, 1, 1, 1, 2, 0, 2, 1, 1], [0, 2, 1, 1, 1, 2, 2, 3, 0, 1, 1, 2], [0, 1, 1, 1, 2, 1, 1, 2, 0, 2, 2, 3], [0, 2, 2, 2, 3, 1, 1, 1, 0, 1, 1, 2], [0, 1, 3, 1, 2, 2, 2, 2, 0, 1, 1, 1], [0, 1, 2, 1, 1, 1, 3, 1, 0, 2, 2, 2]] \$$

$$[0, -y_1 + y_2 + y_3 - y_4 + y_5 + y_6 + y_7 - y_8 - y_9, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3], [1, 0, 1, 0, 0, 2, 0, 1, 3, 2, 1, 5], [1, 0, 2, 0, 0, 1, 0, 1, 5, 0, 1, 5], [1, 0, 1, 0, 0, 1, 0, 2, 5, 0, 1, 5], [1, 0, 1, 0, 0, 1, 0, 1, 5, 0, 2, 5], [2, 0, 1, 0, 0, 1, 0, 1, 5, 0, 1, 5], [1, 0, 1, 0, 0, 2, 0, 1, 5, 0, 1, 5], [1, 0, 2, 0, 0, 1, 0, 1, 5, 0, 1, 5], [1, 0, 1, 0, 0, 1, 0, 2, 5, 0, 1, 5]] \$$

$$[-5y_1 - 5y_2 - 5y_3 + 6y_4 + 6y_5 - 5y_6, 0, 5y_1, 0, 0, 5y_2, 5y_4 + 5y_5 - 5y_7, 5y_3, 5y_4, 5y_5, 5y_6, 5y_7]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

316 . Coloring, $\{2, 5, 10, 12\}$

R: [7, 8, 7, 6, 3, A, B, C, B, 2, 1, 9]

B: [6, 7, 8, 7, A, 3, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 9

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 3, 2, 1, 1, 4, 1], [4, 1, 0, 0, 0, 0, 3, 1, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 1, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 6, 1], [6, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$[y_9, y_8, y_7, 0, 0, y_7, y_6, y_5, y_4, y_3, y_2, y_1]$

$$p = s^7 - s^{10}$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 9

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3], [0, 0, 1, 1, 3, 0, 2, 1, 0, 4, 1, 3], [0, 0, 0, 1, 3, 0, 1, 1, 0, 5, 1, 4], [0, 0, 0, 1, 4, 0, 1, 0, 0, 4, 1, 5], [0, 0, 0, 1, 5, 0, 1, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$

$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_8, y_9, y_7]$

317 . Coloring, $\{2, 5, 11, 12\}$

R: [7, 8, 7, 6, 3, A, B, C, B, C, 4, 9]

B: [6, 7, 8, 7, A, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 10

Omega Rank for R : cycles: $\{\{4, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3], [0, 0, 0, 3, 0, 2, 1, 0, 3, 1, 4, 2], [0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 4, 1], [0, 0, 0, 4, 0, 4, 0, 0, 1, 3, 2, 2], [0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 1, 3], [0, 0, 0, 1, 0, 2, 0, 0, 3, 4, 2, 4], [0, 0, 0, 2, 0, 1, 0, 0, 4, 2, 3, 4], [0, 0, 0, 3, 0, 2, 0, 0, 4, 1, 4, 2], [0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 4, 1]] \$$

$$[0, 0, y_2, y_1 - y_3 - y_5 - y_6 + y_7 + y_4, 0, y_1, y_3, y_2, y_5, y_6, y_7, y_4]$$

$$p = -s^3 + s^9 \quad p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {2, 7, 10}}

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1], [1, 3, 1, 0, 1, 2, 2, 1, 0, 4, 1, 0], [1, 4, 2, 0, 0, 1, 3, 1, 0, 3, 1, 0], [1, 3, 1, 0, 0, 1, 4, 2, 0, 3, 1, 0], [1, 3, 1, 0, 0, 1, 3, 1, 0, 4, 2, 0], [2, 4, 1, 0, 0, 1, 3, 1, 0, 3, 1, 0], [1, 3, 1, 0, 0, 2, 4, 1, 0, 3, 1, 0], [1, 3, 2, 0, 0, 1, 3, 1, 0, 4, 1, 0], [1, 4, 1, 0, 0, 1, 3, 2, 0, 3, 1, 0], [1, 3, 1, 0, 0, 1, 4, 1, 0, 3, 2, 0]] \$$$

$$[3 y_8, 3 y_7, 3 y_6, 0, 3 y_5, 3 y_4, 3 y_3, 3 y_2, 0, 5 y_8 - 3 y_7 + 5 y_6 - 3 y_5 + 5 y_4 - 3 y_3 + 5 y_2 + 5 y_1 - 3 y_9, 3 y_1, 3 y_9]$$

$$p = -s^3 - s^4 - s^5 + s^8 + s^9 + s^{10}$$

318 . Coloring, {2, 6, 7, 8}

R: [7, 8, 7, 6, A, 3, A, B, B, C, 1, 5]

B: [6, 7, 8, 7, 3, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 2, 2], [2, 0, 1, 0, 2, 0, 3, 0, 0, 4, 1, 3], [1, 0, 0, 0, 3, 0, 3, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$$

$$[y_1, 0, -y_4 + y_6, 0, y_2, y_4, y_3, y_4, 0, y_5, y_6, y_7]$$

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 2, 2] , [0, 1, 0, 2, 0, 0, 4, 1, 2, 1, 2, 3] , [0, 1, 0, 2, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 0, 3, 3]] \$

$[0, 4y_4 + 7y_3 + 3y_6 - 3y_1 - 3y_2 - 3y_5, 3y_4 + 3y_3 - 3y_6, 3y_1, 0, 3y_4 + 3y_3 - 3y_6, 3y_2, 3y_4, 3y_3, 3y_4, 3y_5, 3y_6]$

$$p = -s^4 + s^{10} \quad p' = -s^4 + s^7 \quad p = -s^4 + s^7 \quad p' = -s^5 + s^8$$

319 . Coloring, {2, 6, 7, 9}

R: [7, 8, 7, 6, A, 3, A, C, C, C, 1, 5]

B: [6, 7, 8, 7, 3, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 0, 3, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5]] \$

$[2y_6, 0, y_3, 0, y_4, y_6, y_5, y_6, 0, y_1, 0, y_2]$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 4, 1, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, y_1, y_4, y_2, 0, y_4, y_5, y_6, 2 y_4, y_6, y_3, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

320 . Coloring, {2, 6, 7, 10}

R: [7, 8, 7, 6, A, 3, A, C, B, 2, 1, 5]

B: [6, 7, 8, 7, 3, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	4 vs 9

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1] , [1, 3, 1, 0, 1, 0, 3, 2, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 2, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4]] \$

$$[y_2 + y_7, y_1, y_2, 0, y_3, y_7, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^4 + s^9 \quad p' = -s^4 + s^9$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 1, 3, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4]] \$

$$[0, 0, 3 y_4, -3 y_4 + 3 y_2 + 3 y_3, 0, 3 y_4, 3 y_2, 3 y_3, -3 y_4 + 7 y_2 + 4 y_3 - 3 y_1, 3 y_3, 3 y_2 + 3 y_3, 3 y_1]$$

$$p = s^3 - s^5 \quad p' = -s^3 + s^5 \quad p'' = -s^4 + s^6 \quad p''' = -s^3 + s^7 \quad p^{(4)} = -s^4 + s^8$$

321 . Coloring, {2, 6, 7, 11}

$$\Omega p(\Delta)=0: \quad p = 5s^4 + 8s^5 - 8s^7 - 16s^8$$

R: [7, 8, 7, 6, A, 3, A, C, B, C, 4, 5]

B: [6, 7, 8, 7, 3, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 2, 1, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 1, 1, 0, 0, 4, 0, 4] , [0, 0, 1, 0, 4, 0, 2, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[0, 0, y_1, y_2, y_3, y_6, y_7, y_8, 0, y_4, y_8, y_5]$$

$$p = s^6 - s^9$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 2, 1, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 3, 1, 0, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 3, 1, 0, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 3, 2, 0, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 1, 3, 0, 1, 3, 2, 2] , [2, 3, 0, 0, 0, 1, 3, 0, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 3, 0, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 3, 1, 0, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 3, 1, 0, 1, 3, 1, 2]] \$

$$[3y_6, 3y_7, 3y_8, 0, 0, 3y_5, -3y_6 - 3y_1 + 5y_2 - 3y_3 + 8y_4, 3y_1, 3y_2, 3y_3, -3y_7 - 3y_8 - 3y_5 + 8y_2 + 5y_4, 3y_4]$$

$$p' = s^3 - s^9 \quad p = s^3 - s^9$$

322 . Coloring, {2, 6, 7, 12}

R: [7, 8, 7, 6, A, 3, A, C, B, C, 1, 9]

B: [6, 7, 8, 7, 3, A, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 10

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3], [1, 0, 1, 0, 0, 0, 3, 0, 3, 2, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 3, 3, 2], [3, 0, 0, 0, 0, 2, 0, 2, 2, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 2, 2, 2], [2, 0, 0, 0, 0, 4, 0, 2, 3, 3, 2], [3, 0, 0, 0, 0, 0, 2, 0, 2, 4, 2, 3], [2, 0, 0, 0, 0, 0, 3, 0, 3, 2, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 3, 3, 2]] \$$

$$[y_1, 0, y_2, 0, 0, y_4, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p = s^3 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1], [0, 1, 2, 3, 1, 0, 4, 1, 0, 1, 3, 0], [0, 1, 1, 3, 0, 0, 4, 2, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 1, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$

$$[0, y_2 + 2y_4 - y_5, y_2, y_1, y_4 + y_5, y_4, y_7, y_6, 0, y_5, y_3, y_4]$$

$$p = s^5 - s^8 \quad p' = -s^5 + s^8 \quad p'' = -s^6 + s^9$$

323 . Coloring, {2, 6, 8, 9}

R: [7, 8, 7, 6, A, 3, B, B, C, C, 1, 5]

B: [6, 7, 8, 7, 3, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	9 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3], [3, 0, 1, 0, 3, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 4, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 4, 3], [4, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 4, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 4, 3], [4, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 4, 0, 0, 3, 3, 2]] \$$

$[y_5, 0, y_4, 0, -2y_5 - 2y_4 + 5y_3 + 5y_2 - 4y_1, y_3, 4y_5 + 4y_4 - 7y_3 - 6y_2 + 5y_1, y_3, 0, 5y_5 + 5y_4 - 8y_3 - 8y_2 + 6y_1, y_2, y_1]$

$$p' = -s^5 + s^8 \quad p' = -s^4 + s^7 \quad p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 9

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 4, 1, 1, 3, 2, 1], [0, 3, 0, 2, 0, 0, 4, 0, 1, 4, 1, 1], [0, 4, 0, 1, 0, 0, 5, 0, 1, 4, 1, 0], [0, 4, 0, 1, 0, 0, 5, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$[0, y_1, y_3, y_2, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$

$$p = -s^7 + s^{10}$$

324 . Coloring, $\{2, 6, 8, 10\}$

R: [7, 8, 7, 6, A, 3, B, B, B, 2, 1, 5]

B: [6, 7, 8, 7, 3, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	4 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 4, 0], [4, 1, 1, 0, 0, 0, 3, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 5, 1, 0, 0, 5, 0], [5, 0, 0, 0, 0, 3, 2, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$$[y_6, y_7, y_5, 0, 2y_4, y_4, y_2, y_3, 0, 2y_5 - y_4, y_1, 0]$$

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 4
See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 0, 4], [0, 0, 0, 0, 0, 0, 2, 1, 4, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[0, 0, y_1, 2y_1, 0, y_1, 2y_4 + 2y_2 - 2y_3, y_4 + y_2 - y_3, y_4, y_2, 0, y_3]$$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6 \quad p = -s^4 + s^7 \quad p = -s^4 + s^8$$

325 . Coloring, $\{2, 6, 8, 11\}$

R: [7, 8, 7, 6, A, 3, B, B, B, C, 4, 5]
B: [6, 7, 8, 7, 3, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	5 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}, \{5, 10, 12\}\}$
See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 4, 2], [0, 0, 1, 4, 2, 2, 1, 0, 0, 2, 3, 1], [0, 0, 2, 3, 1, 4, 1, 0, 0, 2, 1, 2], [0, 0, 4, 1, 2, 3, 2, 0, 0, 1, 1, 2], [0, 0, 3, 1, 2, 1, 4, 0, 0, 2, 2, 1], [0, 0, 1, 2, 1, 1, 3, 0, 0, 2, 4, 2], [0, 0, 1, 4, 2, 2, 1, 0, 0, 1, 3, 2], [0, 0, 2, 3, 2, 4, 1, 0, 0, 2, 1, 1], [0, 0, 4, 1, 1, 3, 2, 0, 0, 2, 1, 2]] \$$

$$[0, 0, -5y_1 + 11y_5 - 5y_2 - 5y_3 - 5y_4 + 11y_6 - 5y_7 + 11y_8, 5y_1, 5y_5, 5y_2, 5y_3, 5y_4, 0, 5y_6, 5y_7, 5y_8]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 0, 2], [0, 3, 0, 0, 0, 2, 2, 1, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3]] \$$$

$$[6y_2 - 12y_4 - 8y_3 + 6y_1 + 6y_5, y_2, 3y_2 - 6y_4 - 4y_3 + 3y_1 + 3y_5, 0, 0, 3y_2 - 8y_4 - 2y_3 + 3y_1 + 3y_5, y_1, 3y_2 - 7y_4 - 3y_3 + 3y_1 + 3y_5, y_4, y_5, 0, y_3]$$

$$p' = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p = -s^3 + s^9 \quad p = -s^3 + s^6$$

326 . Coloring, {2, 6, 8, 12}

R: [7, 8, 7, 6, A, 3, B, B, B, C, 1, 9]

B: [6, 7, 8, 7, 3, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 4, 2], [4, 0, 1, 0, 0, 0, 3, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[y_1, 0, -y_4 + y_6, 0, 0, y_4, y_2, y_4, y_3, y_4, y_5, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 4, 1, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 3, 2, 0, 4, 0, 1] , [0, 4, 1, 0, 1, 0, 3, 2, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 4, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 3, 1, 0, 4, 0, 1] , [0, 4, 2, 0, 1, 0, 3, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 4, 2, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 3, 1, 0, 4, 0, 2]] \$

$[0, 10y_4 - 9y_1 - 3y_2 + 10y_3 - 3y_5, 3y_4 + 3y_3 - 3y_6, 6y_1, 3y_4, 3y_1, 3y_2, 3y_3, 0, 3y_5, 0, 3y_6]$

$$p = -s^2 - s^4 + s^5 + s^7 \quad p' = -s^2 - s^4 + s^5 + s^7 \quad p = s^2 - s^5 - s^6 + s^9$$

327 . Coloring, {2, 6, 9, 10}

R: [7, 8, 7, 6, A, 3, B, C, C, 2, 1, 5]

B: [6, 7, 8, 7, 3, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {2, 5, 8, 10, 12}}

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 2, 2] , [2, 1, 1, 0, 2, 0, 3, 2, 0, 2, 2, 1] , [2, 2, 0, 0, 1, 0, 3, 1, 0, 2, 3, 2] , [3, 2, 0, 0, 2, 0, 2, 2, 0, 1, 3, 1] , [3, 1, 0, 0, 1, 0, 3, 2, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 0, 3, 1, 0, 1, 3, 2] , [3, 1, 0, 0, 2, 0, 2, 2, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 3, 1, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 0, 3, 2, 0, 1, 3, 1] , [3, 1, 0, 0, 1, 0, 2, 2, 0, 2, 3, 2]] \$

$$[y_1 - y_2 + y_3 - y_4 - y_5 + y_6 + y_7 - y_8 + y_9, y_1, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

$$p = -s^3 - s^4 - s^5 + s^8 + s^9 + s^{10}$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 1, 2, 3, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 3, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 2, 3, 3]] \$

$$[0, 0, y_1, 2y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^3 + s^9 \quad p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

328 . Coloring, {2, 6, 9, 11}

R: [7, 8, 7, 6, A, 3, B, C, C, C, 4, 5]

B: [6, 7, 8, 7, 3, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}, {5, 10, 12}}

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 2, 4], [0, 0, 1, 2, 4, 2, 1, 0, 0, 2, 2, 2], [0, 0, 2, 2, 2, 2, 1, 0, 0, 4, 1, 2], [0, 0, \\ & 2, 1, 2, 2, 2, 0, 0, 2, 1, 4], [0, 0, 2, 1, 4, 1, 2, 0, 0, 2, 2, 2], [0, 0, 1, 2, 2, 1, 2, 0, 0, 4, 2, 2], [0, 0, 1, 2, 2, 2, \\ & 1, 0, 0, 2, 2, 4], [0, 0, 2, 2, 4, 2, 1, 0, 0, 2, 1, 2], [0, 0, 2, 1, 2, 2, 2, 0, 0, 4, 1, 2]] \$ \end{aligned}$$

$$[0, 0, -y_1 + y_4 - y_5 - y_6 + y_7 + y_2 - y_3 + y_8, y_1, y_4, y_5, y_6, y_7, 0, y_2, y_3, y_8]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 2, 0], [2, 3, 0, 0, 0, 2, 2, 1, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 3, 0, 0, 4, 1, 0], [1, 4, \\ & 0, 0, 0, 3, 3, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 1, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, \\ & 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$ \end{aligned}$$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, 2y_3, y_7, y_8, 0]$$

$$p = -s^6 + s^9$$

329 . Coloring, {2, 6, 9, 12}

R: [7, 8, 7, 6, A, 3, B, C, C, C, 1, 9]

B: [6, 7, 8, 7, 3, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 2, 4], [2, 0, 1, 0, 0, 0, 3, 0, 4, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4]] \$

$$[-y_1 - y_3 - y_2 + 2y_5 - y_4, 0, y_1, 0, 0, y_3, y_2, y_3, -2y_3 + y_5, y_3, y_4, y_5]$$

$$p' = -s^5 + s^8 \quad p = s^3 - s^6 \quad p' = s^3 - s^6 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 2, 0], [0, 3, 2, 2, 0, 0, 4, 1, 0, 3, 1, 0], [0, 3, 0, 1, 0, 0, 5, 2, 0, 4, 1, 0], [0, 4, 0, 1, 0, 0, 4, 0, 0, 5, 2, 0], [0, 5, 0, 2, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0]] \$

$$[0, y_8, y_7, y_6, 2y_5, y_5, y_4, y_3, 0, y_2, y_1, 0]$$

$$p = s^6 - s^9$$

330 . Coloring, {2, 6, 10, 11}

R: [7, 8, 7, 6, A, 3, B, C, B, 2, 4, 5]

B: [6, 7, 8, 7, 3, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}, \{2, 5, 8, 10, 12\}\}$ order: 5
See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1], [0, 1, 1, 3, 1, 2, 1, 2, 0, 2, 2, 1], [0, 2, 2, 2, 1, 3, 1, 1, 0, 1, 1, 2], [0, 1, 3, 1, 2, 2, 2, 0, 1, 1, 1], [0, 1, 2, 1, 1, 1, 3, 1, 0, 2, 2, 2], [0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1], [0, 1, 1, 3, 1, 2, 1, 2, 0, 2, 2, 1], [0, 2, 2, 2, 1, 3, 1, 1, 0, 1, 1, 2], [0, 1, 3, 1, 2, 2, 2, 2, 0, 1, 1, 1], [0, 1, 2, 1, 1, 1, 3, 1, 0, 2, 2, 2]] \$$

$[0, 6y_4 - 8y_5 + 8y_1 + 4y_2 - 12y_3, 8y_4 - 17y_5 + 15y_1 + 12y_2 - 22y_3, 2y_4, 2y_5, 12y_4 - 22y_5 + 18y_1 + 14y_2 - 28y_3, 2y_1, 2y_2, 0, 2y_3, -4y_4 + 12y_5 - 8y_1 - 8y_2 + 14y_3, 8y_4 - 15y_5 + 13y_1 + 8y_2 - 18y_3]$

$$p' = -s^2 + s^7 \quad p' = -s^3 + s^8 \quad p' = -s^4 + s^9 \quad p = -s + s^6 \quad p' = -s + s^6$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8
See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3], [1, 0, 0, 0, 0, 2, 0, 1, 3, 3, 1, 5], [1, 0, 0, 0, 0, 1, 0, 0, 5, 2, 1, 6], [1, 0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 7], [0, 0, 0, 0, 0, 1, 0, 0, 7, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 0], [0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$[3y_1 + y_2 - y_3 - y_5 - y_4 + y_6 + y_7, 0, y_1, 0, 0, y_2, 2y_1, y_3, y_5, y_4, y_6, y_7]$

$$p = -s^7 + s^8 \quad p = -s^7 + s^9$$

331 . Coloring, $\{2, 6, 10, 12\}$

R: $[7, 8, 7, 6, A, 3, B, C, B, 2, 1, 9]$

B: $[6, 7, 8, 7, 3, A, A, B, C, C, 4, 5]$

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	6 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1] , [3, 1, 1, 0, 0, 0, 3, 2, 1, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 4, 1, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$$[y_1, y_2 + y_4, y_2, 0, 0, y_4, y_5, y_6, y_3, y_4, y_8, y_7]$$

$$p = -s^6 + s^9 \quad p' = -s^6 + s^9$$

Omega Rank for B : cycles: $\{\{3, 4, 5, 7, 8, 10, 11, 12\}\}$ order: 8
See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 0, 2, 1, 0, 3, 1, 3] , [0, 0, 3, 1, 3, 0, 1, 2, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 0, 1, 3, 0, 1, 2, 2] , [0, 0, 3, 2, 2, 0, 1, 3, 0, 1, 3, 1] , [0, 0, 2, 3, 1, 0, 2, 3, 0, 1, 3, 1] , [0, 0, 1, 3, 1, 0, 3, 2, 0, 2, 3, 1] , [0, 0, 1, 3, 1, 0, 3, 1, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 1, 3]] \$$

$$[0, 0, y_3, -y_1 + y_5 + y_6, y_1, y_2, -y_3 - y_2 + y_5 + y_6, y_5 + y_6 - y_4, 0, y_4, y_5, y_6]$$

$$p' = -s^2 + s^4 - s^6 + s^8 \quad p' = -s^2 + s^3 - s^6 + s^7 \quad p = s^2 - s^3 + s^6 - s^7$$

332 . Coloring, $\{2, 6, 11, 12\}$

R: [7, 8, 7, 6, A, 3, B, C, B, C, 4, 9]

B: [6, 7, 8, 7, 3, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	10 vs 10

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5
See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3] , [0, 0, 1, 3, 0, 2, 1, 0, 3, 0, 4, 2] , [0, 0, 2, 4, 0, 3, 1, 0, 2, 0, 4, 0] , [0, 0, 3, 4, 0, 4, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 3, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 3, 4, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 2, 4, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 3, 3, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 4, 2, 0, 0, 0, 3, 0]] \$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_6, y_5, y_6, y_7, y_8]$$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1], [1, 3, 2, 0, 1, 2, 2, 1, 0, 3, 1, 0], [1, 3, 1, 0, 0, 1, 3, 2, 0, 4, 1, 0], [1, 4, 0, 0, 0, 1, 3, 1, 0, 4, 2, 0], [2, 4, 0, 0, 0, 1, 4, 0, 0, 4, 1, 0], [1, 4, 0, 0, 0, 2, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 1, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$$

$$[y_1, y_2, y_3, 0, y_7, y_4, y_5, y_6, 0, y_8, y_9, y_{10}]$$

333 . Coloring, {2, 7, 8, 9}

R: [7, 8, 7, 6, A, A, A, B, C, C, 1, 5]

B: [6, 7, 8, 7, 3, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 1, 3], [1, 0, 0, 0, 3, 0, 2, 0, 0, 5, 1, 4], [1, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$$

$$[y_1, 0, 0, 0, y_4, y_3, y_2, y_3, 0, y_5, y_6, y_7]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 3, 1], [0, 0, 1, 3, 0, 0, 4, 2, 1, 0, 4, 1], [0, 0, 0, 4, 0, 0, 3, 1, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 0, 0, 0, 6, 0, 0], [0, 0, 0, 6, 0, 0, 0, 0, 0, 6, 0, 0]] \$$$

6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

[0, 2 y₆, y₁, y₂, 0, y₆, y₅, y₃, y₄, 0, y₈, y₇]

$$p = -s^6 + s^9$$

334 . Coloring, {2, 7, 8, 10}

R: [7, 8, 7, 6, A, A, A, B, B, 2, 1, 5]

B: [6, 7, 8, 7, 3, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 v _S 8	9 v _S 9	9 v _S 9	7 v _S 8	5 v _S 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 2, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 2, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 1, 5, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 2, 2, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 4, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 5, 1, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 2, 0, 5, 1, 0]] \$

[y₁, y₂, 0, 0, 2 y₃, y₃, y₄, y₅, 0, y₆, y₇, 0]

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 2, 4] , [0, 0, 1, 2, 0, 0, 2, 2, 4, 0, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 1, 3, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4]] \$

[0, 0, -y₁ - y₂ - y₃ + 5 y₅ - y₄, y₅, 0, y₁, y₅, y₂, y₃, 0, y₅, y₄]

$$p = s^4 - s^8 \quad p' = s^5 - s^7 \quad p'' = s^4 - s^6$$

335 . Coloring, {2, 7, 8, 11}

R: [7, 8, 7, 6, A, A, A, B, B, C, 4, 5]

B: [6, 7, 8, 7, 3, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 2, 0, 0, 0, 5, 1, 4] , [0, 0, 0, 1, 4, 2, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 1, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

[0, 0, 0, y_2 , y_1 , y_4 , $2y_3$, y_3 , 0, y_7 , y_6 , y_5]

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 2, 2] , [2, 0, 1, 0, 0, 2, 2, 2, 2, 0, 2, 3] , [2, 0, 2, 0, 0, 2, 0, 1, 3, 0, 2, 4] , [2, 0, 2, 0, 0, 2, 0, 2, 4, 0, 0, 4] , [0, 0, 2, 0, 0, 2, 0, 2, 4, 0, 0, 6] , [0, 0, 2, 0, 0, 0, 0, 2, 6, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

[y_6 , y_7 , y_8 , 0, 0, $y_6 - y_7 + y_8 + y_4 - y_1 - y_2 - y_3 + y_5$, y_4 , y_1 , y_2 , 0, y_3 , y_5]

$$p = -s^8 + s^9$$

336 . Coloring, {2, 7, 8, 12}

R: [7, 8, 7, 6, A, A, A, B, B, C, 1, 9]

B: [6, 7, 8, 7, 3, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 0, 2, 3, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 2, 2, 3] , [2, 0, 0, 0, 0, 3, 0, 3, 2, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 0, 2, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 2, 2, 3] , [2, 0, 0, 0, 0, 0, 3, 0, 3, 4, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 0, 2, 3, 3, 4]] \$

$$[y_1, 0, 0, 0, 0, y_7, y_6, y_7, y_5, y_3, y_4, y_2]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {4, 7, 11}} order: 12

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 2, 2] , [0, 0, 3, 2, 2, 0, 4, 2, 0, 0, 2, 1] , [0, 0, 2, 2, 1, 0, 2, 3, 0, 0, 4, 2] , [0, 0, 1, 4, 2, 0, 2, 2, 0, 0, 2, 3] , [0, 0, 2, 2, 3, 0, 4, 1, 0, 0, 2, 2] , [0, 0, 3, 2, 2, 0, 2, 2, 0, 0, 4, 1] , [0, 0, 2, 4, 1, 0, 2, 3, 0, 0, 2, 2] , [0, 0, 1, 2, 2, 0, 4, 2, 0, 0, 2, 3] , [0, 0, 2, 2, 3, 0, 2, 1, 0, 0, 4, 2]] \$

$$[0, 2y_4, y_1 + y_4 + y_3 - y_6, 2y_1 + 2y_3 - y_2 - y_5, y_1, y_4, y_2, y_3, 0, 0, y_5, y_6]$$

$$p = s^2 + s^4 - s^5 - s^7 \quad p' = s^2 + s^4 - s^5 - s^7 \quad p'' = -s^3 - s^5 + s^6 + s^8$$

337 . Coloring, {2, 7, 9, 10}

R: [7, 8, 7, 6, A, A, A, C, C, 2, 1, 5]

B: [6, 7, 8, 7, 3, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 2, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 5, 0, 1, 0, 4] , [0, 1, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 1, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2]] \$

$$[2y_3, y_1, 0, 0, y_2, y_3, y_4, y_5, 0, y_6, 0, y_7]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 4, 2] , [0, 0, 1, 4, 0, 0, 2, 2, 2, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, 2y_1 - 2y_3, 0, y_6, 2y_3]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

338 . Coloring, {2, 7, 9, 11}

R: [7, 8, 7, 6, A, A, A, C, C, C, 4, 5]

B: [6, 7, 8, 7, 3, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[0, 0, 0, 2 y_3, y_2, y_1, 2 y_3, y_3, 0, y_4, 0, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 4, 0], [4, 0, 1, 0, 0, 2, 2, 2, 0, 0, 5, 0], [5, 0, 2, 0, 0, 4, 0, 1, 0, 0, 4, 0], [4, 0, 4, 0, 0, 5, 0, 2, 0, 0, 1, 0], [1, 0, 5, 0, 0, 4, 0, 4, 0, 0, 2, 0], [2, 0, 4, 0, 0, 1, 0, 5, 0, 0, 4, 0], [4, 0, 1, 0, 0, 2, 0, 4, 0, 0, 5, 0], [5, 0, 2, 0, 0, 4, 0, 1, 0, 0, 4, 0]] \$$$

$$[y_1, y_6, y_5, 0, 0, y_4, y_3, y_2, y_6, 0, y_7, 0]$$

$$p = -s^3 + s^8$$

339 . Coloring, {2, 7, 9, 12}

R: [7, 8, 7, 6, A, A, A, C, C, C, 1, 9]

B: [6, 7, 8, 7, 3, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 7	6 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 0, 4], [0, 0, 0, 0, 0, 0, 2, 0, 4, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[2 y_5, 0, 0, 0, 0, y_5, y_4, y_5, y_3, y_2, 0, y_1]$$

$$p' = s^4 - s^6 \quad p = s^4 - s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 0, 4, 2, 0, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 4, 3, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 6, 0, 0, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 7, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 6, 0, 0, 0, 3, 0]] \$

$$[0, 2 y_3, y_1, y_2, 2 y_3, y_3, y_4, y_5, 0, 0, y_6, 0]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

340 . Coloring, {2, 7, 10, 11}

R: [7, 8, 7, 6, A, A, A, C, B, 2, 4, 5]

B: [6, 7, 8, 7, 3, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 2, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 1, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4]] \$

$$[0, y_1, 0, y_6, y_5, y_7, 2 y_4, y_2, 0, y_3, y_4, y_8]$$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 3, 3] , [3, 0, 1, 0, 0, 2, 0, 2, 3, 0, 3, 2] , [3, 0, 2, 0, 0, 3, 0, 1, 2, 0, 2, 3] , [2, 0, 3, 0, 0, 3, 0, 2, 3, 0, 1, 2] , [1, 0, 3, 0, 0, 2, 0, 3, 2, 0, 2, 3] , [2, 0, 2, 0, 0, 1, 0, 3, 3, 0, 3, 2] , [3, 0, 1, 0, 0, 2, 0, 2, 2, 0, 3, 3] , [3, 0, 2, 0, 0, 3, 0, 1, 3, 0, 2, 2]] \$

$$[-5 y_1 - 5 y_5 - 5 y_2 - 5 y_3 + 11 y_4 - 5 y_6 + 11 y_7, 0, 5 y_1, 0, 0, 5 y_5, 5 y_2, 5 y_3, 5 y_4, 0, 5 y_6, 5 y_7]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

341 . Coloring, {2, 7, 10, 12}

R: [7, 8, 7, 6, A, A, A, C, B, 2, 1, 9]

B: [6, 7, 8, 7, 3, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 0, 2, 2, 1, 3, 2, 1] , [2, 3, 0, 0, 0, 0, 1, 4, 1, 2, 1, 2] , [1, 2, 0, 0, 0, 0, 2, 3, 2, 1, 1, 4] , [1, 1, 0, 0, 0, 0, 1, 2, 4, 2, 2, 3] , [2, 2, 0, 0, 0, 0, 1, 1, 3, 1, 4, 2] , [4, 1, 0, 0, 0, 0, 2, 2, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 0, 4, 1, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 3, 1, 2, 4, 1, 1]] \$

$$[y_1, y_2, 0, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 3, 3] , [0, 0, 3, 3, 3, 0, 2, 2, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 0, 3, 3, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 3, 3, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_1, y_2, y_3, y_7, y_4, y_5, 0, 0, y_6, 3 y_7]$$

$$p = -s^5 + s^8$$

342 . Coloring, {2, 7, 11, 12}

R: [7, 8, 7, 6, A, A, A, C, B, C, 4, 9]

B: [6, 7, 8, 7, 3, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 2, 5] , [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 5, 2] , [0, 0, 0, 5, 0, 3, 0, 0, 2, 2, 3, 1] , [0, 0, 0, 3, 0, 5, 0, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 3, 0, 0, 2, 5, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 2, 5]] \$

[0, 0, 0, y_1 , 0, y_2 , 2 y_3 , y_3 , y_4 , y_5 , y_6 , y_7]

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 3, 1] , [3, 0, 3, 0, 1, 2, 2, 2, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 3, 0, 3, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 3, 0, 3, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 4, 0, 3, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 0, 3, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 3, 0, 4, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 3, 0, 3, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 3, 0, 3, 0, 0, 3, 0]] \$

[y_1 , 2 y_7 , y_2 , 0, y_6 , y_3 , 2 y_6 - 2 y_7 , y_4 , 0, 0, y_5 , y_7]

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

343 . Coloring, {2, 8, 9, 10}

R: [7, 8, 7, 6, A, A, B, B, C, 2, 1, 5]

B: [6, 7, 8, 7, 3, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 2, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 3, 2, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 3, 3, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 0, 0] , [6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_4, y_5, 0, 0, y_6, y_7, y_8, y_1, 0, y_2, y_3, y_7]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 1, 3] , [0, 0, 1, 1, 0, 0, 2, 2, 3, 2, 2, 3] , [0, 0, 0, 2, 0, 0, 1, 1, 3, 2, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 2, 4, 1] , [0, 0, 0, 4, 0, 0, 3, 0, 1, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 4, 2, 3] , [0, 0, 0, 2, 0, 0, 1, 0, 3, 3, 3, 4]] \$

$$[0, 0, y_1, y_1 - y_3 + y_2 - y_4 - y_5 - y_6 + y_8 + y_7, 0, y_3, y_2, y_4, y_5, y_6, y_8, y_7]$$

$$p = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

344 . Coloring, {2, 8, 9, 11}

R: [7, 8, 7, 6, A, A, B, B, C, C, 4, 5]

B: [6, 7, 8, 7, 3, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 2, 0, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 3, 0, 0, 0, 5, 0, 3] , [0, 0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[0, 0, 0, y_7, y_5, y_6, 2y_4, y_4, 0, y_3, y_1, y_2]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{2, 7, 10}, {1, 3, 6, 8, 9, 11, 12}}

See Matrix

$$\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 1, 1], [1, 2, 1, 0, 0, 2, 2, 2, 1, 2, 2, 1], [2, 2, 2, 0, 0, 1, 2, 1, 1, 2, 1, 2], [1, 2, 1, 0, 0, 2, 2, 2, 2, 1, 1], [1, 2, 2, 0, 0, 1, 2, 1, 1, 2, 2, 2], [2, 2, 1, 0, 0, 1, 2, 2, 2, 2, 1, 1], [1, 2, 1, 0, 0, 2, 2, 1, 1, 2, 2, 2], [2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 1, 1], [1, 2, 1, 0, 0, 2, 2, 2, 1, 2, 2, 1], [2, 2, 2, 0, 0, 1, 2, 1, 1, 2, 1, 2], [1, 2]] \$$$

$$[5y_4 - y_1 - y_2 - y_3 - y_5 - y_6 - y_7, y_4, y_1, 0, 0, y_2, y_4, y_3, y_5, y_4, y_6, y_7]$$

$$p' = -s + s^8 \quad p' = -s^2 + s^9 \quad p = -s + s^8$$

345 . Coloring, {2, 8, 9, 12}

R: [7, 8, 7, 6, A, A, B, B, C, C, 1, 9]

B: [6, 7, 8, 7, 3, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 10

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 1, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4], [2, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4]] \$$$

$$[y_2 + y_3 + y_4 - y_1 - y_5, 0, 0, 0, 0, y_2 + y_3 - y_4, y_1, y_2 + y_3 - y_4, y_2, y_3, y_5, y_4]$$

$$p' = s^4 - s^7 \quad p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 7, 10}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 1, 1] , [0, 2, 3, 1, 1, 0, 4, 2, 0, 2, 0, 1] , [0, 2, 1, 0, 1, 0, 3, 3, 0, 4, 0, 2] , [0, 4, 1, 0, 2, 0, 2, 1, 0, 3, 0, 3] , [0, 3, 2, 0, 3, 0, 4, 1, 0, 2, 0, 1] , [0, 2, 3, 0, 1, 0, 3, 2, 0, 4, 0, 1] , [0, 4, 1, 0, 1, 0, 2, 3, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 4, 1, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 3, 1, 0, 4, 0, 1] , [0, 4, 3, 0, 1, 0, 2, 2, 0, 3, 0, 1]] \$

$$[0, 2y_8, 2y_7, 2y_6, 2y_5, 7y_8 - 9y_7 + 7y_6 - 9y_5 + 7y_4 - 9y_3 + 7y_2 - 9y_1, 2y_4, 2y_3, 0, 2y_2, 7y_8 - 9y_7 + 7y_6 - 9y_5 + 7y_4 - 9y_3 + 7y_2 - 9y_1, 2y_1]$$

$$p' = s^3 + s^4 + s^5 - s^7 - s^8 - s^9 \quad p = s^3 - s^6 - s^7 + s^{10}$$

346 . Coloring, {2, 8, 10, 11}

R: [7, 8, 7, 6, A, A, B, B, B, 2, 4, 5]

B: [6, 7, 8, 7, 3, 3, A, C, C, C, 1, 9]

' See graph

' ' See pair graph

'

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 4, 0, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 3, 0, 3, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 2, 0, 4, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 3, 0, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 3, 3, 0]] \$

$$[0, y_1, 0, y_2, y_6, y_5, y_6, y_3, 0, y_4, y_7, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 0, 4] , [0, 0, 1, 0, 0, 2, 0, 2, 4, 2, 0, 5] , [0, 0, 2, 0, 0, 0, 0, 1, 5, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$

$$[-2y_2 + 2y_5, 0, y_1, 0, 0, y_2, -2y_2 + 2y_5, y_3, y_4, y_5, 0, y_6]$$

$$p' = -s^5 + s^7 \quad p = -s^5 + s^7$$

347 . Coloring, {2, 8, 10, 12}

R: [7, 8, 7, 6, A, A, B, B, B, 2, 1, 9]

B: [6, 7, 8, 7, 3, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 2, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 4, 2, 0, 0, 4, 0], [4, 0, 0, 0, 0, 5, 1, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$$$

$$[y_1, y_3, 0, 0, 0, y_2, y_7, y_6, 2y_2, y_5, y_4, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 2, 2, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 0, 3, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5]] \$$$

$$[0, 0, y_1 + 3y_2 - y_3 + y_4 + y_6 - y_5, 2y_2, y_1, y_2, y_3, y_4, 0, y_6, 0, y_5]$$

$$p' = -s^4 + s^5 - s^6 + s^7 \quad p = s^4 - s^5 + s^6 - s^7$$

348 . Coloring, {2, 8, 11, 12}

R: [7, 8, 7, 6, A, A, B, B, B, C, 4, 9]

B: [6, 7, 8, 7, 3, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 1, 5, 2] , [0, 0, 0, 5, 0, 4, 0, 0, 2, 2, 2, 1] , [0, 0, 0, 2, 0, 5, 0, 0, 1, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 5, 1, 4] , [0, 0, 0, 1, 0, 2, 0, 0, 4, 2, 2, 5] , [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 1, 5, 2]] \$

[0, 0, 0, y_6 , 0, y_1 , 2 y_3 , y_3 , y_4 , y_2 , y_5 , y_7]

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {2, 7, 10}} order: 12

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 2, 2, 2, 0, 2, 0, 1] , [0, 2, 4, 0, 1, 0, 2, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 2, 4, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 2, 1, 0, 2, 0, 4] , [0, 2, 3, 0, 4, 0, 2, 2, 0, 2, 0, 1] , [0, 2, 4, 0, 1, 0, 2, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 2, 4, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 2, 1, 0, 2, 0, 4]] \$

[y_2 , y_3 , y_4 , 0, y_5 , y_6 , y_3 , $-y_2 + 5y_3 - y_4 - y_5 - y_6 - y_1$, 0, y_3 , 0, y_1]

$$p = -s^3 + s^7 \quad p' = -s^4 + s^8 \quad p'' = -s^3 + s^7$$

349 . Coloring, {2, 9, 10, 11}

R: [7, 8, 7, 6, A, A, B, C, C, 2, 4, 5]

B: [6, 7, 8, 7, 3, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	9 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5
See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 2, 2], [0, 2, 0, 2, 2, 2, 0, 2, 0, 3, 2, 1], [0, 3, 0, 2, 1, 2, 0, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 2, 0, 3, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 4, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 3, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 4, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 2, 0, 4, 0, 4], [0, 4, 0, 0, 4, 0, 0, 3, 0, 3, 0, 2]] \$$

$[0, y_1, 0, y_2, y_3, y_4, y_9, y_5, 0, y_6, y_7, y_8]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}\}$ order: 5
See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 2, 2], [2, 0, 1, 0, 0, 2, 0, 2, 2, 2, 3, 2], [3, 0, 2, 0, 0, 2, 0, 1, 2, 0, 4, 2], [4, 0, 2, 0, 0, 3, 0, 2, 2, 0, 3, 0], [3, 0, 3, 0, 0, 4, 0, 2, 0, 0, 4, 0], [4, 0, 4, 0, 0, 3, 0, 3, 0, 0, 2, 0], [2, 0, 3, 0, 0, 4, 0, 4, 0, 0, 3, 0], [3, 0, 4, 0, 0, 2, 0, 3, 0, 0, 4, 0], [4, 0, 2, 0, 0, 3, 0, 4, 0, 0, 3, 0]] \$$

$[y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$

350 . Coloring, $\{2, 9, 10, 12\}$

R: [7, 8, 7, 6, A, A, B, C, C, 2, 1, 9]

B: [6, 7, 8, 7, 3, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}, \{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 2, 2], [2, 2, 0, 0, 0, 0, 2, 2, 2, 1, 2, 3], [2, 1, 0, 0, 0, 0, 2, 2, 3, 0, 2, 4], [2, 0, 0, 0, 0, 2, 1, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5]] \$$

$$[2y_4, 5y_4 - 2y_2 - 2y_5, 0, 0, 0, 2y_2, 2y_4, 2y_1, 5y_4 - 2y_1 - 2y_3, 2y_3, 2y_4, 2y_5]$$

$$p' = -s^5 + s^8 \quad p = s^5 - s^6 \quad p' = -s^5 + s^7 \quad p' = -s^5 + s^6$$

Omega Rank for B : cycles: {{3, 4, 5, 7, 8, 10, 11, 12}} order: 8
See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 2, 2], [0, 0, 3, 2, 2, 0, 2, 2, 0, 2, 1, 2], [0, 0, 2, 1, 2, 0, 2, 3, 0, 2, 2, 2], [0, 0, 2, 2, 2, 0, 1, 2, 0, 2, 3, 2], [0, 0, 2, 3, 2, 0, 2, 2, 0, 1, 2, 2], [0, 0, 2, 2, 2, 0, 3, 2, 0, 2, 2, 1], [0, 0, 2, 2, 1, 0, 2, 2, 0, 3, 2, 2], [0, 0, 1, 2, 2, 0, 2, 2, 0, 2, 2, 3], [0, 0, 2, 2, 3, 0, 2, 1, 0, 2, 2, 2]] \$$$

$$[0, 0, y_1 + y_2 + y_3 - y_4 + y_5 + y_6 - y_7 - y_8, y_1, y_2, y_3, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

351 . Coloring, {2, 9, 11, 12}

R: [7, 8, 7, 6, A, A, B, C, C, C, 4, 9]

B: [6, 7, 8, 7, 3, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6
See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 2, 4], [0, 0, 0, 2, 0, 2, 0, 0, 4, 1, 2, 5], [0, 0, 0, 2, 0, 2, 0, 0, 5, 2, 0, 5], [0, 0, 0, 0, 2, 0, 0, 5, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[0, 0, 0, y_1, 0, y_2, 2y_7, y_7, y_3, y_4, y_5, y_6]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {2, 7, 10}}
See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 2, 0] , [2, 2, 3, 0, 0, 2, 2, 2, 0, 2, 1, 0] , [1, 2, 2, 0, 0, 2, 2, 3, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 1, 2, 2, 0, 2, 3, 0] , [3, 2, 1, 0, 0, 2, 2, 2, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 3, 2, 1, 0, 2, 2, 0] , [2, 2, 3, 0, 0, 2, 2, 0, 2, 1, 0] , [1, 2, 2, 0, 0, 2, 2, 3, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 1, 2, 2, 0, 2, 3, 0]] \$

$$[5y_5 - y_1 - y_2 - y_3 - y_4 - y_6, y_5, y_1, 0, y_2, y_3, y_5, y_4, 0, y_5, y_6, 0]$$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7 \quad p'' = -s^3 + s^8$$

352 . Coloring, {2, 10, 11, 12}

R: [7, 8, 7, 6, A, A, B, C, B, 2, 4, 9]

B: [6, 7, 8, 7, 3, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 0, 2, 1, 1, 4, 1] , [0, 1, 0, 4, 0, 3, 0, 2, 1, 2, 1, 2] , [0, 2, 0, 1, 0, 4, 0, 1, 2, 3, 1, 2] , [0, 3, 0, 1, 0, 1, 0, 2, 2, 4, 2, 1] , [0, 4, 0, 2, 0, 1, 0, 3, 1, 1, 2, 2] , [0, 1, 0, 2, 0, 2, 0, 4, 2, 1, 1, 3] , [0, 1, 0, 1, 0, 2, 0, 1, 3, 2, 2, 4] , [0, 2, 0, 2, 0, 1, 0, 1, 4, 2, 3, 1]] \$

$$[0, y_1, 0, y_2, 0, y_8, y_3, y_4, y_5, y_6, y_7, y_9]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 1, 3] , [1, 0, 3, 0, 3, 2, 0, 2, 0, 2, 1, 2] , [1, 0, 5, 0, 2, 1, 0, 3, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 1, 0, 5, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 2, 0, 3, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 3, 0, 3, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 5, 0, 2, 0, 0, 3, 0] , [3, 0, 5, 0, 0, 3, 0, 3, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 0, 5, 0, 0, 3, 0]] \$

$$[y_6, 0, y_7, 0, y_8, y_9, y_5, y_1, 0, y_2, y_3, y_4]$$

353 . Coloring, {3, 4, 5, 6}

R: [7, 7, 8, 7, 3, 3, B, C, B, C, 1, 5]
B: [6, 8, 7, 6, A, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 0, 3, 3] , [3, 0, 2, 0, 3, 0, 2, 2, 0, 0, 3, 1] , [3, 0, 3, 0, 1, 0, 3, 2, 0, 0, 2, 2] , [2, 0, 1, 0, 2, 0, 3, 3, 0, 0, 3, 2] , [3, 0, 2, 0, 2, 0, 2, 1, 0, 0, 3, 3] , [3, 0, 2, 0, 3, 0, 3, 2, 0, 0, 2, 1] , [2, 0, 3, 0, 1, 0, 3, 2, 0, 0, 3, 2]] \$

$$[y_1 + y_2 - y_3 + y_4 - y_5 + y_6, 0, y_1, 0, y_2, 0, y_3, y_4, 0, 0, y_5, y_6]$$

$$p = -s - s^2 - s^3 + s^5 + s^6 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 0, 2, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 1, 0, 4, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 1, 0, 3, 1, 1, 4, 2] , [0, 1, 0, 4, 0, 2, 0, 2, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 4, 0, 1, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 3, 0, 1, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 0, 2, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 1, 0, 4, 2, 2, 2, 1]] \$

$$[0, 3y_1, 0, -3y_2 + 8y_3 - 3y_7 + 5y_6, 0, -3y_1 - 3y_4 + 5y_3 - 3y_5 + 8y_6, 3y_4, 3y_2, 3y_3, 3y_7, 3y_5, 3y_6]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

354 . Coloring, {3, 4, 5, 7}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, A, C, B, C, 1, 5]

B: [6, 8, 7, 6, A, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	9 vs 10

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 0, 2, 1, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 1, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 1, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$$

$$[y_5, 0, y_4, 0, y_3, 0, y_5 - y_4 + y_3, y_2, 0, y_5 + y_3 - y_2, y_1, y_5 + y_3 - y_1]$$

$$p' = s^6 - s^7 \quad p' = s^5 - s^7 \quad p = s^5 - s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{3, 4, 6, 7, 11\}\}$ order: 10

See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 3, 1], [0, 1, 2, 3, 0, 2, 1, 2, 1, 0, 2, 2], [0, 0, 2, 2, 0, 3, 2, 1, 2, 0, 3, 1], [0, 0, 3, 3, 0, 2, 2, 0, 1, 0, 3, 2], [0, 0, 2, 3, 0, 3, 3, 0, 2, 0, 2, 1], [0, 0, 3, 2, 0, 3, 2, 0, 1, 0, 3, 2], [0, 0, 3, 3, 0, 2, 3, 0, 2, 0, 2, 1], [0, 0, 2, 2, 0, 3, 3, 0, 1, 0, 3, 2], [0, 0, 3, 3, 0, 2, 2, 0, 2, 0, 3, 1], [0, 0, 2, 3, 0, 3, 3, 0, 1, 0, 2, 2]] \$$

$$[0, -3y_1 - 3y_2 - 3y_3 - 3y_6 - 3y_4 + 13y_5 - 3y_7 - 3y_8 + 13y_9, 3y_1, 3y_2, 0, 3y_3, 3y_6, 3y_4, 3y_5, 3y_7, 3y_8, 3y_9]$$

$$p = -s^4 - s^5 + s^9 + s^{10}$$

355 . Coloring, $\{3, 4, 5, 8\}$

R: [7, 7, 8, 7, 3, A, B, B, B, C, 1, 5]

B: [6, 8, 7, 6, A, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 4, 2], [4, 0, 2, 0, 2, 0, 2, 1, 0, 0, 4, 1], [4, 0, 2, 0, 1, 0, 4, 2, 0, 0, 3, 0], [3, 0, 1, 0, 0, 0, 4, 2, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 3, 1, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$$

$[y_2, 0, y_1, 0, y_5, 0, y_4, y_3, 0, y_8, y_6, y_7]$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8
See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 0, 2], [0, 3, 2, 0, 0, 2, 1, 2, 2, 1, 0, 3], [0, 1, 2, 0, 0, 0, 2, 3, 3, 1, 0, 4], [0, 1, 0, 0, 0, 2, 1, 4, 2, 0, 6], [0, 2, 0, 0, 0, 0, 0, 1, 6, 2, 0, 5], [0, 2, 0, 0, 0, 0, 0, 2, 5, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$[0, y_3, y_1, y_2, 0, y_4, y_5, y_6, y_7, y_8, 0, y_9]$

356 . Coloring, $\{3, 4, 5, 9\}$

R: $[7, 7, 8, 7, 3, A, B, C, C, C, 1, 5]$

B: $[6, 8, 7, 6, A, 3, A, B, B, 2, 4, 9]$

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{1, 7, 11\}\}$ order: 12
See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 2, 4], [2, 0, 2, 0, 4, 0, 2, 1, 0, 0, 3, 2], [3, 0, 4, 0, 2, 0, 2, 2, 0, 0, 2, 1], [2, 0, 2, 0, 1, 0, 3, 4, 0, 0, 2, 2], [2, 0, 1, 0, 2, 0, 2, 2, 0, 0, 3, 4], [3, 0, 2, 0, 4, 0, 2, 1, 0, 0, 2, 2], [2, 0, 4, 0, 2, 0, 3, 2, 0, 0, 2, 1], [2, 0, 2, 0, 1, 0, 2, 4, 0, 0, 3, 2]] \$$

$$[7y_1, 0, 9y_1 - 7y_2 + 9y_3 - 7y_4 - 7y_5 + 9y_6 - 7y_7, 0, 7y_2, 0, 7y_3, 7y_4, 0, 7y_5, 7y_6, 7y_7]$$

$$p = s^2 + s^3 + s^4 - s^6 - s^7 - s^8$$

Omega Rank for B : cycles: {{2, 3, 4, 6, 7, 8, 10, 11}} order: 8

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 2, 0], [0, 3, 2, 2, 0, 2, 1, 2, 0, 1, 3, 0], [0, 1, 2, 3, 0, 2, 2, 3, 0, 1, 2, 0], [0, 1, 2, 2, 0, 3, 2, 1, 0, 2, 3, 0], [0, 2, 3, 3, 0, 2, 2, 1, 0, 2, 1, 0], [0, 2, 2, 1, 0, 3, 3, 2, 0, 2, 1, 0], [0, 2, 3, 1, 0, 1, 2, 2, 0, 3, 2, 0], [0, 3, 1, 2, 0, 1, 3, 2, 0, 2, 2, 0], [0, 2, 1, 2, 0, 2, 1, 3, 0, 3, 2, 0]] \$$$

$$[0, y_1, y_2, y_3, 0, y_4, y_6, y_5, y_7, y_8, y_9, 0]$$

357 . Coloring, {3, 4, 5, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, B, C, B, 2, 1, 5]

B: [6, 8, 7, 6, A, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}, {1, 7, 11}} order: 12

See Matrix

$$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 3, 1], [3, 1, 2, 0, 1, 0, 4, 1, 0, 0, 3, 1], [3, 0, 1, 0, 1, 0, 4, 2, 0, 0, 4, 1], [4, 0, 1, 0, 1, 0, 3, 1, 0, 0, 4, 2], [4, 0, 1, 0, 2, 0, 4, 1, 0, 0, 3, 1], [3, 0, 2, 0, 1, 0, 4, 1, 0, 0, 4, 1], [4, 0, 1, 0, 1, 0, 3, 2, 0, 0, 4, 1], [4, 0, 1, 0, 1, 0, 4, 1, 0, 0, 3, 2], [3, 0, 1, 0, 2, 0, 4, 1, 0, 0, 4, 1]] \$$$

$$[-5y_1 + 11y_2 + 11y_3 - 5y_4 + 11y_5 - 5y_6 - 5y_7 + 11y_8, 5y_1, 5y_2, 0, 5y_3, 0, 5y_4, 5y_5, 0, 5y_6, 5y_7, 5y_8]$$

$$p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 1, 3] , [0, 0, 2, 1, 0, 2, 1, 0, 3, 1, 1, 5] , [0, 0, 2, 1, 0, 1, 2, 0, 5, 1, 0, 4] , [0, 0, 1, 0, 0, 1, 2, 0, 4, 2, 0, 6] , [0, 0, 1, 0, 0, 0, 1, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[0, 0, y₁, y₂, 0, y₃, y₉, y₄, y₅, y₆, y₇, y₈]

358 . Coloring, {3, 4, 5, 11}

$\Omega p(\Delta)=0: p = s^3 - 2s^4 - 8s^6 + 32s^8$

R: [7, 7, 8, 7, 3, A, B, C, B, C, 4, 5]

B: [6, 8, 7, 6, A, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 10

Omega Rank for R : cycles: {{3, 5, 8, 12}, {4, 7, 11}} order: 12

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 0, 2, 1, 0, 0, 3, 2] , [0, 0, 3, 3, 2, 0, 3, 2, 0, 0, 2, 1] , [0, 0, 2, 2, 1, 0, 3, 3, 0, 0, 3, 2] , [0, 0, 1, 3, 2, 0, 2, 2, 0, 0, 3, 3] , [0, 0, 2, 3, 3, 0, 3, 1, 0, 0, 2, 2] , [0, 0, 3, 2, 2, 0, 3, 2, 0, 0, 3, 1] , [0, 0, 2, 3, 1, 0, 2, 3, 0, 0, 3, 2]] \$

[0, 0, y₁ + y₃ + y₂ - y₆, y₅, y₁, 0, y₄, y₃, 0, y₂, -y₅ + 2 y₁ - y₄ + 2 y₃ + 2 y₂, y₆]

$p' = -s^2 - s^4 + s^5 + s^7$ $p = -s^2 - s^4 + s^5 + s^7$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 3, 6, 7, 8, 10, 11}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 1, 1] , [1, 3, 2, 0, 0, 2, 1, 2, 1, 1, 1, 2] , [1, 1, 2, 0, 0, 1, 2, 3, 2, 1, 2, 1] , [2, 1, 1, 0, 0, 1, 2, 1, 1, 2, 3, 2] , [3, 2, 1, 0, 0, 2, 1, 1, 2, 2, 1, 1] , [1, 2, 2, 0, 0, 3, 1, 2, 1, 1, 1, 2] , [1, 1, 3, 0, 0, 1, 2, 2, 2, 1, 2, 1] , [2, 1, 1, 0, 0, 1, 3, 1, 1, 2, 2, 2] , [2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 1, 1] , [1, 3, 2, 0, 0, 2, 1, 2, 1, 1, 1, 2]] \$

$$[-3 y_1 - 3 y_4 + 8 y_5 - 3 y_6 + 5 y_8, -3 y_2 - 3 y_3 + 5 y_5 - 3 y_7 + 8 y_8, 3 y_1, 0, 0, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7, 3 y_8]$$

$$p = s - s^9 \quad p' = s - s^9$$

359 . Coloring, {3, 4, 5, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, B, C, B, C, 1, 9]

B: [6, 8, 7, 6, A, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 2, 1, 3, 0, 5, 2], [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[y_1, 0, y_5, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{2, 3, 4, 6, 7, 8, 10, 11}} order: 8

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 1, 2, 0, 3, 1, 0], [0, 3, 2, 1, 0, 1, 2, 3, 0, 2, 2, 0], [0, 2, 1, 2, 0, 1, 2, 3, 0, 2, 3, 0], [0, 2, 1, 3, 0, 2, 1, 2, 0, 2, 3, 0], [0, 2, 2, 3, 0, 3, 1, 2, 0, 1, 2, 0], [0, 1, 3, 2, 0, 3, 2, 2, 0, 1, 2, 0], [0, 1, 3, 2, 0, 2, 3, 1, 0, 2, 2, 0], [0, 2, 2, 2, 0, 2, 3, 1, 0, 3, 1, 0], [0, 3, 2, 1, 0, 2, 2, 2, 0, 3, 1, 0]] \$$$

$$[0, y_5, y_6, y_7, -y_5 + y_6 + y_7 - y_1 - y_2 + y_3 + y_4 - y_8 + y_9, y_1, y_2, y_3, 0, y_4, y_8, y_9]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

360 . Coloring, {3, 4, 6, 7}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, A, C, B, C, 1, 5]

B: [6, 8, 7, 6, 3, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 1, 3], [1, 0, 0, 0, 3, 0, 2, 1, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6], [0, 0, \\ & 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, \\ & 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$ \end{aligned}$$

$$[y_6, 0, y_4, 0, y_5, 0, y_3, y_6 - y_4, 0, y_2, y_4, y_1]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 1, 2, 1, 2, 2, 2], [0, 2, 0, 2, 0, 3, 0, 1, 2, 2, 3, 1], [0, 2, \\ & 0, 3, 0, 2, 0, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 3, 0, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 1, 0, 3, 1, 3, 2, 2], [0, 3, 0, 2, 0, 2, \\ & 0, 2, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 0, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 3, 0, 1, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 0, 2, 1, 3, \\ & 1, 2]] \$ \end{aligned}$$

$$\begin{aligned} [& 0, 2y_8, 2y_7, 2y_6, 0, 2y_5, 2y_4, 2y_3, 2y_2, 11y_8 + 11y_7 - 2y_6 + 11y_5 - 2y_4 - 2y_3 - 39y_2 + 11 \\ & y_1, 2y_1, 3y_8 + 3y_7 + 3y_5 - 11y_2 + 3y_1] \end{aligned}$$

$$p' = -s^3 + s^9 \quad p = -s^3 + s^9$$

361 . Coloring, {3, 4, 6, 8}

R: [7, 7, 8, 7, A, 3, B, B, B, C, 1, 5]

B: [6, 8, 7, 6, 3, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{1, 7, 11\}\}$ order: 3

See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 4, 2], [4, 0, 0, 0, 2, 0, 2, 1, 0, 2, 4, 1], [4, 0, 0, 0, 1, 0, 4, 0, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 2, 4, 1], [4, 0, 0, 0, 1, 0, 4, 0, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 2, 4, 1]] \$$

$[-2 y_1 + 9 y_2 + 9 y_3 - 11 y_5 - 2 y_4, 0, 2 y_1, 0, -2 y_2 - 2 y_3 + 2 y_4 + 2 y_5, 0, 2 y_2, 2 y_3, 0, 7 y_2 + 7 y_3 - 2 y_4 - 9 y_5, 2 y_4, 2 y_5]$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 0, 2], [0, 3, 0, 0, 0, 2, 1, 2, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 0, 3, 3, 3, 0, 4], [0, 3, 0, 0, 0, 0, 3, 4, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 3, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$[0, y_6, y_5, 2 y_5, 0, 2 y_4, y_4, y_2, y_3, y_1, 0, y_7]$

$$p = s^6 - s^8 \quad p' = s^6 - s^8$$

362 . Coloring, {3, 4, 6, 9}

R: [7, 7, 8, 7, A, 3, B, C, C, C, 1, 5]

B: [6, 8, 7, 6, 3, A, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{1, 7, 11\}\}$ order: 3

See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 2, 4], [2, 0, 0, 0, 4, 0, 2, 1, 0, 2, 3, 2], [3, 0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 3, 0, 0, 2, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 3, 2]] \$$

$$[4y_4 + 4y_5 + 3y_1 + 3y_2 - 7y_3, 0, 2y_4, 0, 2y_5, 0, 10y_4 + 10y_5 + 4y_1 + 4y_2 - 16y_3, 2y_1, 0, 2y_2, 2y_3, 16y_4 + 16y_5 + 7y_1 + 7y_2 - 27y_3]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = s^4 - s^7$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 2, 0], [0, 3, 0, 2, 0, 2, 1, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 0, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 2, 0, 3, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 0, 2, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 0, 3, 0, 3, 2, 0]] \$$

$$[0, y_1, y_2, y_3, 0, y_8, y_4, y_5, 2y_2, y_6, y_7, 0]$$

$$p = -s^3 + s^9$$

363 . Coloring, $\{3, 4, 6, 10\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, B, C, B, 2, 1, 5]

B: [6, 8, 7, 6, 3, A, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 9
See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 3, 1], [3, 1, 0, 0, 1, 0, 4, 1, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 4, 0, 0, 1, 4, 1], [4, 1, 0, 0, 1, 0, 5, 0, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 5, 0, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$[y_9, y_8, y_7, 0, y_6, 0, y_5, y_4, 0, y_3, y_2, y_1]$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6
See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 1, 3], [0, 0, 0, 1, 0, 2, 1, 0, 3, 3, 1, 5], [0, 0, 0, 1, 0, 1, 0, 0, 5, 3, 0, 6], [0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 0], [0, 0, 9, 0, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$[0, 0, y_3, y_1, 0, y_2, y_6, y_3, y_4, y_5, y_6, y_7]$

$$p' = s^6 - s^8 \quad p = s^6 - s^8$$

364 . Coloring, $\{3, 4, 6, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, B, C, B, C, 4, 5]

B: [6, 8, 7, 6, 3, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 10

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3
See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 1, 0, 2, 3, 2] , [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2]] \$

$$[0, 0, -y_1 + y_4, y_2 + y_5, y_1, 0, y_3, y_2, 0, y_5, y_4, y_3]$$

$$p = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 2, 1, 2, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 1, 0, 3, 2, 3, 2, 1] , [2, 3, 0, 0, 0, 1, 0, 3, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 2, 0, 3, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 3, 0, 1, 1, 2, 3, 2] , [3, 2, 0, 0, 0, 3, 0, 1, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 3, 0, 2, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 1, 0, 3, 2, 3, 2, 1] , [2, 3, 0, 0, 0, 1, 0, 3, 1, 1, 3, 2]] \$

$$[3y_8, 3y_7, 3y_6, 0, 0, 3y_5, 3y_4, 3y_3, 3y_2, -3y_8 - 3y_6 - 3y_3 + 8y_2 + 5y_1, -3y_7 - 3y_5 - 3y_4 + 5y_2 + 8y_1, 3y_1]$$

$$p' = -s^3 + s^9 \quad p'' = -s^3 + s^9$$

365 . Coloring, {3, 4, 6, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, B, C, B, C, 1, 9]

B: [6, 8, 7, 6, 3, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 1, 3, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_1, 0, y_5, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 1, 2, 0, 3, 1, 0], [0, 3, 1, 1, 0, 1, 2, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 1, 1, 3, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 0, 2, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 0, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 3, 0, 3, 3, 0], [0, 3, 0, 2, 0, 2, 0, 3, 0, 3, 3, 0]] \$$$

$$[0, y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7 - y_8 + y_9, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

$$p = s^5 - s^6 + s^7 - s^8 + s^9 - s^{10}$$

366 . Coloring, {3, 4, 7, 8}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, A, B, B, C, 1, 5]

B: [6, 8, 7, 6, 3, 3, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 4, 2, 2], [2, 0, 0, 0, 2, 0, 2, 0, 0, 5, 1, 4], [1, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$$$

$$[y_5, 0, 0, 0, y_4, 0, y_3, y_2, 0, y_1, y_7, y_6]$$

Omega Rank for B : cycles: {{9, 12}, {3, 4, 6, 7, 11}} order: 10

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 0, 2, 2] , [0, 0, 2, 2, 0, 2, 2, 2, 2, 0, 1, 3] , [0, 0, 2, 1, 0, 2, 2, 0, 3, 0, 2, 4] , [0, 0, 2, 2, 0, 1, 2, 0, 4, 0, 2, 3] , [0, 0, 1, 2, 0, 2, 2, 0, 3, 0, 2, 4] , [0, 0, 2, 2, 0, 2, 1, 0, 4, 0, 2, 3] , [0, 0, 2, 2, 0, 2, 2, 0, 3, 0, 1, 4] , [0, 0, 2, 1, 0, 2, 2, 0, 4, 0, 2, 3] , [0, 0, 2, 2, 0, 1, 2, 0, 3, 0, 2, 4]] \$

[0, 7 y₄, 7 y₅, 7 y₆, 0, 9 y₄ - 7 y₅ - 7 y₆ - 7 y₁ + 9 y₂ + 9 y₃ - 7 y₇ + 9 y₈, 7 y₁, 7 y₂, 7 y₃, 0, 7 y₇, 7 y₈]

$$p = -s^3 - s^4 + s^8 + s^9$$

367 . Coloring, {3, 4, 7, 9}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, A, C, C, C, 1, 5]

B: [6, 8, 7, 6, 3, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

[2 y₃, 0, 0, 0, y₁, 0, y₂, y₃, 0, y₄, 0, y₅]

$$p = -s^3 + s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 2, 2, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 2, 0, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 4, 2, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 4, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 2, 4, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 4, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 2, 0, 0, 0, 4, 0]] \$

$$[0, y_6, y_1, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, 0]$$

$$p = -s^3 + s^8$$

368 . Coloring, {3, 4, 7, 10}

R: [7, 7, 8, 7, A, A, A, C, B, 2, 1, 5]

B: [6, 8, 7, 6, 3, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 0, 4, 0, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[y_6 + y_4, y_1, 0, 0, y_2, 0, y_3, y_6, 0, y_5, y_6, y_4]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {3, 4, 6, 7, 11}} order: 10

See Matrix

\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 0, 3, 3] , [0, 0, 2, 3, 0, 2, 2, 0, 3, 0, 2, 2] , [0, 0, 2, 2, 0, 3, 2, 0, 2, 0, 2, 3] , [0, 0, 3, 2, 0, 2, 2, 0, 3, 0, 2, 2] , [0, 0, 2, 2, 0, 2, 3, 0, 2, 0, 2, 3] , [0, 0, 2, 2, 0, 2, 0, 3, 0, 3, 2] , [0, 0, 2, 3, 0, 2, 2, 0, 2, 0, 2, 3] , [0, 0, 2, 2, 0, 3, 2, 0, 3, 0, 2, 2]] \$

$$[0, 0, 5y_1, -5y_1 - 5y_4 - 5y_5 - 5y_3 + 11y_2 - 5y_6 + 11y_7, 0, 5y_4, 5y_5, 5y_3, 5y_2, 0, 5y_6, 5y_7]$$

$$p = s^2 + s^3 - s^7 - s^8$$

369 . Coloring, {3, 4, 7, 11}

R: [7, 7, 8, 7, A, A, A, C, B, C, 4, 5]

B: [6, 8, 7, 6, 3, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

[0, 0, 0, $y_2, y_1, 0, y_3, y_5, 0, y_4, y_5, y_6$]

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 0, 3, 1] , [3, 0, 2, 0, 0, 2, 2, 2, 1, 0, 2, 2] , [2, 0, 2, 0, 0, 3, 2, 0, 2, 0, 4, 1] , [4, 0, 3, 0, 0, 2, 2, 0, 1, 0, 2, 2] , [2, 0, 2, 0, 0, 4, 3, 0, 2, 0, 2, 1] , [2, 0, 4, 0, 0, 2, 2, 0, 1, 0, 3, 2] , [3, 0, 2, 0, 0, 2, 4, 0, 2, 0, 2, 1] , [2, 0, 2, 0, 0, 3, 2, 0, 1, 0, 4, 2] , [4, 0, 3, 0, 0, 2, 2, 0, 2, 0, 2, 1]] \$

[3 $y_3, -3 y_3 - 3 y_1 - 3 y_2 - 3 y_4 - 3 y_5 + 13 y_6 - 3 y_7 + 13 y_8, 3 y_1, 0, 0, 3 y_2, 3 y_4, 3 y_5, 3 y_6, 0, 3 y_7, 3 y_8$]

$$p = -s^3 - s^4 + s^8 + s^9$$

370 . Coloring, {3, 4, 7, 12}

R: [7, 7, 8, 7, A, A, A, C, B, C, 1, 9]

B: [6, 8, 7, 6, 3, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 4, 1, 3], [1, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 5], [2, 0, 0, 0, 0, 0, 1, 0, 5, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 3, 1, 5, 2], [5, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 1], [3, 0, 0, 0, 0, 0, 5, 0, 1, 3, 2, 2], [2, 0, 0, 0, 0, 0, 3, 0, 2, 5, 1, 3]] \$$

$$[y_1, 0, 0, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 0, 3, 1], [0, 0, 4, 3, 1, 2, 2, 2, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 3, 4, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0]] \$$

$$[0, 2y_7, y_3, y_4, y_5, y_6, y_1, 2y_5 - 3y_7, 0, 0, y_2, y_7]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

371 . Coloring, $\{3, 4, 8, 9\}$

R: [7, 7, 8, 7, A, A, B, B, C, C, 1, 5]

B: [6, 8, 7, 6, 3, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	10 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3
 See Matrix

$\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 3, 3]] \$$

$[2y_1, 0, 0, 0, 2y_2, 0, 7y_1 - 27y_2 - 2y_3 + 16y_4, 2y_3, 0, 3y_1 - 7y_2 + 4y_4, 2y_4, 4y_1 - 16y_2 + 10y_4]$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{2, 3, 4, 6, 7, 8, 9, 10, 11, 12\}\}$ order: 10
 See Matrix

$\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 2, 1, 1], [0, 2, 2, 1, 0, 2, 2, 2, 1, 1, 2, 1], [0, 1, 2, 2, 0, 1, 2, 2, 1, 2, 1, 2], [0, 2, 1, 1, 0, 2, 2, 1, 2, 2, 1, 2], [0, 2, 2, 1, 0, 1, 1, 2, 2, 2, 2, 1], [0, 2, 1, 2, 0, 1, 2, 2, 1, 1, 2, 2], [0, 1, 1, 2, 0, 2, 1, 2, 2, 2, 1, 2], [0, 2, 2, 1, 0, 2, 1, 1, 2, 1, 2, 2], [0, 1, 2, 2, 0, 1, 2, 2, 2, 1, 2, 1], [0, 1, 1, 2, 0, 2, 2, 1, 1, 2, 2, 2]] \$$

$[0, y_1, y_2, y_3, 0, y_6, y_4, y_5, y_7, y_8, y_9, y_{10}]$

372 . Coloring, $\{3, 4, 8, 10\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, B, B, B, 2, 1, 5]

B: [6, 8, 7, 6, 3, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
 See Matrix

$\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 4, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$$[y_1, y_2, 0, 0, 2y_5, 0, y_3, y_5, 0, y_4, y_6, 0]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 2, 2, 0, 2, 1, 1, 2, 2, 0, 4], [0, 0, 2, 0, 0, 2, 2, 0, 4, 1, 0, 5], [0, 0, 2, 0, 0, 0, 2, 0, 5, 2, 0, 5], [0, 0, \\ & 0, 0, 0, 0, 2, 0, 5, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, \\ & 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$ \end{aligned}$$

$$[0, 0, y_1, 2y_4, 0, y_2, y_3, y_4, y_5, y_6, 0, y_7]$$

$$p = -s^6 + s^8$$

373 . Coloring, {3, 4, 8, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, B, B, B, C, 4, 5]

B: [6, 8, 7, 6, 3, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	9 vs 9

Omega Rank for R : cycles: {{5, 10, 12}, {4, 7, 11}} order: 3

See Matrix

$$\begin{aligned} \$ [& [0, 0, 0, 2, 2, 0, 3, 1, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 4, 0, 0, 2, 2, 2], [0, 0, \\ & 0, 2, 2, 0, 4, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 4, 0, 0, 2, 2, 2], [0, 0, 0, 2, 2, 0, \\ & 4, 0, 0, 2, 4, 2]] \$ \end{aligned}$$

$$[0, 0, 0, y_2, y_4, 0, y_1, -y_2 - y_1 + 5y_4 - y_3, 0, y_4, y_3, y_4]$$

$$p' = s^2 - s^5 \quad p' = s^3 - s^6 \quad p = s^2 - s^5$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 2, 0, 2] , [0, 2, 2, 0, 0, 2, 2, 2, 2, 1, 0, 3] , [0, 1, 2, 0, 0, 0, 2, 2, 3, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 2, 1, 4, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 0, 2, 5, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$[y_1, y_3, y_2, 0, 0, y_4, y_5, y_6, y_8, y_7, 0, y_9]$

374 . Coloring, {3, 4, 8, 12}

$\Omega p(\Delta)=0: p = -3s^3 + 2s^4 + 8s^6 + 32s^8$

R: [7, 7, 8, 7, A, A, B, B, B, C, 1, 9]

B: [6, 8, 7, 6, 3, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 2, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 0, 2, 0, 6, 2] , [6, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$[y_1, 0, 0, 0, 0, 0, y_3, y_2, y_4, 2y_2, y_5, y_6]$

$p = -s^4 + s^7$

Omega Rank for B : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 2, 0, 2] , [0, 2, 4, 0, 2, 2, 2, 2, 0, 1, 0, 1] , [0, 1, 4, 0, 1, 0, 4, 2, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 4, 1, 0, 4, 0, 2] , [0, 4, 2, 0, 2, 0, 1, 2, 0, 4, 0, 1] , [0, 4, 2, 0, 1, 0, 2, 4, 0, 1, 0, 2] , [0, 1, 1, 0, 2, 0, 2, 4, 0, 2, 0, 4] , [0, 2, 2, 0, 4, 0, 1, 1, 0, 2, 0, 4] , [0, 2, 4, 0, 4, 0, 2, 2, 0, 1, 0, 1]] \$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_7, 0, y_8, 0, y_9]$$

375 . Coloring, {3, 4, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, B, C, C, 2, 1, 5]

B: [6, 8, 7, 6, 3, 3, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 4, 0, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 4, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 5, 0, 0, 1, 4, 0], [4, 1, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[y_1, y_2, 0, 0, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 2, 2, 2], [0, 0, 2, 2, 0, 2, 2, 0, 2, 1, 3, 2], [0, 0, 2, 3, 0, 2, 2, 0, 2, 2, 2, 1], [0, 0, 2, 2, 0, 3, 2, 0, 1, 2, 2, 2], [0, 0, 3, 2, 0, 2, 2, 0, 2, 2, 1, 2], [0, 0, 2, 1, 0, 2, 3, 0, 2, 2, 2, 2], [0, 0, 2, 2, 0, 1, 2, 0, 2, 3, 2, 2], [0, 0, 1, 2, 0, 2, 2, 0, 2, 2, 2, 3], [0, 0, 2, 2, 0, 2, 1, 0, 3, 2, 2, 2]] \$$$

$$[0, 0, y_5, y_4, 0, y_3, y_1, y_2, y_9, y_8, y_7, y_6]$$

376 . Coloring, {3, 4, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, B, C, C, C, 4, 5]

B: [6, 8, 7, 6, 3, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{4, 7, 11\}\}$ order: 3

See Matrix

$\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 0, 3, 0, 0, 3, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 0, 3, 0, 0, 3, 2, 4]] \$$

$[0, 0, 0, 10y_1 - 16y_3 + 4y_4, 2y_1, 0, 4y_1 - 7y_3 + 3y_4, 16y_1 - 2y_2 - 27y_3 + 7y_4, 0, 2y_2, 2y_3, 2y_4]$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{1, 2, 3, 6, 7, 8, 10, 11\}\}$ order: 8

See Matrix

$\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 2, 2, 0], [2, 2, 2, 0, 0, 2, 2, 2, 0, 1, 3, 0], [3, 1, 2, 0, 0, 2, 2, 2, 0, 2, 2, 0], [2, 2, 2, 0, 0, 3, 2, 1, 0, 2, 2, 0], [2, 2, 3, 0, 0, 2, 2, 2, 0, 2, 1, 0], [1, 2, 2, 0, 0, 2, 3, 2, 0, 2, 2, 0], [2, 2, 2, 0, 0, 1, 2, 2, 0, 3, 2, 0], [2, 3, 1, 0, 0, 2, 2, 2, 0, 2, 2, 0], [2, 2, 2, 0, 0, 2, 1, 3, 0, 2, 2, 0]] \$$

$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, y_7, y_8, y_9, 0]$

377 . Coloring, $\{3, 4, 9, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, B, C, C, C, 1, 9]

B: [6, 8, 7, 6, 3, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}, \{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 2, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 5], [3, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 3, 0, 5, 0, 2, 4]] \$$

$$[7 y_1, 0, 0, 0, 0, 0, 7 y_2, 7 y_3, 9 y_1 + 9 y_2 - 21 y_3 + 9 y_4 - 7 y_5, 14 y_3, 7 y_4, 7 y_5]$$

$$p = -s^2 - s^3 + s^5 + s^6 \quad p = s^2 - s^4 - s^5 + s^7$$

Omega Rank for B : cycles: $\{\{2, 3, 4, 6, 7, 8, 10, 11\}\}$ order: 8

See Matrix

$\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 2, 2, 0], [0, 2, 4, 2, 0, 2, 2, 2, 0, 1, 1, 0], [0, 1, 2, 1, 0, 2, 4, 2, 0, 2, 2, 0], [0, 2, 2, 2, 0, 1, 2, 1, 0, 4, 2, 0], [0, 4, 1, 2, 0, 2, 2, 2, 0, 2, 1, 0], [0, 2, 2, 1, 0, 2, 1, 4, 0, 2, 2, 0], [0, 2, 2, 2, 0, 1, 2, 2, 0, 1, 4, 0], [0, 1, 1, 4, 0, 2, 2, 2, 0, 2, 2, 0], [0, 2, 2, 2, 0, 4, 1, 1, 0, 2, 2, 0]] \$$

$$[0, y_1, y_2, y_3, y_4, y_5, y_8, y_6, 0, y_7, y_9, 0]$$

378 . Coloring, $\{3, 4, 10, 11\}$

R: [7, 7, 8, 7, A, A, B, C, B, 2, 4, 5]

B: [6, 8, 7, 6, 3, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 4, 0, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 5, 0, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 5, 0, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$$[0, y_5, 0, y_4, y_3, 0, y_2, y_1, 0, y_8, y_7, y_6]$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 2, 1, 3], [1, 0, 2, 0, 0, 2, 2, 0, 3, 1, 1, 4], [1, 0, 2, 0, 0, 1, 2, 0, 4, 2, 0, 4], [0, 0, 1, 0, 0, 1, 2, 0, 4, 2, 0, 6], [0, 0, 1, 0, 0, 0, 1, 0, 6, 2, 0, 6], [0, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[y_5, 0, y_4, 0, 0, y_3, y_1, y_2, y_7, y_8, y_9, y_6]$$

379 . Coloring, {3, 4, 10, 12}

R: [7, 7, 8, 7, A, A, B, C, B, 2, 1, 9]

B: [6, 8, 7, 6, 3, 3, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 4, 0, 1, 0, 5, 1], [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[y_1, 2 y_4, 0, 0, 0, 0, y_2, y_5, y_6, 2 y_5, y_3, y_4]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 2, 1, 3], [0, 0, 4, 1, 3, 2, 2, 0, 0, 1, 1, 2], [0, 0, 5, 1, 2, 1, 4, 0, 0, 2, 0, 1], [0, 0, 3, 0, 1, 1, 5, 0, 0, 4, 0, 2], [0, 0, 2, 0, 2, 0, 3, 0, 0, 5, 0, 4], [0, 0, 2, 0, 4, 0, 2, 0, 0, 3, 0, 5], [0, 0, 4, 0, 5, 0, 2, 0, 0, 2, 0, 3], [0, 0, 5, 0, 3, 0, 4, 0, 0, 2, 0, 2], [0, 0, 3, 0, 2, 0, 5, 0, 0, 4, 0, 2]] \$$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

380 . Coloring, {3, 4, 11, 12}

R: [7, 7, 8, 7, A, A, B, C, B, C, 4, 9]

B: [6, 8, 7, 6, 3, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	9 vs 10

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 0, 5, 3] , [0, 0, 0, 5, 0, 0, 3, 0, 3, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, 0, 0, y_1, 0, 0, y_2, y_3, y_4, 2y_3, y_5, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 2, 3, 6, 7, 8, 10, 11}} order: 8

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 2, 1, 1] , [1, 2, 4, 0, 1, 2, 2, 2, 0, 1, 1, 0] , [1, 1, 3, 0, 0, 1, 4, 2, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 1, 3, 1, 0, 4, 2, 0] , [2, 4, 1, 0, 0, 2, 1, 2, 0, 3, 1, 0] , [1, 3, 2, 0, 0, 2, 1, 4, 0, 1, 2, 0] , [2, 1, 2, 0, 0, 1, 2, 3, 0, 1, 4, 0] , [4, 1, 1, 0, 0, 2, 2, 1, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 4, 1, 1, 0, 2, 1, 0] , [1, 2, 4, 0, 0, 3, 2, 2, 0, 1, 1, 0]] \$

$$[y_1 - y_2 + y_3 + y_4 + y_5 - y_6 - y_7 + y_8 - y_9, y_1, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9 - s^{10}$$

381 . Coloring, {3, 5, 6, 7}

R: [7, 7, 8, 6, 3, 3, A, C, B, C, 1, 5]
B: [6, 8, 7, 7, A, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 1, 3] , [1, 0, 3, 0, 3, 0, 2, 2, 0, 2, 0, 3] , [0, 0, 3, 0, 3, 0, 1, 3, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 3, 0, 1, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4]] \$

$$[y_1 - y_2 + y_3 - y_4 - y_5 + y_6, 0, y_1, 0, y_2, y_7, y_3, y_4, 0, y_5, y_7, y_6]$$

$$p = s^5 - s^9 \quad p' = s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 0, 2, 2, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 0, 3, 2, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 3, 1, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1]] \$

$$[0, -3y_1 - 3y_2 - 3y_3 - 3y_4 + 13y_5 - 3y_6 - 3y_7 + 13y_8, 0, 3y_1, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

382 . Coloring, {3, 5, 6, 8}

R: [7, 7, 8, 6, 3, 3, B, B, B, C, 1, 5]
B: [6, 8, 7, 7, A, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 4, 2], [4, 0, 3, 0, 2, 0, 2, 2, 0, 0, 3, 0], [3, 0, 2, 0, 0, 0, 4, 3, 0, 0, 4, 0], [4, 0, 0, 0, 0, 3, 2, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0]] \$$

$[y_1, 0, y_5, 0, y_3, y_2, y_4, y_7, 0, 0, y_6, 2 y_2]$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6
See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 2, 2, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 0, 4, 3, 2, 0, 4], [0, 2, 0, 0, 0, 0, 3, 4, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$[0, y_1, 0, 2 y_2, 0, y_2, y_3, y_4, y_5, y_6, 0, y_7]$

$$p = -s^6 + s^8$$

383 . Coloring, $\{3, 5, 6, 9\}$

R: [7, 7, 8, 6, 3, 3, B, C, C, C, 1, 5]

B: [6, 8, 7, 7, A, A, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{1, 7, 11\}\}$ order: 12

See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 2, 4], [2, 0, 3, 0, 4, 0, 2, 2, 0, 0, 2, 1], [2, 0, 4, 0, 1, 0, 2, 3, 0, 0, 2, 2], [2, 0, 1, 0, 2, 0, 2, 4, 0, 0, 2, 3], [2, 0, 2, 0, 3, 0, 2, 1, 0, 0, 2, 4], [2, 0, 3, 0, 4, 0, 2, 2, 0, 0, 2, 1], [2, 0, 4, 0, 1, 0, 2, 3, 0, 0, 2, 2], [2, 0, 1, 0, 2, 0, 2, 4, 0, 0, 2, 3]] \$$

$$[y_5, 0, y_4, 0, y_3, y_2, y_5, y_1, 0, 0, y_5, 5y_5 - y_4 - y_3 - y_2 - y_1]$$

$$p' = -s^2 + s^6 \quad p = -s^2 + s^6 \quad p' = s^3 - s^7$$

Omega Rank for B : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 0, 2, 4, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 3, 3, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 0, 4, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 3, 3, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 2, 0, 3, 3, 0]] \$$

$$[0, y_1, 0, y_2, 0, y_7, y_3, y_4, 2y_7, y_5, y_6, 0]$$

$$p = -s^2 + s^8$$

384 . Coloring, $\{3, 5, 6, 10\}$

R: $[7, 7, 8, 6, 3, 3, B, C, B, 2, 1, 5]$

B: $[6, 8, 7, 7, A, A, A, B, C, C, 4, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{1, 7, 11\}\}$ order: 12

See Matrix

$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 3, 1], [3, 0, 3, 0, 1, 0, 4, 2, 0, 0, 2, 1], [2, 0, 1, 0, 1, 0, 3, 3, 0, 0, 4, 2], [4, 0, 1, 0, 2, 0, 2, 1, 0, 0, 3, 3], [3, 0, 2, 0, 3, 0, 4, 1, 0, 0, 2, 1], [2, 0, 3, 0, 1, 0, 3, 2, 0, 0, 4, 1], [4, 0, 1, 0, 1, 0, 2, 3, 0, 0, 3, 2], [3, 0, 1, 0, 2, 0, 4, 1, 0, 0, 2, 3], [2, 0, 2, 0, 3, 0, 3, 1, 0, 0, 4, 1]] \$$

$$[5 y_7, -14 y_7 + 18 y_6 + 18 y_5 - 14 y_4 + 18 y_3 - 14 y_2 + 18 y_1, 5 y_6, 0, 5 y_5, -7 y_7 + 9 y_6 + 9 y_5 - 7 y_4 + 9 y_3 - 7 y_2 + 9 y_1, 5 y_4, 5 y_3, 0, 0, 5 y_2, 5 y_1]$$

$$p = -s^2 - s^3 - s^4 + s^6 + s^7 + s^8 \quad p' = -s^2 - s^3 - s^4 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 1, 3], [0, 0, 0, 1, 0, 0, 2, 0, 3, 3, 1, 6], [0, 0, 0, 1, 0, 0, 1, 0, 6, 2, 0, 6], [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[0, 0, 0, y_1, 0, y_3, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = s^6 - s^8$$

385 . Coloring, {3, 5, 6, 11}

R: [7, 7, 8, 6, 3, 3, B, C, B, C, 4, 5]

B: [6, 8, 7, 7, A, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 3, 3], [0, 0, 3, 3, 3, 2, 0, 2, 0, 0, 2, 1], [0, 0, 5, 2, 1, 3, 0, 3, 0, 0, 0, 2], [0, 0, 4, 0, 2, 2, 0, 5, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3]] \$$$

$$[0, 0, y_8, y_6, y_7, y_5, y_4, y_3, 0, 0, y_1, y_2]$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 1, 1], [1, 4, 0, 0, 0, 2, 0, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 1, 0, 4, 2, 2, 2, 1], [2, 2, 0, 0, 0, 1, 0, 3, 1, 1, 4, 2], [4, 1, 0, 0, 0, 2, 0, 2, 2, 1, 3, 1], [3, 1, 0, 0, 0, 4, 0, 1, 1, 2, 2, 2], [2, 2, 0, 0, 0, 3,$$

0, 1, 2, 4, 1, 1], [1, 4, 0, 0, 0, 2, 0, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 1, 0, 4, 2, 2, 2, 1]] \$

$[-3y_3 + 8y_4 - 3y_5 + 5y_7, -3y_1 - 3y_2 + 5y_4 - 3y_6 + 8y_7, 0, 0, 0, 3y_1, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

386 . Coloring, {3, 5, 6, 12}

R: [7, 7, 8, 6, 3, 3, B, C, B, C, 1, 9]

B: [6, 8, 7, 7, A, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 3, 3], [3, 0, 1, 0, 0, 0, 2, 2, 3, 0, 4, 1], [4, 0, 0, 0, 0, 0, 3, 1, 1, 0, 5, 2], [5, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 0, 0], [6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$[y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8]$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 1, 1], [0, 4, 0, 1, 1, 0, 2, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 1, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 1, 5, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 2, 3, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 4, 1, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 5, 1, 0, 4, 1, 0], [0, 4, 0, 1, 0, 0, 3, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 1, 4, 0, 3, 2, 0]] \$

$[0, y_1 - y_2 - y_3 + y_4 + y_5 - y_6, 0, y_1, y_2, y_7, y_3, y_4, 0, y_5, y_6, y_7]$

$$p = -s^3 + s^9 \quad p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

387 . Coloring, {3, 5, 7, 8}

R: [7, 7, 8, 6, 3, A, A, B, B, C, 1, 5]

B: [6, 8, 7, 7, A, 3, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 10

Omega Rank for R : cycles: {{1, 3, 5, 7, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 0, 2, 2, 0, 2, 1, 3] , [1, 0, 3, 0, 3, 0, 1, 2, 0, 2, 2, 2] , [2, 0, 3, 0, 2, 0, 1, 3, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 3, 0, 1, 3, 1] , [3, 0, 2, 0, 1, 0, 2, 2, 0, 2, 3, 1] , [3, 0, 1, 0, 1, 0, 3, 2, 0, 2, 2, 2] , [2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 2, 2]] \$

$$[y_6, 0, y_5, 0, y_4, y_3, y_6 - y_5 + y_4 - y_3, y_2, 0, y_6 + y_4 - y_2, y_1, y_6 + y_4 - y_1]$$

$$p' = -s^3 + s^4 - s^7 + s^8 \quad p' = s^2 - s^3 + s^6 - s^7 \quad p = s^2 - s^4 + s^6 - s^8$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 2, 2] , [0, 1, 1, 2, 0, 0, 3, 2, 2, 0, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 1, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4]] \$

$$[0, y_4 + y_5 - y_2 + y_3, y_4 + y_5 - y_2, y_4 + y_5 + y_2 + y_3 - y_6 - y_1, 0, y_3, y_6, y_4, y_5, y_3, y_1, y_2]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p' = -s^5 + s^8 \quad p = -s^4 + s^{10}$$

388 . Coloring, {3, 5, 7, 9}

R: [7, 7, 8, 6, 3, A, A, C, C, C, 1, 5]

B: [6, 8, 7, 7, A, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	6 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 2, 1, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 0, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$$

$$[2y_1, 0, -y_1 + y_3 + y_4 - y_2, 0, -2y_1 + y_3 + y_4, y_1, y_2, y_3, 0, y_4, 0, y_3 + y_4]$$

$$p' = -s^4 + s^5 \quad p = s^4 - s^5 \quad p' = -s^4 + s^6 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 4, 0], [0, 1, 1, 4, 0, 0, 3, 2, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 1, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$$[0, y_2 + y_6, y_2, y_1, 0, y_6, y_3, y_4, 2y_6, y_6, y_5, 0]$$

$$p' = -s^4 + s^7 \quad p' = -s^5 + s^8 \quad p = s^4 - s^7$$

389 . Coloring, {3, 5, 7, 10}

R: [7, 7, 8, 6, 3, A, A, C, B, 2, 1, 5]

B: [6, 8, 7, 7, A, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	5 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{2, 7, 10\}\}$ order: 12

See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1], [1, 3, 2, 0, 1, 0, 4, 1, 0, 3, 0, 1], [0, 3, 1, 0, 1, 0, 4, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 1, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 4, 1, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 4, 1, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 4, 1, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 4, 1, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 3, 1, 0, 4, 0, 1]] \$$

$[-5 y_1 + 11 y_2 + 11 y_3 - 10 y_7 - 5 y_4 + 11 y_5 - 5 y_6 + 11 y_8, 5 y_1, 5 y_2, 0, 5 y_3, 5 y_7, 5 y_4, 5 y_5, 0, 5 y_6, 5 y_7, 5 y_8]$

$p = s^3 - s^6 - s^7 + s^{10} \quad p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9$

Omega Rank for B : cycles: $\{\{9, 12\}, \{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3], [0, 0, 1, 3, 0, 0, 3, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3]] \$$

$[0, 0, -3 y_1 - 3 y_2 - 6 y_3 + 10 y_5 - 3 y_4, 3 y_1, 0, 3 y_3, 3 y_2, 3 y_3, -3 y_3 + 3 y_5, 3 y_3, 3 y_4, 3 y_5]$

$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p = -s^3 + s^9$

390 . Coloring, $\{3, 5, 7, 11\}$

R: [7, 7, 8, 6, 3, A, A, C, B, C, 4, 5]

B: [6, 8, 7, 7, A, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	9 vs 10

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 0, 1, 0, 3, 0, 4], [0, 0, 3, 0, 4, 1, 0, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 1, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$$

$$[0, 0, -y_4 + y_5 - y_2, -y_1 + y_4 + y_5, y_1, y_2, 2y_4, -y_3 + y_4 + y_5, 0, y_3, y_4, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^8 \quad p = -s^5 + s^9 \quad p = -s^5 + s^7$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1], [3, 1, 1, 0, 0, 2, 1, 2, 1, 0, 3, 2], [3, 0, 2, 0, 0, 3, 1, 1, 2, 0, 3, 1], [3, 0, 3, 0, 0, 3, 2, 0, 1, 0, 2, 2], [2, 0, 3, 0, 0, 3, 3, 0, 2, 0, 2, 1], [2, 0, 3, 0, 0, 2, 3, 0, 1, 0, 3, 2], [3, 0, 2, 0, 0, 2, 3, 0, 2, 0, 3, 1], [3, 0, 2, 0, 0, 3, 2, 0, 1, 0, 3, 2], [3, 0, 3, 0, 0, 3, 2, 0, 2, 0, 2, 1], [2, 0, 3, 0, 0, 3, 3, 0, 1, 0, 2, 2]] \$$$

$$[3y_9, 3y_8, 3y_7, 0, 0, 3y_6, 3y_5, 3y_4, 3y_3, 3y_2, -3y_9 - 3y_8 - 3y_7 - 3y_6 - 3y_5 - 3y_4 + 13y_3 - 3y_2 + 13y_1, 3y_1]$$

$$p = -s^4 - s^5 + s^9 + s^{10}$$

391 . Coloring, $\{3, 5, 7, 12\}$

R: [7, 7, 8, 6, 3, A, A, C, B, C, 1, 9]

B: [6, 8, 7, 7, A, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3], [1, 0, 0, 0, 0, 0, 2, 1, 3, 3, 2, 4], [2, 0, 0, 0, 0, 0, 1, 0, 4, 2, 3, 4], [3, 0, 0, 0, 0, 2, 0, 4, 1, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 2, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 3, 2, 2], [2, 0, 0, 0, 0, 0, 4, 0, 2, 4, 1, 3], [1, 0, 0, 0, 0, 0, 2, 0, 3, 4, 2, 4], [2, 0, 0, 0, 0, 0, 1, 0, 4, 2, 3, 4]] \$$$

$$[2y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, 0, 0, y_1, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1] , [0, 1, 1, 3, 1, 0, 3, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 1, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 3, 2, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, y_1, y_3 - y_8, y_2, y_3, y_8, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^6 + s^9 \quad p' = -s^6 + s^9$$

392 . Coloring, {3, 5, 8, 9}

R: [7, 7, 8, 6, 3, A, B, B, C, C, 1, 5]

B: [6, 8, 7, 7, A, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	10 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 9
See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 0, 2, 1, 0, 1, 3, 1] , [3, 0, 3, 0, 1, 0, 3, 2, 0, 0, 3, 1] , [3, 0, 1, 0, 1, 0, 3, 3, 0, 0, 5, 0] , [5, 0, 1, 0, 0, 0, 3, 1, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 1, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$$[y_1, 0, y_2, 0, y_7, y_3, y_4, y_5, 0, y_6, y_9, y_8]$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 9, 10, 11, 12}} order: 8
See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1] , [0, 3, 1, 1, 0, 0, 3, 2, 1, 2, 2, 1] , [0, 2, 0, 2, 0, 0, 2, 3, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 0, 2, 2, 2, 2, 1, 3] , [0, 2, 0, 1, 0, 0, 1, 3, 3, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 1, 2, 2, 1, 3, 3] , [0, 1, 0, 3, 0, 0, 2, 2, 3, 1, 2, 2] , [0, 1, 0, 2, 0, 0, 3, 1, 2, 2, 3, 2] , [0, 2, 0, 3, 0, 0, 2, 1, 2, 3, 2, 1] , [0, 3, 0, 2, 0, 0, 3, 2, 1, 2, 2, 1]] \$

$$[0, y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, y_8, y_9, y_{10}]$$

393 . Coloring, {3, 5, 8, 10}

R: [7, 7, 8, 6, 3, A, B, B, B, 2, 1, 5]

B: [6, 8, 7, 7, A, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 4, 0] , [4, 1, 2, 0, 0, 0, 4, 1, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 0, 5, 2, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0]] \$

$$[y_2, y_1, -5y_6 + 4y_1 - 2y_4, 0, 2y_6, y_6, y_5, y_4, 0, 2y_1 - 2y_6 - y_4, y_3, 0]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 0, 4] , [0, 0, 1, 0, 0, 0, 3, 0, 4, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, 0, y_6, 2y_5, 0, y_5, y_4, y_5, y_3, y_2, 0, y_1]$$

$$p' = s^5 - s^7 \quad p = s^5 - s^7$$

394 . Coloring, {3, 5, 8, 11}

R: [7, 7, 8, 6, 3, A, B, B, B, C, 4, 5]

B: [6, 8, 7, 7, A, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: {{3, 4, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 2, 0, 1, 0, 1, 3, 1] , [0, 0, 2, 3, 1, 4, 0, 2, 0, 2, 1, 1] , [0, 0, 1, 1, 1, 3, 0, 2, 0, 4, 2, 2] , [0, 0, 1, 2, 2, 1, 0, 1, 0, 3, 2, 4] , [0, 0, 2, 2, 4, 2, 0, 1, 0, 1, 1, 3] , [0, 0, 4, 1, 3, 2, 0, 2, 0, 2, 1, 1] , [0, 0, 3, 1, 1, 1, 0, 4, 0, 2, 2, 2] , [0, 0, 1, 2, 2, 1, 0, 3, 0, 1, 4, 2]] \$

[0, 0, y_3 , $y_3 - y_1 + y_2 - y_7 - y_8 - y_6 + y_5 + y_4$, y_1 , y_2 , y_7 , y_8 , 0, y_6 , y_5 , y_4]

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 0, 2] , [0, 3, 1, 0, 0, 2, 1, 2, 2, 2, 0, 3] , [0, 2, 2, 0, 0, 0, 1, 3, 3, 1, 0, 4] , [0, 1, 0, 0, 0, 2, 2, 4, 1, 0, 6] , [0, 1, 0, 0, 0, 0, 0, 1, 6, 2, 0, 6] , [0, 2, 0, 0, 0, 0, 0, 1, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[y_1 , y_2 , y_3 , 0, 0, y_8 , y_9 , y_4 , y_5 , y_6 , 0, y_7]

395 . Coloring, {3, 5, 8, 12}

R: [7, 7, 8, 6, 3, A, B, B, B, C, 1, 9]

B: [6, 8, 7, 7, A, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 1, 2, 1, 5, 1] , [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$[y_1, 0, y_7, 0, 0, y_7, y_6, y_5, y_4, y_5, y_3, y_2]$

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 3, 2, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 1, 3, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 2, 0, 3, 0, 5] , [0, 3, 0, 0, 5, 0, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 4, 0, 2, 0, 3]] \$

$[0, y_7, y_4, 2y_6, y_5, y_6, y_1, y_2, 0, y_3, 0, y_8]$

$$p = -s^4 + s^9$$

396 . Coloring, {3, 5, 9, 10}

R: [7, 7, 8, 6, 3, A, B, C, C, 2, 1, 5]

B: [6, 8, 7, 7, A, 3, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	8 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}, {1, 7, 11}} order: 12

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 0, 4, 1, 0, 1, 2, 1] , [2, 1, 2, 0, 1, 0, 3, 2, 0, 0, 4, 1] , [4, 0, 1, 0, 1, 0, 3, 2, 0, 0, 3, 2] , [3, 0, 1, 0, 2, 0, 4, 1, 0, 0, 3, 2] , [3, 0, 2, 0, 2, 0, 3, 1, 0, 0, 4, 1] , [4, 0, 2, 0, 1, 0, 3, 2, 0, 0, 3, 1] , [3, 0, 1, 0, 1, 0, 4, 2, 0, 0, 3, 2] , [3, 0, 1, 0, 2, 0, 3, 1, 0, 0, 4, 2] , [4, 0, 2, 0, 2, 0, 3, 1, 0, 0, 3, 1]] \$

$$[-3 y_1 + 10 y_8 - 3 y_7 - 3 y_5 + 10 y_6 - 3 y_3 - 3 y_4, 3 y_1, 3 y_8 + 3 y_6 - 3 y_2, 0, 3 y_8, 3 y_7, 3 y_5, 3 y_6, 0, 3 y_3, 3 y_4, 3 y_2]$$

$$p' = -s^4 - s^6 + s^7 + s^9 \quad p = s^4 + s^6 - s^7 - s^9$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 2, 2], [0, 0, 1, 2, 0, 0, 3, 0, 2, 2, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 3, 2, 2], [0, 0, 0, 2, 0, 0, 3, 0, 2, 3, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 3, 2, 3], [0, 0, 0, 2, 0, 0, 3, 0, 3, 2, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 3, 3, 2], [0, 0, 0, 3, 0, 0, 3, 0, 2, 2, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 3, 2, 2]] \$$$

$$[0, 0, y_2, y_1, 0, y_4, y_3, y_4, y_7, y_8, y_6, y_5]$$

$$p = -s^3 + s^9$$

397 . Coloring, {3, 5, 9, 11}

R: [7, 7, 8, 6, 3, A, B, C, C, C, 4, 5]

B: [6, 8, 7, 7, A, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 2, 4], [0, 0, 2, 2, 4, 2, 0, 1, 0, 1, 2, 2], [0, 0, 4, 2, 2, 2, 0, 2, 0, 2, 0, 2], [0, 0, 2, 0, 2, 2, 0, 4, 0, 2, 0, 4], [0, 0, 2, 0, 4, 0, 0, 2, 0, 2, 0, 6], [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6]] \$$$

$$[0, 0, y_2, y_2 - y_1 + y_4 - y_5 - y_6 - y_3 + y_7 + y_8, y_1, y_4, y_5, y_6, 0, y_3, y_7, y_8]$$

$$p = s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{1, 2, 3, 6, 7, 8, 10, 11}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 2, 0] , [2, 3, 1, 0, 0, 2, 1, 2, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 2, 1, 3, 0, 1, 2, 0] , [2, 1, 2, 0, 0, 3, 2, 2, 0, 1, 3, 0] , [3, 1, 3, 0, 0, 2, 2, 1, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 3, 3, 1, 0, 2, 1, 0] , [1, 2, 3, 0, 0, 2, 2, 0, 3, 1, 0] , [1, 3, 2, 0, 0, 1, 3, 2, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 1, 2, 3, 0, 3, 2, 0]] \$

$$[y_2, y_3, y_1, 0, 0, y_6, y_4, y_5, y_9, y_7, y_8, 0]$$

398 . Coloring, {3, 5, 9, 12}

R: [7, 7, 8, 6, 3, A, B, C, C, C, 1, 9]

B: [6, 8, 7, 7, A, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 1, 4, 1, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6] , [2, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6] , [2, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6] , [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6]] \$

$$[y_4, 0, y_1, 0, 0, y_1, y_4, y_3, 5y_4 - 2y_1 - 2y_3 - y_2, y_3, y_4, y_2]$$

$$p = -s^3 + s^5 \quad p' = -s^3 + s^5 \quad p = -s^3 + s^7 \quad p' = -s^3 + s^7 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 2, 0] , [0, 3, 1, 2, 0, 0, 3, 2, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 3, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 1, 4, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 2, 3, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 3, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 1, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 3, 2, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 3, 3, 0, 3, 2, 0]] \$

$$[0, y_3, y_1, y_2, 2y_4, y_4, y_5, y_6, 0, y_7, y_8, 0]$$

$$p = -s^3 + s^9$$

399 . Coloring, {3, 5, 10, 11}

R: [7, 7, 8, 6, 3, A, B, C, B, 2, 4, 5]

B: [6, 8, 7, 7, A, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	9 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 2, 1, 0, 1, 2, 1] , [0, 1, 1, 2, 1, 3, 1, 2, 0, 2, 2, 1] , [0, 2, 1, 2, 1, 2, 1, 1, 0, 3, 1, 2] , [0, 3, 1, 1, 2, 2, 2, 1, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 1, 3, 1, 0, 2, 2, 1] , [0, 2, 1, 2, 1, 1, 2, 2, 0, 1, 3, 1] , [0, 1, 1, 3, 1, 2, 2, 1, 0, 1, 2, 2] , [0, 1, 1, 2, 2, 3, 1, 1, 0, 2, 2, 1] , [0, 2, 2, 2, 1, 2, 1, 1, 0, 3, 1, 1]] \$

$[0, 3y_8, 3y_7, 3y_6, 3y_5, 3y_4, 3y_3, -8y_7 + 5y_6 - 3y_5 + 5y_3 + 5y_2 - 8y_1, 0, 3y_2, -3y_8 - 11y_7 + 8y_6 - 3y_4 + 8y_3 + 8y_2 - 11y_1, 3y_1]$

$p = -s - s^3 + s^7 + s^9 \quad p' = -s - s^3 + s^7 + s^9$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3] , [1, 0, 1, 0, 0, 2, 1, 0, 3, 2, 1, 5] , [1, 0, 2, 0, 0, 1, 1, 0, 5, 1, 0, 5] , [0, 0, 1, 0, 0, 1, 2, 0, 5, 1, 0, 6] , [0, 0, 1, 0, 0, 0, 1, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$[y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, y_9, y_7, y_8]$

400 . Coloring, {3, 5, 10, 12}

R: [7, 7, 8, 6, 3, A, B, C, B, 2, 1, 9]

B: [6, 8, 7, 7, A, 3, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$[[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 4, 1, 1, 1, 4, 1], [4, 1, 0, 0, 0, 0, 4, 0, 1, 0, 5, 1], [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]]$$

$[y_1, y_2 + y_7, y_2, 0, 0, y_2, y_3, y_5, y_4, y_5, y_6, y_7]$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8 \quad p'' = -s^6 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$[[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3], [0, 0, 1, 1, 3, 0, 3, 0, 0, 4, 1, 3], [0, 0, 0, 1, 3, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]]$$

$[0, 0, y_6, y_1, y_2, y_4, y_3, y_4, 0, y_5, y_6, y_7]$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

401 . Coloring, {3, 5, 11, 12}

R: [7, 7, 8, 6, 3, A, B, C, B, C, 4, 9]

B: [6, 8, 7, 7, A, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 10

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 1, 3, 1, 4, 2] , [0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 3, 2] , [0, 0, 0, 3, 0, 4, 0, 0, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 3, 0, 0, 2, 4, 2, 3] , [0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 4, 2] , [0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 3, 2]] \$

$[0, 0, y_2, y_1, 0, y_2 + y_1 + y_4 + y_3 + y_5 - y_7 - y_6, 2y_2, y_4, y_3, y_5, y_7, y_6]$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{1, 2, 3, 6, 7, 8, 10, 11}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1] , [1, 3, 1, 0, 1, 2, 1, 2, 0, 4, 1, 0] , [1, 4, 2, 0, 0, 1, 1, 3, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 1, 2, 4, 0, 1, 3, 0] , [3, 1, 1, 0, 0, 2, 1, 2, 0, 2, 4, 0] , [4, 2, 2, 0, 0, 3, 1, 1, 0, 1, 2, 0] , [2, 1, 3, 0, 0, 4, 2, 2, 0, 1, 1, 0] , [1, 1, 4, 0, 0, 2, 3, 1, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 1, 4, 1, 0, 3, 1, 0] , [1, 3, 1, 0, 0, 2, 2, 2, 0, 4, 1, 0]] \$

$[y_1, y_2, -y_1 + y_2 + y_4 + y_5 + y_3 - y_8 - y_9 + y_6 - y_7, 0, y_4, y_5, y_3, y_8, 0, y_9, y_6, y_7]$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

402 . Coloring, {3, 6, 7, 8}

R: [7, 7, 8, 6, A, 3, A, B, B, C, 1, 5]

B: [6, 8, 7, 7, 3, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 0, 2, 1, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 0, 2, 1, 0, 4, 1, 4] , [1, 0, 0, 0, 4, 0, 1, 0, 0, 5, 1, 4] , [1, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_8, 0, y_9, 0, y_1, y_2, y_3, y_4, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 2, 2] , [0, 1, 0, 2, 0, 0, 3, 2, 2, 1, 2, 3] , [0, 1, 0, 2, 0, 0, 2, 1, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 1, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 3, 5] , [0, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2, 4]] \$

$$[0, 2y_8, 7y_8 - 9y_7 - 9y_6 + 7y_5 + 7y_4 + 7y_3 - 9y_2 + 7y_1, 2y_7, 0, 7y_8 - 9y_7 - 9y_6 + 7y_5 + 7y_4 + 7y_3 - 9y_2 + 7y_1, 2y_6, 2y_5, 2y_4, 2y_3, 2y_2, 2y_1]$$

$$p' = s^5 + s^6 - s^8 - s^9 \quad p = s^5 - s^7 - s^8 + s^{10}$$

403 . Coloring, {3, 6, 7, 9}

R: [7, 7, 8, 6, A, 3, A, C, C, C, 1, 5]

B: [6, 8, 7, 7, 3, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 0, 2, 1, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 1, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4]] \$

$$[2y_1, 0, y_3, 0, y_2, y_1, 2y_3, y_6, 0, y_5, 0, y_4]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 4, 0], [0, 1, 0, 4, 0, 0, 3, 2, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 4, 1, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 1, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[0, y_1, y_3, y_2, 0, y_3, y_7, y_4, 2y_3, y_5, y_6, 0]$$

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

404 . Coloring, {3, 6, 7, 10}

R: [7, 7, 8, 6, A, 3, A, C, B, 2, 1, 5]

B: [6, 8, 7, 7, 3, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	4 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1], [1, 3, 1, 0, 1, 0, 4, 1, 0, 4, 0, 1], [0, 4, 0, 0, 1, 0, 4, 1, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 4, 0, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$$

$$[y_2, y_1, y_2 - y_7, 0, y_3, y_7, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p' = -s^6 + s^9 \quad p = -s^6 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 1, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 0, 3, 0, 0], [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4]] \$$$

$$[0, 0, 7y_4 - 3y_1 - 3y_2 - 3y_3, -4y_4 + 3y_1 + 3y_2 + 3y_3, 0, 7y_4 - 3y_1 - 3y_2 - 3y_3, -4y_4 + 3y_1 + 3y_2 + 3y_3, 7y_4 - 3y_1 - 3y_2 - 3y_3, 3y_1, 3y_2, 3y_4, 3y_3]$$

$$p' = s^5 - s^7 \quad p' = s^3 - s^7 \quad p' = s^4 - s^8 \quad p = s^3 - s^9 \quad p' = s^6 - s^8$$

405 . Coloring, {3, 6, 7, 11}

R: [7, 7, 8, 6, A, 3, A, C, B, C, 4, 5]

B: [6, 8, 7, 7, 3, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3], [0, 0, 1, 1, 3, 2, 0, 1, 0, 4, 0, 4], [0, 0, 2, 0, 4, 1, 0, 1, 0, 3, 0, 5], [0, 0, 1, 0, 5, 0, 0, 2, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 0, 1, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$$$

$$[0, 0, y_8, y_7, y_6, y_5, 2y_2, y_4, 0, y_3, y_2, y_1]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1], [3, 1, 0, 0, 0, 2, 1, 2, 1, 1, 3, 2], [3, 1, 0, 0, 0, 3, 0, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 3, 0, 1, 1, 3, 1, 2], [1, 3, 0, 0, 0, 3, 0, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 1, 0, 3, 1, 3, 2, 2], [2, 3, 0, 0, 0, 1, 0, 3, 2, 1, 3, 1], [3, 1, 0, 0, 0, 2, 0, 3, 1, 1, 3, 2], [3, 1, 0, 0, 0, 3, 0, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 3, 0, 1, 1, 3, 1, 2]] \$$$

$$[-3y_3 - 3y_4 + 5y_5 - 3y_7 + 8y_8, -3y_1 - 3y_2 + 8y_5 - 3y_6 + 5y_8, 3y_1, 0, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_7, 3y_6, 3y_8]$$

$$p = -s^3 + s^9 \quad p' = -s^3 + s^9$$

406 . Coloring, {3, 6, 7, 12}

R: [7, 7, 8, 6, A, 3, A, C, B, C, 1, 9]

B: [6, 8, 7, 7, 3, A, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 10

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3] , [1, 0, 1, 0, 0, 0, 2, 1, 3, 2, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 1, 4, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 3, 1, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 2, 3, 1] , [3, 0, 0, 0, 0, 0, 4, 0, 1, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 0, 4, 3, 3, 3]] \$

$$[y_1, 0, y_2, 0, 0, y_9, y_6, y_7, y_8, y_5, y_3, y_4]$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 0, 3, 2, 0, 1, 3, 0] , [0, 1, 1, 3, 0, 0, 5, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, y_1 + 2y_7 - y_5, y_1, y_2, y_7 + y_5, y_7, y_3, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8 \quad p' = -s^6 + s^9$$

407 . Coloring, {3, 6, 8, 9}

R: [7, 7, 8, 6, A, 3, B, B, C, C, 1, 5]

B: [6, 8, 7, 7, 3, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	9 vs 10

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3], [3, 0, 1, 0, 3, 0, 2, 1, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 3, 1, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 4, 3], [4, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 4, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 4, 3], [4, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 4, 0, 0, 3, 3, 2]] \$$

$[y_5, 0, y_4, 0, y_3, -6y_5 - 6y_4 + 5y_3 + 4y_2 + 4y_1 - y_6, y_2, y_1, 0, 5y_5 + 5y_4 - 4y_3 - 2y_2 - 2y_1, y_6, -8y_5 - 8y_4 + 6y_3 + 5y_2 + 5y_1]$

$$p' = -s^5 + s^8 \quad p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{2, 4, 7, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 3, 2, 1, 3, 2, 1], [0, 3, 0, 2, 0, 0, 1, 3, 1, 3, 1, 2], [0, 3, 0, 1, 0, 0, 2, 3, 2, 1, 1, 3], [0, 1, 0, 1, 0, 0, 1, 3, 3, 2, 2, 3], [0, 2, 0, 2, 0, 0, 1, 1, 3, 1, 3, 3], [0, 1, 0, 3, 0, 0, 2, 2, 3, 1, 3, 1], [0, 1, 0, 3, 0, 0, 3, 1, 1, 2, 3, 2], [0, 2, 0, 3, 0, 0, 3, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 3, 2, 1, 3, 2, 1]] \$$

$[0, y_1, y_4, y_2, 0, y_4, y_3, y_5, y_6, y_7, y_8, y_9]$

$$p = -s^2 + s^{10}$$

408 . Coloring, $\{3, 6, 8, 10\}$

R: $[7, 7, 8, 6, A, 3, B, B, B, 2, 1, 5]$

B: $[6, 8, 7, 7, 3, A, A, C, C, C, 4, 9]$

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	5 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 4, 0], [4, 1, 1, 0, 0, 0, 4, 1, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 5, 1, 0, 0, 5, 0], [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$$[y_1, y_2 - y_5 + 2y_4, y_2, 0, 4y_2 - 2y_5, 2y_2 - y_5, y_3, y_4, 0, y_5, y_6, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 4
See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 0, 4], [0, 0, 0, 0, 0, 0, 3, 0, 4, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$$[0, 0, y_5, 2y_5, 0, y_5, y_4, y_5, y_2, y_3, 0, y_1]$$

$$p = -s^4 + s^8 \quad p' = -s^4 + s^6 \quad p'' = -s^4 + s^6$$

409 . Coloring, $\{3, 6, 8, 11\}$

R: [7, 7, 8, 6, A, 3, B, B, B, C, 4, 5]

B: [6, 8, 7, 7, 3, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}, {5, 10, 12}}

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 4, 2] , [0, 0, 1, 4, 2, 2, 0, 1, 0, 2, 3, 1] , [0, 0, 2, 3, 1, 4, 0, 1, 0, 2, 1, 2] , [0, 0, 4, 1, 2, 3, 0, 2, 0, 1, 1, 2] , [0, 0, 3, 1, 2, 1, 0, 4, 0, 2, 2, 1] , [0, 0, 1, 2, 1, 1, 0, 3, 0, 2, 4, 2] , [0, 0, 1, 4, 2, 2, 0, 1, 0, 1, 3, 2] , [0, 0, 2, 3, 2, 4, 0, 1, 0, 2, 1, 1] , [0, 0, 4, 1, 1, 3, 0, 2, 0, 2, 1, 2]] \$

[0, 0, -5 y₆ + 11 y₄ - 5 y₅ - 5 y₃ - 5 y₂ + 11 y₁ - 5 y₇ + 11 y₈, 5 y₆, 5 y₄, 5 y₅, 5 y₃, 5 y₂, 0, 5 y₁, 5 y₇, 5 y₈]

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 2, 1, 2, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 0, 3, 3, 3, 0, 4] , [0, 3, 0, 0, 0, 0, 3, 4, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 3, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[2 y₁, y₇, y₁, 0, 0, -3 y₁ + 2 y₂, y₂, y₃, y₄, y₅, 0, y₆]

$$p' = -s^6 + s^8 \quad p = -s^6 + s^8$$

410 . Coloring, {3, 6, 8, 12}

R: [7, 7, 8, 6, A, 3, B, B, B, C, 1, 9]

B: [6, 8, 7, 7, 3, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 4, 2] , [4, 0, 1, 0, 0, 0, 2, 1, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 4, 1, 1, 0, 5, 0] , [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_1, 0, -y_4 + y_5, 0, 0, y_4, y_2, y_3 + y_4 - y_5, y_3, y_4, y_6, y_5]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 3, 2, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 2, 3, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 2, 3, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 1, 3, 0, 2, 0, 3], [0, 2, 3, 0, 3, 0, 2, 2, 0, 1, 0, 3], [0, 1, 3, 0, 3, 0, 3, 2, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 3, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 3, 2, 0, 3, 0, 1]] \$$$

$$[0, y_8, y_7, 2y_5, y_6, y_5, y_4, y_3, 0, y_2, 0, y_1]$$

$$p = s^2 - s^9$$

411 . Coloring, {3, 6, 9, 10}

R: [7, 7, 8, 6, A, 3, B, C, C, 2, 1, 5]

B: [6, 8, 7, 7, 3, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 9

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 2, 2], [2, 1, 1, 0, 2, 0, 4, 1, 0, 2, 2, 1], [2, 2, 0, 0, 1, 0, 3, 1, 0, 2, 4, 1], [4, 2, 0, 0, 1, 0, 4, 0, 0, 1, 3, 1], [3, 1, 0, 0, 1, 0, 6, 0, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 4, 0, 0, 1, 6, 0], [6, 1, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$$$

$$[y_2, y_1, y_6, 0, y_5, y_4, y_8, y_3, 0, y_7, y_{10}, y_9]$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 2, 2], [0, 0, 0, 2, 0, 0, 3, 0, 2, 3, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 3, 2, 3], [0, 0, 0, 2, 0, 0, 3, 0, 3, 2, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 3, 3, 2], [0, 0, 0, 3, 0, 0, 3, 0, 2, 2, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 0, 3, 0, 0]] \$$$

3, 0, 3, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 3, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 3, 2, 3]] \$

[0, 0, y₃, y₂, 0, y₃, y₁, y₃, y₇, y₅, y₆, y₄]

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

412 . Coloring, {3, 6, 9, 11}

R: [7, 7, 8, 6, A, 3, B, C, C, C, 4, 5]

B: [6, 8, 7, 7, 3, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 2, 4] , [0, 0, 1, 2, 4, 2, 0, 1, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 2, 0, 1, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 2, 0, 2, 0, 2, 0, 5] , [0, 0, 2, 0, 5, 0, 0, 2, 0, 3, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 2, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5]] \$

[0, 0, y₂, y₁, y₈, y₃, y₄, y₅, 0, y₆, y₇, y₉]

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 1, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 0, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 0, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 0, 3, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 0, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 0, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 0, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 0, 3, 0, 3, 2, 0]] \$

[y₁, y₂, y₃, 0, 0, y₄, y₅, y₆, 2y₃, y₇, y₈, 0]

$$p = -s^3 + s^9$$

413 . Coloring, {3, 6, 9, 12}

R: [7, 7, 8, 6, A, 3, B, C, C, C, 1, 9]

B: [6, 8, 7, 7, 3, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 2, 4] , [2, 0, 1, 0, 0, 0, 2, 1, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 1, 4, 0, 2, 5] , [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5] , [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5] , [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5] , [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5] , [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5]] \$

$$[2y_3, 0, 5y_3 - 2y_4, 0, 0, 2y_2, 2y_3, 5y_3 - 4y_2 - 2y_1, 2y_1, 2y_2, 2y_3, 2y_4]$$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6 \quad p = -s^4 + s^7 \quad p = -s^4 + s^8 \quad p = -s^4 + s^9$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 0, 3, 2, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 0, 4, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 1, 3, 0, 4, 3, 0] , [0, 4, 0, 3, 0, 0, 2, 3, 0, 1, 3, 0] , [0, 1, 0, 3, 0, 0, 3, 4, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 1, 0, 3, 4, 0] , [0, 3, 0, 4, 0, 0, 3, 2, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 0, 4, 3, 0, 3, 2, 0]] \$

$$[0, y_1, y_2, y_3, 2y_4, y_4, y_5, y_6, 0, y_7, y_8, 0]$$

$$p = -s^3 + s^9$$

414 . Coloring, {3, 6, 10, 11}

R: [7, 7, 8, 6, A, 3, B, C, B, 2, 4, 5]

B: [6, 8, 7, 7, 3, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{2, 3, 4, 5, 6, 7, 8, 10, 11, 12\}\}$ order: 10
See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1], [0, 1, 1, 3, 1, 2, 2, 1, 0, 2, 2, 1], [0, 2, 2, 2, 1, 3, 1, 1, 0, 1, 2, 1], [0, 1, 3, 2, 1, 2, 2, 0, 1, 1, 1], [0, 1, 2, 1, 1, 2, 1, 3, 0, 1, 2, 2], [0, 1, 2, 2, 2, 1, 1, 2, 0, 1, 1, 3], [0, 1, 1, 1, 3, 2, 1, 2, 0, 2, 1, 2], [0, 2, 2, 1, 2, 1, 1, 1, 0, 3, 1, 2], [0, 3, 1, 1, 2, 1, 2, 2, 0, 2, 1, 1], [0, 2, 1, 1, 1, 1, 3, 1, 0, 2, 2, 2]] \$$

$$[0, y_4, y_5, y_6, y_1, y_2, y_3, y_7, 0, y_8, y_9, y_{10}]$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3], [1, 0, 0, 0, 0, 2, 1, 0, 3, 3, 1, 5], [1, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 6], [0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 9, 0, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$$[y_1, 0, y_2, 0, 0, y_4, y_2 + y_6, y_2, y_3, y_5, y_6, y_7]$$

$$p = -s^6 + s^8 \quad p' = -s^6 + s^8$$

415 . Coloring, $\{3, 6, 10, 12\}$

R: [7, 7, 8, 6, A, 3, B, C, B, 2, 1, 9]

B: [6, 8, 7, 7, 3, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1] , [3, 1, 1, 0, 0, 0, 4, 1, 1, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 4, 1, 1, 0, 5, 1] , [5, 0, 0, 0, 0, 4, 0, 1, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_1, y_2 + y_6, y_2, 0, 0, y_6, y_4, y_3, y_8, y_6, y_5, y_7]$$

$$p = s^6 - s^9 \quad p' = -s^6 + s^9$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 0, 3, 0, 0, 3, 1, 3] , [0, 0, 3, 1, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3]] \$

$$[0, 0, y_8, y_7, y_6, y_5, y_4, y_5, 0, y_3, y_2, y_1]$$

$$p = s^4 - s^9$$

416 . Coloring, {3, 6, 11, 12}

R: [7, 7, 8, 6, A, 3, B, C, B, C, 4, 9]

B: [6, 8, 7, 7, 3, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 10

Omega Rank for R : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3] , [0, 0, 1, 3, 0, 2, 0, 1, 3, 0, 4, 2] , [0, 0, 2, 4, 0, 3, 0, 1, 2, 0, 3, 1] , [0, 0, 3, 3, 0, 4, 0, 2, 1, 0, 2, 1] , [0, 0, 4, 2, 0, 3, 0, 3, 1, 0, 1, 2] , [0, 0, 3, 1, 0, 2, 0, 4, 2, 0, 1, 3] , [0, 0, 2, 1, 0, 1, 0, 3, 3, 0, 2, 4] , [0, 0, 1, 2, 0, 1, 0, 2, 4, 0, 3, 3] , [0, 0, 1, 3, 0, 2, 0, 1, 3, 0, 4, 2]] \$

$$[0, 0, y_8, y_7, 0, y_6, 2y_3, y_4, y_5, y_3, y_2, y_1]$$

$$p = -s^2 + s^9$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1], [1, 3, 2, 0, 1, 2, 1, 2, 0, 3, 1, 0], [1, 3, 1, 0, 0, 1, 2, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 1, 1, 3, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 0, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 0, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 0, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 3, 0, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 0, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 0, 3, 0, 3, 3, 0], [3, 0]] \$$$

$$[y_1 - y_2 + y_3 + y_4 + y_5 - y_6 - y_7 + y_8 - y_9, y_1, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

$$p = -s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

417 . Coloring, {3, 7, 8, 9}

R: [7, 7, 8, 6, A, A, A, B, C, C, 1, 5]

B: [6, 8, 7, 7, 3, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 1, 3], [1, 0, 0, 0, 3, 0, 2, 0, 0, 5, 1, 4], [1, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$$

$$[y_1, 0, 0, 0, y_2, y_7, y_6, y_7, 0, y_3, y_4, y_5]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 3, 1] , [0, 0, 1, 3, 0, 0, 4, 2, 1, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, 2y_3, y_1, y_2, 0, y_3, y_4, 2y_1 - 3y_3, y_5, 0, y_6, y_7]$$

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

418 . Coloring, {3, 7, 8, 10}

R: [7, 7, 8, 6, A, A, A, B, B, 2, 1, 5]

B: [6, 8, 7, 7, 3, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 4, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

$$[y_1, y_2, 0, 0, 2y_5, y_5, y_3, y_5, 0, y_4, y_6, 0]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 2, 4] , [0, 0, 1, 2, 0, 0, 4, 0, 4, 0, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 0, 4, 4] , [0, 0, 0, 4, 0, 0, 2, 0, 4, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 2, 0, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 4, 0, 4, 0, 2, 3]] \$

$$[0, 0, 2y_6, 2y_5, 0, 7y_6 + 7y_5 + 7y_4 - 9y_3 + 7y_2 - 9y_1, 2y_4, 7y_6 + 7y_5 + 7y_4 - 9y_3 + 7y_2 - 9y_1, 2y_3, 0, 2y_2, 2y_1]$$

$$p' = s^3 + s^4 - s^6 - s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

419 . Coloring, {3, 7, 8, 11}

R: [7, 7, 8, 6, A, A, A, B, B, C, 4, 5]

B: [6, 8, 7, 7, 3, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 2, 0, 0, 0, 5, 1, 4] , [0, 0, 0, 1, 4, 2, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 1, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

$$[0, 0, 0, y_7, y_6, y_5, 2y_4, y_4, 0, y_3, y_2, y_1]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 7, 11}} order: 10

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 2, 2] , [2, 0, 1, 0, 0, 2, 2, 2, 2, 0, 2, 3] , [2, 0, 2, 0, 0, 2, 1, 0, 3, 0, 2, 4] , [2, 0, 2, 0, 0, 2, 2, 0, 4, 0, 1, 3] , [1, 0, 2, 0, 0, 2, 2, 0, 3, 0, 2, 4] , [2, 0, 2, 0, 0, 1, 2, 0, 4, 0, 2, 3] , [2, 0, 1, 0, 0, 2, 0, 3, 0, 2, 4] , [2, 0, 2, 0, 0, 2, 1, 0, 4, 0, 2, 3] , [2, 0, 2, 0, 0, 2, 2, 0, 3, 0, 1, 4]] \$

$$[9y_1 - 7y_2 - 7y_3 - 7y_4 + 9y_5 + 9y_6 - 7y_7 + 9y_8, 7y_1, 7y_2, 0, 0, 7y_3, 7y_4, 7y_5, 7y_6, 0, 7y_7, 7y_8]$$

$$p = s^3 + s^4 - s^8 - s^9$$

420 . Coloring, {3, 7, 8, 12}

R: [7, 7, 8, 6, A, A, A, B, B, C, 1, 9]

B: [6, 8, 7, 7, 3, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 0, 2, 3, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 2, 2, 3] , [2, 0, 0, 0, 0, 0, 3, 0, 3, 2, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 0, 2, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 2, 2, 3] , [2, 0, 0, 0, 0, 0, 3, 0, 3, 4, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 0, 2, 3, 3, 4]] \$

[$y_1, 0, 0, 0, 0, y_3, y_2, y_3, y_4, y_5, y_6, y_7$]

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 2, 2] , [0, 0, 3, 2, 2, 0, 4, 2, 0, 0, 2, 1] , [0, 0, 2, 2, 1, 0, 5, 0, 0, 0, 4, 2] , [0, 0, 1, 4, 2, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0]] \$

[$0, 2y_1, y_4, y_3, y_2, y_1, y_5, y_6, 0, 0, y_8, y_7$]

$$p = -s^6 + s^9$$

421 . Coloring, {3, 7, 9, 10}

R: [7, 7, 8, 6, A, A, A, C, C, 2, 1, 5]

B: [6, 8, 7, 7, 3, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	5 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6
See Matrix

$\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 4, 0, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$$[2y_4, y_2, 0, 0, y_1, y_4, y_3, y_4, 0, y_5, 0, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 3
See Matrix

$\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 4, 2], [0, 0, 1, 4, 0, 0, 4, 0, 2, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$$[0, 0, y_1, y_2, 0, y_4, y_3, y_4, 2y_1 - 2y_4, 0, y_5, 2y_4]$$

$$p' = -s^3 + s^6 \quad p' = s^4 - s^7 \quad p = -s^3 + s^6$$

422 . Coloring, {3, 7, 9, 11}

R: [7, 7, 8, 6, A, A, A, C, C, C, 4, 5]

B: [6, 8, 7, 7, 3, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

[0, 0, 0, 2 y₂, y₃, y₄, 2 y₂, y₂, 0, y₁, 0, y₅]

$$p = -s^3 + s^6 \quad p' = s^3 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 2, 2, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 1, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 5, 2, 0, 0, 0, 1, 0] , [1, 0, 5, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 1, 5, 0, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 4, 0, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 1, 0, 0, 0, 4, 0]] \$

[y₃, y₄, y₅, 0, 0, y₆, y₇, y₁, y₄, 0, y₂, 0]

$$p = -s^3 + s^8$$

423 . Coloring, {3, 7, 9, 12}

R: [7, 7, 8, 6, A, A, A, C, C, C, 1, 9]

B: [6, 8, 7, 7, 3, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 7	5 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 0, 4, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[2y_2, 0, 0, 0, 0, y_2, y_1, y_2, y_3, y_4, 0, y_5]$$

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 4, 0], [0, 0, 3, 4, 0, 0, 4, 2, 0, 0, 3, 0], [0, 0, 0, 3, 0, 0, 7, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 3, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 6, 0, 0, 0, 3, 0], [0, 0, 0, 3, 0, 0, 7, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 3, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 6, 0, 0, 0, 3, 0]] \$$$

$$[0, 4y_1 - 6y_4, y_1, y_2, 4y_1 - 6y_4, 2y_1 - 3y_4, y_3, y_4, 0, 0, y_5, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

424 . Coloring, {3, 7, 10, 11}

R: [7, 7, 8, 6, A, A, A, C, B, 2, 4, 5]

B: [6, 8, 7, 7, 3, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 1, 1], [0, 4, 0, 1, 1, 2, 2, 0, 0, 5, 0, 1], [0, 5, 0, 0, 1, 1, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[0, y_1, 0, y_5 + y_6, 2y_5 - y_6 + y_2, y_2, y_3, y_5, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 7, 11}} order: 10

See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 3, 3], [3, 0, 1, 0, 0, 2, 2, 0, 3, 0, 3, 2], [3, 0, 2, 0, 0, 3, 1, 0, 2, 0, 2, 3], [2, 0, 3, 0, 0, 3, 2, 0, 3, 0, 1, 2], [1, 0, 3, 0, 0, 2, 3, 0, 2, 0, 2, 3], [2, 0, 2, 0, 0, 1, 3, 0, 3, 0, 3, 2], [3, 0, 1, 0, 0, 2, 0, 2, 0, 3, 3], [3, 0, 2, 0, 0, 3, 1, 0, 3, 0, 2, 2]] \$$

$$[-5 y_1 - 5 y_4 - 5 y_5 - 5 y_6 + 11 y_2 - 5 y_3 + 11 y_7, 0, 5 y_1, 0, 0, 5 y_4, 5 y_5, 5 y_6, 5 y_2, 0, 5 y_3, 5 y_7]$$

$$p = s^2 + s^3 - s^7 - s^8$$

425 . Coloring, {3, 7, 10, 12}

R: [7, 7, 8, 6, A, A, A, C, B, 2, 1, 9]

B: [6, 8, 7, 7, 3, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 4, 0, 1, 3, 2, 1], [2, 3, 0, 0, 0, 0, 5, 0, 1, 4, 1, 0], [1, 4, 0, 0, 0, 0, 5, 0, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$$[y_1, y_2, 0, 0, 0, y_4, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p = s^6 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 3, 3], [0, 0, 3, 3, 3, 0, 4, 0, 0, 0, 3, 0], [0, 0, 3, 3, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$$

$$[0, 0, y_1, y_3, y_2, y_4, y_5, y_4, 0, 0, y_6, 3 y_4]$$

$$p' = s^4 - s^7 \quad p = -s^4 + s^7$$

426 . Coloring, {3, 7, 11, 12}

R: [7, 7, 8, 6, A, A, A, C, B, C, 4, 9]

B: [6, 8, 7, 7, 3, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 2, 5] , [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 5, 2] , [0, 0, 0, 5, 0, 3, 0, 0, 2, 2, 3, 1] , [0, 0, 0, 3, 0, 5, 0, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 3, 0, 0, 2, 5, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 2, 5]] \$

$$[0, 0, 0, y_3, 0, y_4, 2y_1, y_1, y_2, y_7, y_5, y_6]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 3, 1] , [3, 0, 3, 0, 1, 2, 2, 2, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 3, 3, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 3, 3, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 4, 3, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 3, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 3, 4, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 3, 3, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 3, 3, 0, 0, 0, 3, 0]] \$

$$[y_1, 2y_7, y_2, 0, y_3, y_4, y_5, 2y_3 - 3y_7, 0, 0, y_6, y_7]$$

$$p' = -s^3 + s^8 \quad p = -s^3 + s^8$$

427 . Coloring, {3, 8, 9, 10}

R: [7, 7, 8, 6, A, A, B, B, C, 2, 1, 5]

B: [6, 8, 7, 7, 3, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 4, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 5, 0, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

[$y_1, y_2, 0, 0, y_3, y_5, y_4, y_5, 0, y_6, y_7, y_5$]

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 1, 3] , [0, 0, 1, 1, 0, 0, 4, 0, 3, 2, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 4, 3, 2] , [0, 0, 0, 3, 0, 0, 2, 2, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 2, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 3, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 4, 0, 3, 2, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 4, 3, 2]] \$

[$0, 0, y_8, y_7, 0, y_6, y_5, y_6, y_4, y_3, y_1, y_2$]

$$p = s^3 - s^9$$

428 . Coloring, {3, 8, 9, 11}

R: [7, 7, 8, 6, A, A, B, B, C, C, 4, 5]

B: [6, 8, 7, 7, 3, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 2, 0, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 3, 0, 0, 0, 5, 0, 3] , [0, 0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

[0, 0, 0, y₁, y₂, y₃, 2 y₄, y₄, 0, y₆, y₇, y₅]

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{1, 2, 3, 6, 7, 8, 9, 10, 11, 12}} order: 10

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 1, 1] , [1, 2, 1, 0, 0, 2, 2, 2, 1, 2, 2, 1] , [2, 2, 2, 0, 0, 1, 1, 2, 1, 2, 1, 2] , [1, 2, 1, 0, 0, 2, 2, 2, 1, 1, 2] , [1, 1, 2, 0, 0, 1, 1, 2, 2, 2, 2, 2] , [2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 2, 2] , [2, 1, 1, 0, 0, 2, 1, 2, 2, 2, 1] , [2, 2, 2, 0, 0, 2, 1, 1, 1, 1, 2, 2] , [2, 1, 2, 0, 0, 2, 2, 2, 2, 1, 1, 1] , [1, 1, 2, 0, 0, 2, 2, 1, 1, 2, 2, 2]] \$

[y₅, y₄, y₃, 0, 0, y₁, y₂, y₁₀, y₉, y₇, y₈, y₆]

429 . Coloring, {3, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s + s^2 + s^4 + 4s^5 - 8s^7 - 16s^8$$

R: [7, 7, 8, 6, A, A, B, B, C, C, 1, 9]

B: [6, 8, 7, 7, 3, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	9 vs 10

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 0, 3, 1, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4]] \$

$$[-y_3 + y_2 + 2y_5 - y_4, 0, 0, 0, 0, y_2, y_3, y_2, y_2 - y_1 + y_5, y_1, y_4, y_5]$$

$$p' = -s^4 + s^7 \quad p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

$$\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 1, 1], [0, 2, 3, 1, 1, 0, 4, 2, 0, 2, 0, 1], [0, 2, 1, 0, 1, 0, 4, 2, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 1, 2, 0, 4, 0, 2], [0, 4, 2, 0, 2, 0, 1, 4, 0, 1, 0, 2], [0, 1, 2, 0, 2, 0, 2, 4, 0, 1, 0, 4], [0, 1, 2, 0, 4, 0, 2, 1, 0, 2, 0, 4], [0, 2, 4, 0, 4, 0, 2, 1, 0, 2, 0, 1], [0, 2, 4, 0, 1, 0, 4, 2, 0, 2, 0, 1], [0, 2, 1, 0, 1, 0, 4, 2, 0, 4, 0, 2]] \$$$

$$[0, y_3, y_1, y_2, y_6, y_7, y_5, y_4, 0, y_9, y_7, y_8]$$

$$p = -s^3 + s^{10}$$

430 . Coloring, {3, 8, 10, 11}

R: [7, 7, 8, 6, A, A, B, B, B, 2, 4, 5]

B: [6, 8, 7, 7, 3, 3, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 2, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 4, 2, 0, 0, 2, 2, 0], [0, 2, 0, 2, 0, 3, 3, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 2, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 4, 0, 0, 2, 2, 0], [0, 2, 0, 2, 0, 3, 3, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 2, 0, 0, 3, 3, 0]] \$$$

$$[0, y_1, 0, y_2, 2y_5, y_3, y_4, y_5, 0, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 0, 4] , [0, 0, 1, 0, 0, 2, 2, 0, 4, 2, 0, 5] , [0, 0, 2, 0, 0, 0, 1, 0, 5, 2, 0, 6] , [0, 0, 0, 0, 0, 2, 0, 6, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[2 y_6, 0, y_1, 0, 0, y_2, y_5, y_6, y_3, y_4, 0, y_7]$$

$$p = s^6 - s^8$$

431 . Coloring, {3, 8, 10, 12}

R: [7, 7, 8, 6, A, A, B, B, B, 2, 1, 9]

B: [6, 8, 7, 7, 3, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 0, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[y_1, y_2, 0, 0, 0, y_4, y_3, y_4, 2 y_4, y_5, y_6, 0]$$

$$p = s^4 - s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 2] , [0, 0, 3, 0, 2, 0, 4, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 4, 0, 3, 0, 2, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 2]] \$

$$[0, 0, y_1, 2 y_4, y_2, y_4, y_3, y_4, 0, y_5, 0, y_6]$$

$$p' = -s^2 + s^7 \quad p = -s^2 + s^7$$

432 . Coloring, {3, 8, 11, 12}

R: [7, 7, 8, 6, A, A, B, B, B, C, 4, 9]

B: [6, 8, 7, 7, 3, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 1, 5, 2] , [0, 0, 0, 5, 0, 4, 0, 0, 2, 2, 2, 1] , [0, 0, 0, 2, 0, 5, 0, 0, 1, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 5, 1, 4] , [0, 0, 0, 1, 0, 2, 0, 0, 4, 2, 2, 5] , [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 1, 5, 2]] \$

[0, 0, 0, y_1 , 0, y_2 , 2 y_3 , y_3 , y_4 , y_5 , y_6 , y_7]

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 2, 2, 2, 0, 2, 0, 1] , [0, 2, 4, 0, 1, 0, 3, 2, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 4, 2, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 1, 2, 0, 4, 0, 2] , [0, 4, 2, 0, 2, 0, 2, 3, 0, 1, 0, 2] , [0, 1, 2, 0, 2, 0, 2, 4, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 2, 1, 0, 2, 0, 4] , [0, 2, 3, 0, 4, 0, 2, 2, 0, 2, 0, 1]] \$

[y_1 , y_7 , y_2 , 0, y_3 , y_4 , y_5 , y_6 , 0, y_8 , 0, y_9]

433 . Coloring, {3, 9, 10, 11}

R: [7, 7, 8, 6, A, A, B, C, C, 2, 4, 5]

B: [6, 8, 7, 7, 3, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 6, 7, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 2, 2], [0, 2, 0, 2, 2, 2, 2, 0, 0, 3, 2, 1], [0, 3, 0, 2, 1, 2, 2, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 3, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 4, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 2, 3, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 3, 2, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 4, 2, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 2, 0, 0, 4, 2, 0]] \$$

$$[0, y_2, 0, y_3, -y_2 + y_3 - y_4 + y_1 - y_7 + y_5 - y_6 + y_8, y_4, y_1, y_7, 0, y_5, y_6, y_8]$$

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 2, 2], [2, 0, 1, 0, 0, 2, 2, 0, 2, 2, 3, 2], [3, 0, 2, 0, 0, 2, 1, 0, 2, 2, 2, 2], [2, 0, 2, 0, 0, 3, 2, 0, 2, 1, 2, 2], [2, 0, 3, 0, 0, 2, 2, 0, 2, 2, 2, 1], [2, 0, 2, 0, 0, 2, 3, 0, 1, 2, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 3, 1, 2], [1, 0, 2, 0, 0, 2, 2, 0, 2, 2, 2, 3], [2, 0, 2, 0, 0, 1, 2, 0, 3, 2, 2, 2]] \$$

$$[y_5, 0, y_4, 0, 0, y_6, y_1, y_2, y_3, y_9, y_7, y_8]$$

434 . Coloring, $\{3, 9, 10, 12\}$

R: [7, 7, 8, 6, A, A, B, C, C, 2, 1, 9]

B: [6, 8, 7, 7, 3, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}, \{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 2, 2], [2, 2, 0, 0, 0, 0, 4, 0, 2, 1, 2, 3], [2, 1, 0, 0, 0, 0, 4, 0, 3, 0, 4, 2], [4, 0, 0, 0, 0, 3, 0, 2, 0, 4, 3], [4, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 4, 2]] \$$

$[-5y_1 + 6y_3 - 5y_2 + 11y_4 - 5y_5 - 5y_6 + 11y_7, 5y_1, 0, 0, 0, 5y_3, 5y_2, 5y_3, 5y_4, 5y_5, 5y_6, 5y_7]$

$$p = -s^4 - s^5 + s^7 + s^8 \quad p = s^4 - s^6 - s^7 + s^9$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 2, 2], [0, 0, 3, 2, 2, 0, 4, 0, 0, 2, 1, 2], [0, 0, 2, 1, 2, 0, 5, 0, 0, 4, 0, 2], [0, 0, 2, 0, 2, 0, 3, 0, 0, 5, 0, 4], [0, 0, 2, 0, 4, 0, 2, 0, 0, 3, 0, 5], [0, 0, 4, 0, 5, 0, 2, 0, 0, 2, 0, 3], [0, 0, 5, 0, 3, 0, 4, 0, 0, 2, 0, 2], [0, 0, 3, 0, 2, 0, 5, 0, 0, 4, 0, 2], [0, 0, 2, 0, 2, 0, 3, 0, 0, 5, 0, 4]] \$$

$[0, 0, y_3, y_1, y_2, y_5, y_4, y_5, 0, y_6, y_7, y_8]$

$$p = -s^4 + s^9$$

435 . Coloring, $\{3, 9, 11, 12\}$

R: $[7, 7, 8, 6, A, A, B, C, C, C, 4, 9]$

B: $[6, 8, 7, 7, 3, 3, A, B, B, 2, 1, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 2, 4], [0, 0, 0, 2, 0, 2, 0, 0, 4, 1, 2, 5], [0, 0, 0, 2, 0, 2, 0, 0, 5, 2, 0, 5], [0, 0, 0, 0, 2, 0, 0, 5, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$$[0, 0, 0, y_4, 0, y_3, 2 y_2, y_2, y_1, y_5, y_6, y_7]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{1, 2, 3, 6, 7, 8, 10, 11}} order: 8

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 2, 0], [2, 2, 3, 0, 0, 2, 2, 2, 0, 2, 1, 0], [1, 2, 2, 0, 0, 2, 3, 2, 0, 2, 2, 0], [2, 2, 2, 0, 0, 1, 2, 2, 0, 3, 2, 0], [2, 3, 1, 0, 0, 2, 2, 2, 0, 2, 2, 0], [2, 2, 2, 0, 0, 2, 1, 3, 0, 2, 2, 0], [2, 2, 2, 0, 0, 2, 2, 2, 0, 1, 3, 0], [3, 1, 2, 0, 0, 2, 2, 2, 0, 2, 2, 0], [2, 2, 2, 0, 0, 3, 2, 1, 0, 2, 2, 0]] \$$$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_9, y_8, 0]$$

436 . Coloring, {3, 10, 11, 12}

R: [7, 7, 8, 6, A, A, B, C, B, 2, 4, 9]

B: [6, 8, 7, 7, 3, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 2, 0, 1, 1, 4, 1], [0, 1, 0, 4, 0, 3, 2, 0, 1, 2, 3, 0], [0, 2, 0, 3, 0, 4, 1, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 2, 0, 0, 4, 1, 0], [0, 4, 0, 1, 0, 3, 3, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 1, 4, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 3, 0, 0, 1, 4, 0], [0, 1, 0, 4, 0, 3, 3, 0, 0, 2, 3, 0]] \$$$

$$[0, y_1, 0, y_2, 0, y_6, y_7, y_3, y_4, y_5, y_8, y_9]$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 1, 3], [1, 0, 3, 0, 3, 2, 2, 0, 0, 2, 1, 2], [1, 0, 5, 0, 2, 1, 3, 0, 0, 2, 0, 2], [0, 0, 3, 0, 2, 1, 5, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 3, 0, 0, 5, 0, 3], [0, 0, 2, 0, 3, 0, 3, 0, 0, 3, 0, 5], [0, 0, 3, 0, 5, 0, 2, 0, 0, 3, 0, 3], [0, 0, 5, 0, 3, 0, 3, 0, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 5, 0, 0, 3, 0, 2]] \$$$

$$[y_8, 0, y_6, 0, y_7, y_3, y_4, y_5, 0, y_1, y_2, y_9]$$

437 . Coloring, {4, 5, 6, 7}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, C, B, C, 1, 5]

B: [6, 8, 8, 6, A, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	6 vs 8

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 0, 4, 0, 0, 2, 1, 3], [1, 0, 2, 0, 3, 0, 4, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2]] \$$$

$$[y_7, 0, y_6, 0, y_5, 0, y_4, 0, 0, y_3, y_1, y_2]$$

Omega Rank for B : cycles: {{9, 12}, {2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 2, 0, 2, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 0, 2, 1, 2, 2, 2], [0, 2, 0, 2, 0, 3, 0, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 2, 0, 2, 1, 3, 2, 2], [0, 3, 0, 2, 0, 2, 0, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 2, 0, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 2, 0, 2, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 0, 2, 1, 2, 2, 2]] \$$$

$$[0, -3y_1 + 8y_3 - 3y_4 + 5y_6, 0, -3y_2 + 5y_3 - 3y_5 + 8y_6, 0, 3y_1, 0, 3y_2, 3y_3, 3y_5, 3y_4, 3y_6]$$

$$p = s - s^7 \quad p' = s - s^7$$

438 . Coloring, {4, 5, 6, 8}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 8s^5 - 16s^6 \quad p' = s^3 - 8s^6 - 16s^7 \quad p = s^2 - 8s^5 - 16s^6$$

R: [7, 7, 7, 7, 3, 3, B, B, B, C, 1, 5]
B: [6, 8, 8, 8, 6, A, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	6 vs 6	7 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
 See Matrix

\$ [[2, 0, 2, 0, 2, 0, 4, 0, 0, 0, 4, 2] , [4, 0, 2, 0, 2, 0, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$$[y_1, 0, y_2, 0, y_3, 0, y_6, 0, 0, 0, y_4, y_5]$$

Omega Rank for B : cycles: {{9, 12}} order: 6
 See Matrix

\$ [[0, 2, 0, 2, 0, 2, 0, 2, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 2, 0, 2, 2, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 4, 4, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 2, 4, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 6]] \$

$$[0, y_6, 0, y_1, 0, y_2, 0, y_3, y_4, y_5, 0, y_7]$$

439 . Coloring, {4, 5, 6, 9}

$$\Omega p(\Delta)=0: \quad p = s^2 + 2s^3 + 8s^5 + 32s^7 \quad p' = s^2 + 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, 3, B, C, C, C, 1, 5]
B: [6, 8, 8, 8, 6, A, A, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 6	7 vs 7

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
 See Matrix

\$ [[2, 0, 2, 0, 2, 0, 4, 0, 0, 0, 2, 4] , [2, 0, 2, 0, 4, 0, 4, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 0, 4, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 8, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 4, 0, 0, 0, 8, 0] , [8, 0, 0, 0, 0, 0, 4, 0, 0, 0, 4, 0]] \$

$$[y_3, 0, y_1, 0, y_2, 0, y_4, 0, 0, 0, y_5, y_6]$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6
 See Matrix

\$ [[0, 2, 0, 2, 0, 2, 0, 2, 2, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 4, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 0, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 4, 0, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 2, 0, 4, 0, 4, 2, 0]] \$

$$[0, y_7, 0, y_6, 0, y_5, 0, y_4, y_3, y_2, y_1, 0]$$

440 . Coloring, {4, 5, 6, 10}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, C, B, 2, 1, 5]

B: [6, 8, 8, 6, A, A, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 7

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
 See Matrix

\$ [[2, 2, 2, 0, 2, 0, 4, 0, 0, 0, 3, 1] , [3, 0, 2, 0, 1, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_1, 2y_6, y_2, 0, y_3, 0, y_4, 0, 0, 0, y_5, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 2, 0, 2, 2, 4, 1, 3], [0, 0, 0, 1, 0, 2, 0, 0, 3, 2, 2, 6], [0, 0, 0, 2, 0, 1, 0, 0, 6, 2, 0, 5], [0, 0, 0, 0, 0, 2, 0, 0, 5, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$$$

$$[0, 0, 0, y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, y_7]$$

441 . Coloring, {4, 5, 6, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, C, B, C, 4, 5]

B: [6, 8, 8, 6, A, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 6	6 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 2, 0, 4, 0, 0, 0, 3, 3], [0, 0, 2, 3, 3, 0, 4, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$$$

$$[0, 0, y_1, y_2, y_3, 0, y_4, 0, 0, 0, y_5, y_6]$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 2, 0, 2, 2, 4, 1, 1], [1, 4, 0, 0, 0, 2, 0, 2, 1, 2, 2, 2], [2, 2, 0, 0, 0, 1, 0, 4, 2, 2, 2, 1], [2, 2, 0, 0, 0, 2, 0, 2, 1, 1, 4, 2], [4, 1, 0, 0, 0, 2, 0, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 4, 0, 1, 1, 2, 2, 2], [2, 2, 0, 0, 0, 2, 0, 2, 2, 4, 1, 1], [1, 4, 0, 0, 0, 2, 0, 2, 1, 2, 2, 2]] \$$$

$$[2 y_1, 11 y_1 - 2 y_2 + 11 y_3 - 39 y_4 + 11 y_5 - 2 y_6, 0, 0, 0, 2 y_2, 0, 2 y_3, 2 y_4, 2 y_5, 2 y_6, 3 y_1 + 3 y_3 - 11 y_4 + 3 y_5]$$

$$p = -s + s^7 \quad p' = -s + s^7$$

442 . Coloring, {4, 5, 6, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, C, B, C, 1, 9]

B: [6, 8, 8, 6, A, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 3
See Matrix

$$\$ [[2, 0, 2, 0, 0, 0, 4, 0, 2, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 6, 0], [6, 0, 0, 0, 0, 0, 3, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 6, 0, 0, 0, 3, 0], [3, 0, 0, 0, 0, 0, 7, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 3, 0, 0, 0, 7, 0]] \$$$

$$[2 y_1, 0, 2 y_2, 0, 0, 0, 2 y_3, 0, 2 y_4, 0, 2 y_5, 3 y_2]$$

$$p = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6
See Matrix

$$\$ [[0, 2, 0, 2, 2, 2, 0, 2, 0, 4, 1, 1], [0, 4, 0, 1, 1, 2, 0, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 1, 0, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 4, 0, 1, 4, 0], [0, 1, 0, 4, 0, 2, 0, 3, 0, 2, 4, 0], [0, 2, 0, 4, 0, 4, 0, 1, 0, 2, 3, 0], [0, 2, 0, 3, 0, 4, 0, 2, 0, 4, 1, 0], [0, 4, 0, 1, 0, 3, 0, 2, 0, 4, 2, 0]] \$$$

$$[0, y_1, 0, y_2, y_3, y_4, 0, y_5, 0, y_6, y_7, y_8]$$

443 . Coloring, {4, 5, 7, 8}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, A, B, B, C, 1, 5]

B: [6, 8, 8, 6, A, 3, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 2, 0, 0, 4, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2] , [0, 0, 4, 0, 2, 0, 3, 0, 0, 4, 0, 3]] \$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, 0, 0, y_6, y_7, y_5]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 1, 2, 2] , [0, 1, 2, 2, 0, 2, 0, 3, 2, 0, 0, 4] , [0, 0, 2, 0, 0, 2, 0, 3, 4, 0, 0, 5] , [0, 0, 2, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0] , [0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, y_1, y_3, 2y_1 - 2y_6, 0, y_2, 0, y_4, y_5, y_6, 2y_6, y_7]$$

$$p' = -s^6 + s^8 \quad p = -s^6 + s^8$$

444 . Coloring, {4, 5, 7, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, A, C, C, C, 1, 5]

B: [6, 8, 8, 6, A, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 6	7 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 3, 0, 0, 4, 0, 3], [0, 0, 4, 0, 3, 0, 2, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 3, 0, 4]] \$$

$$[y_3, 0, y_4, 0, y_5, 0, y_1, 0, 0, y_2, 0, y_6]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5
See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 1, 4, 0], [0, 1, 2, 4, 0, 2, 0, 3, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0], [0, 0, 4, 3, 0, 3, 0, 4, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 0, 3, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0]] \$$

$$[0, y_1, y_2, y_3, 0, y_4, 0, y_5, 2y_6, y_6, y_7, 0]$$

$$p = -s^3 + s^8$$

445 . Coloring, $\{4, 5, 7, 10\}$

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, A, A, C, B, 2, 1, 5]

B: [6, 8, 8, 6, A, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[y_4, y_5, y_6, 0, y_4, 0, y_3, 0, 0, y_1, y_2, y_2]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {3, 4, 6, 8, 11}} order: 10
See Matrix

\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 1, 3, 3] , [0, 0, 2, 3, 0, 2, 0, 1, 3, 0, 2, 3] , [0, 0, 2, 2, 0, 3, 0, 2, 3, 0, 1, 3] , [0, 0, 3, 1, 0, 2, 0, 2, 3, 0, 2, 3] , [0, 0, 2, 2, 0, 1, 0, 3, 3, 0, 2, 3] , [0, 0, 1, 2, 0, 2, 0, 2, 3, 0, 3, 3] , [0, 0, 2, 3, 0, 2, 0, 1, 3, 0, 2, 3] , [0, 0, 2, 2, 0, 3, 0, 2, 3, 0, 1, 3]] \$

$$[0, 0, -3y_5 - 3y_1 - 3y_4 + 10y_3 - 3y_2, 3y_5, 0, 3y_1, 0, 3y_4, -3y_6 + 3y_3, 3y_6, 3y_2, 3y_3]$$

$$p' = -s^2 + s^7 \quad p = -s^2 + s^7$$

446 . Coloring, {4, 5, 7, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, A, A, C, B, C, 4, 5]

B: [6, 8, 8, 6, A, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5
See Matrix

\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3]] \$

$$[0, 0, y_2, y_3, y_1, 0, y_7, 0, 0, y_6, y_4, y_5]$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 1, 3, 1], [3, 1, 2, 0, 0, 2, 0, 3, 1, 0, 2, 2], [2, 0, 2, 0, 0, 3, 0, 3, 2, 0, 3, 1], [3, 0, 3, 0, 0, 2, 0, 2, 1, 0, 3, 2], [3, 0, 2, 0, 0, 3, 0, 3, 2, 0, 2, 1], [2, 0, 3, 0, 0, 3, 0, 2, 1, 0, 3, 2], [3, 0, 3, 0, 0, 2, 0, 3, 2, 0, 2, 1], [2, 0, 2, 0, 0, 3, 0, 3, 1, 0, 3, 2], [3, 0, 3, 0, 0, 2, 0, 2, 2, 0, 3, 1]] \$$$

$$[3 y_2, 3 y_1, -3 y_2 - 3 y_1 - 3 y_3 - 3 y_8 + 13 y_6 - 3 y_7 - 3 y_5 + 13 y_4, 0, 0, 3 y_3, 0, 3 y_8, 3 y_6, 3 y_7, 3 y_5, 3 y_4]$$

$$p = -s^3 - s^4 + s^8 + s^9$$

447 . Coloring, {4, 5, 7, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, A, A, C, B, C, 1, 9]

B: [6, 8, 8, 6, A, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 3, 1, 3], [1, 0, 0, 0, 0, 0, 3, 0, 3, 4, 2, 3], [2, 0, 0, 0, 0, 0, 1, 0, 3, 3, 3, 4], [3, 0, 0, 0, 0, 2, 0, 4, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 2, 4, 1], [4, 0, 0, 0, 0, 0, 3, 0, 1, 3, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 3, 1, 3]] \$$$

$$[y_2, 0, y_1, 0, 0, 0, y_2 + y_1 + y_6 + y_5 - y_3 - y_4, 0, y_6, y_5, y_3, y_4]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 0, 3, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 3, 0, 3, 0, 1, 3, 0] , [0, 1, 3, 3, 0, 2, 0, 4, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 3, 0, 4, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 3, 0, 2, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 4, 0, 3, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 0, 3, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 2, 0, 4, 0, 0, 3, 0]] \$

$$[0, y_1, y_2, y_3, y_4, y_5, 0, y_6, 0, y_7, y_8, y_9]$$

448 . Coloring, {4, 5, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, A, B, B, C, C, 1, 5]

B: [6, 8, 8, 6, A, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 0, 3, 0, 0, 0, 4, 1] , [4, 0, 3, 0, 1, 0, 5, 0, 0, 0, 3, 0] , [3, 0, 1, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0]] \$

$$[y_2, 0, y_1, 0, y_3, 0, y_4, 0, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 3, 1, 1] , [0, 3, 2, 1, 0, 2, 0, 3, 1, 0, 2, 2] , [0, 0, 2, 2, 0, 1, 0, 5, 2, 0, 1, 3] , [0, 0, 1, 1, 0, 2, 0, 2, 3, 0, 2, 5] , [0, 0, 2, 2, 0, 1, 0, 1, 5, 0, 3, 2] , [0, 0, 1, 3, 0, 2, 0, 2, 2, 0, 5, 1] , [0, 0, 2, 5, 0, 3, 0, 1, 1, 0, 2, 2] , [0, 0, 3, 2, 0, 5, 0, 2, 2, 0, 1, 1] , [0, 0, 5, 1, 0, 2, 0, 3, 1, 0, 2, 2]] \$

$$[0, y_1, y_2, y_3, 0, y_4, 0, y_7, y_8, y_9, y_5, y_6]$$

449 . Coloring, {4, 5, 8, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, B, B, B, 2, 1, 5]

B: [6, 8, 8, 8, 6, A, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	6 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 1, 4, 0], [4, 1, 2, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0]] \$

$$[y_3, y_1, 2y_1 - 3y_4, 0, 2y_4, 0, y_2, 0, 0, y_4, y_5, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 3, 0, 4], [0, 0, 2, 0, 0, 2, 0, 1, 4, 0, 0, 7], [0, 0, 2, 0, 0, 0, 0, 2, 7, 0, 0, 5], [0, 0, 0, 0, 0, 0, 2, 5, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, 2y_2, 2y_1, 0, 2y_3, 0, 2y_4, 2y_5, 3y_1, 0, 2y_6]$$

$$p = -s^5 + s^7$$

450 . Coloring, {4, 5, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 8s^6 - 16s^7 \quad p' = s^3 - 8s^6 - 16s^7$$

R: [7, 7, 7, 7, 3, A, B, B, B, C, 4, 5]

B: [6, 8, 8, 8, 6, A, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 7	6 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 0, 3, 0, 0, 0, 4, 1] , [0, 0, 2, 4, 1, 0, 6, 0, 0, 0, 3, 0] , [0, 0, 1, 3, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

[0, 0, $y_1, y_4, y_3, 0, y_2, 0, 0, y_7, y_5, y_6$]

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 3, 0, 2] , [0, 3, 2, 0, 0, 2, 0, 3, 2, 0, 0, 4] , [0, 0, 2, 0, 0, 0, 0, 5, 4, 0, 0, 5] , [0, 0, 0, 0, 0, 0, 2, 5, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$[-4y_1 + 6y_3, 2y_1, 2y_2, 0, 0, 2y_3, 0, 2y_4, 2y_5, -6y_1 + 9y_3, 0, 2y_6]$

$$p = -s^5 + s^7 \quad p' = s^5 - s^7$$

451 . Coloring, {4, 5, 8, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, B, B, B, C, 1, 9]

B: [6, 8, 8, 6, A, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 1, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 1] , [6, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_1, 0, y_4, 0, 0, 0, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5
See Matrix

\$ [[0, 2, 1, 2, 2, 0, 2, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 2, 0, 3, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 0, 5, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 4, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 2, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 2, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 5, 0, 2, 0, 3]] \$

$$[0, y_1, y_2, y_3, y_4, y_5, 0, y_6, 0, y_7, 0, y_8]$$

452 . Coloring, {4, 5, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, B, C, C, 2, 1, 5]

B: [6, 8, 8, 6, A, 3, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_1, y_2, y_3, 0, 2y_2 - 2y_5, 0, y_4, 0, 0, y_5, y_6, 2y_5]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 3, 2, 2], [0, 0, 2, 2, 0, 2, 0, 1, 2, 0, 4, 3], [0, 0, 2, 4, 0, 2, 0, 2, 3, 0, 3, 0], [0, 0, 2, 3, 0, 4, 0, 2, 0, 0, 5, 0], [0, 0, 4, 5, 0, 3, 0, 2, 0, 0, 2, 0], [0, 0, 3, 2, 0, 5, 0, 4, 0, 0, 2, 0], [0, 0, 5, 2, 0, 2, 0, 3, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 0, 5, 0, 0, 3, 0]] \$$$

$$[0, 0, y_3, y_2, 0, y_1, 0, y_8, y_7, y_6, y_5, y_4]$$

453 . Coloring, {4, 5, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, B, C, C, C, 4, 5]

B: [6, 8, 8, 6, A, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 1, 2, 4], [0, 0, 2, 2, 4, 0, 3, 0, 0, 0, 4, 1], [0, 0, 4, 4, 1, 0, 4, 0, 0, 0, 3, 0], [0, 0, 1, 3, 0, 0, 8, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 4, 0, 0, 0, 8, 0], [0, 0, 0, 8, 0, 0, 4, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 8, 0, 0, 0, 4, 0]] \$$$

$$[0, 0, y_1, y_2, y_3, 0, y_4, 0, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 3, 2, 0], [2, 3, 2, 0, 0, 2, 0, 3, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 0, 5, 0, 0, 3, 0], [3, 0, 2, 0, 0, 4, 0, 2, 0, 0, 5, 0], [5, 0, 4, 0, 0, 3, 0, 2, 0, 0, 2, 0], [2, 0, 3, 0, 0, 5, 0, 4, 0, 0, 2, 0], [2, 0, 5, 0, 0, 2, 0, 3, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 0, 5, 0, 0, 3, 0]] \$$$

$$[2 y_1, 2 y_7, 2 y_2, 0, 0, 2 y_3, 0, 2 y_4, 2 y_5, 3 y_5, 2 y_6, 0]$$

$$p = -s^3 + s^8$$

454 . Coloring, {4, 5, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, B, C, C, C, 1, 9]

B: [6, 8, 8, 6, A, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 1, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 4, 3], [4, 0, 0, 0, 0, 0, 2, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 4, 0, 4, 0, 2, 3], [2, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 4], [4, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 2, 4]] \$$$

$$[2 y_1, 0, 7 y_1 + 7 y_2 - 9 y_3 + 7 y_5 - 9 y_4, 0, 0, 0, 2 y_2, 0, 2 y_3, 7 y_1 + 7 y_2 - 9 y_3 + 7 y_5 - 9 y_4, 2 y_5, 2 y_4]$$

$$p = -s^2 - s^3 + s^5 + s^6 \quad p = s^2 - s^4 - s^5 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 3, 2, 0], [0, 3, 2, 2, 0, 2, 0, 3, 0, 2, 2, 0], [0, 2, 2, 2, 0, 2, 0, 5, 0, 0, 3, 0], [0, 0, 2, 3, 0, 2, 0, 4, 0, 0, 5, 0], [0, 0, 2, 5, 0, 3, 0, 2, 0, 0, 4, 0], [0, 0, 3, 4, 0, 5, 0, 2, 0, 0, 2, 0], [0, 0, 5, 2, 0, 4, 0, 3, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 0, 5, 0, 0, 3, 0]] \$$$

$$[0, y_1, y_2, y_3, y_5, y_4, 0, y_6, 0, y_7, y_8, 0]$$

455 . Coloring, {4, 5, 10, 11}

$$\Omega p(\Delta)=0: \quad p' = -3s^2 + 2s^3 - 8s^5 + 32s^7 \quad p = 3s^2 - 2s^3 + 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, A, B, C, B, 2, 4, 5]

B: [6, 8, 8, 6, A, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 1, 3, 1], [0, 1, 2, 3, 1, 0, 5, 0, 0, 0, 4, 0], [0, 0, 1, 4, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[0, y_2, y_3, y_1, y_2, 0, y_4, 0, 0, y_6, y_5, y_6]$$

$$p' = -s^4 + s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

$$\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 3, 1, 3], [1, 0, 2, 0, 0, 2, 0, 1, 3, 0, 2, 5], [2, 0, 2, 0, 0, 1, 0, 2, 5, 0, 1, 3], [1, 0, 1, 0, 0, 2, 0, 2, 3, 0, 2, 5], [2, 0, 2, 0, 0, 1, 0, 1, 5, 0, 2, 3], [2, 0, 1, 0, 0, 2, 0, 2, 3, 0, 1, 5], [1, 0, 2, 0, 0, 2, 0, 1, 5, 0, 2, 3], [2, 0, 2, 0, 0, 1, 0, 2, 3, 0, 1, 5]] \$$$

$$[y_7, 0, -y_7 - y_1 - y_2 + y_3 + y_4 - y_5 + y_6, 0, 0, y_1, 0, y_2, y_3, y_4, y_5, y_6]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

456 . Coloring, {4, 5, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^2 + 10s^3 + 40s^5 + 32s^6 + 32s^7 + 128s^8 \quad p' = -3s^2 + 2s^3 - 8s^4 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, A, B, C, B, 2, 1, 9]

B: [6, 8, 8, 8, 6, A, 3, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	8 vs 9	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 0, 5, 0, 1, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$[y_5, y_4, y_3, 0, 0, 0, y_2, 0, y_4, y_3, y_1, y_3]$

$$p' = -s^4 + s^7 \quad p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}, {5, 10, 12}}

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 2, 0, 1, 0, 2, 2, 3] , [0, 0, 2, 2, 3, 1, 0, 2, 0, 3, 1, 2] , [0, 0, 1, 1, 2, 2, 0, 2, 0, 3, 2, 3] , [0, 0, 2, 2, 3, 1, 0, 1, 0, 2, 2, 3] , [0, 0, 1, 2, 3, 2, 0, 2, 0, 3, 1, 2] , [0, 0, 2, 1, 2, 2, 0, 1, 0, 3, 2, 3] , [0, 0, 2, 2, 3, 1, 0, 2, 0, 2, 1, 3]] \$

$[0, 0, -y_1 + y_2 - y_3 - y_4 + y_5 - y_6 + y_7, y_1, y_2, y_3, 0, y_4, 0, y_5, y_6, y_7]$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

457 . Coloring, {4, 5, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = 3s^2 + 2s^3 + 8s^4 - 8s^5 - 32s^7 \quad p = 3s^2 - 10s^3 - 40s^5 + 32s^6 - 32s^7 + 128s^8$$

R: [7, 7, 7, 7, 3, A, B, C, B, C, 4, 9]

B: [6, 8, 8, 8, 6, A, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	8 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 3, 0, 1, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$

[0, 0, $y_3, y_1, 0, 0, y_6, 0, y_2, y_3, y_4, y_5$]

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5
See Matrix

\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 0, 3, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 1, 0, 5, 0, 1, 3, 0] , [3, 1, 1, 0, 0, 2, 0, 4, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 3, 0, 2, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 5, 0, 2, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 4, 0, 3, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 0, 5, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 2, 0, 4, 0, 0, 5, 0]] \$

[$y_9, y_8, y_7, 0, y_6, y_5, 0, y_4, 0, y_3, y_2, y_1$]

458 . Coloring, {4, 6, 7, 8}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, A, B, B, C, 1, 5]

B: [6, 8, 8, 6, 3, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 3, 2, 2] , [2, 0, 0, 0, 2, 0, 3, 0, 0, 6, 0, 3] , [0, 0, 0, 0, 3, 0, 2, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_1, 0, y_4, 0, y_2, 0, y_3, 0, 0, y_5, 2y_4, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 1, 2, 2] , [0, 1, 0, 2, 0, 2, 0, 3, 2, 2, 0, 4] , [0, 2, 0, 0, 0, 2, 0, 1, 4, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 2, 5, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, y_6, y_7, y_8, 0, y_2, 0, y_1, y_4, y_5, 2y_7, y_3]$$

$$p = -s^7 + s^9$$

459 . Coloring, {4, 6, 7, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, A, C, C, C, 1, 5]

B: [6, 8, 8, 6, 3, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 3, 0, 4] , [0, 0, 0, 0, 4, 0, 3, 0, 0, 6, 0, 3] , [0, 0, 0, 0, 3, 0, 0, 0, 0, 7, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 3, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 6, 0, 3] , [0, 0, 0, 0, 3, 0, 0, 0, 0, 7, 0, 6]] \$

$$[2 y_1, 0, y_1, 0, y_2, 0, y_3, 0, 0, y_4, 0, y_5]$$

$$p = s^3 - s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 1, 4, 0], [0, 1, 0, 4, 0, 2, 0, 3, 0, 2, 4, 0], [0, 2, 0, 4, 0, 4, 0, 1, 0, 2, 3, 0], [0, 2, 0, 3, 0, 4, 0, 2, 0, 4, 1, 0], [0, 4, 0, 1, 0, 3, 0, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 1, 0, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 4, 0, 1, 4, 0], [0, 1, 0, 4, 0, 2, 0, 3, 0, 2, 4, 0]] \$$$

$$[0, y_1, y_3, y_2, 0, y_7, 0, y_6, 2 y_3, y_4, y_5, 0]$$

$$p = -s^2 + s^8$$

460 . Coloring, {4, 6, 7, 10}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 - 8s^5 + 32s^7 \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 + 32s^7 + 64s^8$$

R: [7, 7, 7, 7, A, 3, A, C, B, 2, 1, 5]

B: [6, 8, 8, 6, 3, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

$$\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 3, 1, 1], [1, 3, 0, 0, 1, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$$$

$$[y_2, y_1, y_5, 0, y_2, 0, y_3, 0, 0, y_4, y_5, y_5]$$

$$p' = -s^4 + s^7 \quad p = s^3 - s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 1, 3, 2, 2, 3] , [0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 1, 5] , [0, 0, 0, 1, 0, 2, 0, 0, 5, 3, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, y_2, y_3, 0, y_1, 0, y_4, y_5, y_6, y_7, y_8]$$

461 . Coloring, {4, 6, 7, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, 3, A, C, B, C, 4, 5]

B: [6, 8, 8, 6, 3, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 3, 1, 3] , [0, 0, 0, 1, 3, 0, 3, 0, 0, 6, 0, 3] , [0, 0, 0, 0, 3, 0, 1, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$

$$[0, 0, y_5, y_1, y_2, 0, y_3, 0, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 3, 0, 1, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 0, 2, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 3, 0, 2, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 1, 0, 3, 1, 3, 2, 2] , [2, 3, 0, 0, 0, 2, 0, 2, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 3, 0, 1, 2, 2, 3, 1]] \$

$$[11 y_2 + 11 y_1 + 11 y_7 - 2 y_6 - 39 y_5 - 2 y_4 + 11 y_3, 2 y_2, 2 y_1, 0, 0, 2 y_7, 0, 2 y_6, 2 y_5, 2 y_4, 2 y_3, 3 y_2 + 3 y_1 + 3 y_7 - 11 y_5 + 3 y_3]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

462 . Coloring, {4, 6, 7, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7 \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 + 32s^7 - 64s^8$$

R: [7, 7, 7, 7, A, 3, A, C, B, C, 1, 9]

B: [6, 8, 8, 6, 3, A, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 4, 2, 3] , [2, 0, 0, 0, 0, 0, 1, 0, 3, 3, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 1, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 2, 4, 1] , [4, 0, 0, 0, 0, 0, 3, 0, 1, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 3, 1, 3]] \$

$$[y_6, 0, y_5, 0, 0, 0, y_4, 0, y_1, y_2, y_6 + y_5 - y_4 + y_1 + y_2 - y_3, y_3]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 0, 3, 0, 2, 2, 0] , [0, 2, 1, 2, 0, 3, 0, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 2, 0, 3, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 3, 0, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 0, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 0, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 2, 0, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 0, 3, 0, 2, 3, 0]] \$

$$[0, y_9, y_8, y_7, y_6, y_5, 0, y_4, 0, y_3, y_2, y_1]$$

463 . Coloring, {4, 6, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, 3, B, B, C, C, 1, 5]

B: [6, 8, 8, 8, 6, 3, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 1, 3, 3], [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1], [4, 0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 3, 3], [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1], [4, 0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 3, 3]] \$$

$[y_1, 0, y_2, 0, y_3, 0, 4y_1 + 4y_2 + 5y_3 - 6y_4, 0, 0, -2y_1 - 2y_2 - 4y_3 + 5y_4, y_4, 5y_1 + 5y_2 + 6y_3 - 8y_4]$

$$p' = s^2 - s^5 \quad p = s^2 - s^5 \quad p' = s^3 - s^6$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 0, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 1, 0, 3, 2, 2, 1, 3], [0, 2, 0, 1, 0, 2, 0, 2, 3, 1, 2, 3], [0, 1, 0, 2, 0, 1, 0, 2, 3, 2, 3, 2], [0, 2, 0, 3, 0, 2, 0, 1, 2, 1, 3, 2], [0, 1, 0, 3, 0, 3, 0, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 3, 0, 1, 1, 3, 2, 2], [0, 3, 0, 2, 0, 2, 0, 2, 2, 3, 1, 1]] \$$

$[0, y_1, y_2, y_3, 0, y_4, 0, y_5, y_6, y_7, y_8, y_9]$

464 . Coloring, {4, 6, 8, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, 3, B, B, B, 2, 1, 5]

B: [6, 8, 8, 8, 6, 3, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	5 vs 7

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 5, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$$[y_1, y_2, y_3, 0, 2y_3, 0, y_4, 0, 0, y_6, y_5, 0]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 4
See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 3, 0, 4], [0, 0, 0, 0, 0, 2, 0, 1, 4, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$$[0, 0, y_5, 2y_5, 0, -2y_5 + 2y_4, 0, y_4, y_3, y_2, 0, y_1]$$

$$p = -s^4 + s^6 \quad p' = s^4 - s^6$$

465 . Coloring, $\{4, 6, 8, 11\}$

$$\Omega p(\Delta)=0: \quad p' = s^3 + 4s^4 - 8s^6 - 16s^7 \quad p = s^3 - 16s^5 - 8s^6 + 16s^7 + 64s^8$$

R: [7, 7, 7, 7, A, 3, B, B, B, C, 4, 5]

B: [6, 8, 8, 6, 3, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 1, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 2, 4, 1], [0, 0, 0, 4, 1, 0, 4, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 2, 4, 1], [0, 0, 0, 4, 1, 0, 4, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 4, 2]] \$$

$[0, 0, 2y_1, -2y_1 + 9y_2 - 11y_3 - 2y_4, -2y_2 + 2y_3 + 2y_4, 0, 2y_2, 0, 0, 7y_2 - 9y_3 - 2y_4, 2y_4, 2y_3]$

$$p = -s^2 + s^5 \quad p' = s^3 - s^6 \quad p'' = -s^2 + s^5$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 3, 0, 2], [0, 3, 0, 0, 0, 2, 0, 3, 2, 2, 0, 4], [0, 2, 0, 0, 0, 0, 0, 3, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7], [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$[2y_2, y_1, y_2, 0, 0, y_3, 0, y_4, y_5, y_6, 0, y_7]$

$$p = s^6 - s^8$$

466 . Coloring, $\{4, 6, 8, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 8s^5 - 24s^6 - 16s^7 - 64s^8 \quad p' = s^3 + 4s^4 + 8s^5 + 8s^6 + 16s^7$$

R: $[7, 7, 7, 7, A, 3, B, B, B, C, 1, 9]$

B: $[6, 8, 8, 6, 3, A, A, C, C, 2, 4, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 1, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 1], [6, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$$[y_1, 0, y_4, 0, 0, 0, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 3, 0, 2], [0, 3, 2, 0, 2, 2, 0, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 0, 5, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5]] \$$$

$$[0, y_2, y_1, y_4, y_5, y_3, 0, y_6, 0, y_7, 0, y_8]$$

467 . Coloring, {4, 6, 9, 10}

$$\Omega p(\Delta)=0: p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, 3, B, C, C, 2, 1, 5]

B: [6, 8, 8, 6, 3, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 1, 2, 2], [2, 1, 0, 0, 2, 0, 5, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 3, 0, 0, 2, 5, 0], [5, 2, 0, 0, 0, 0, 6, 0, 0, 0, 3, 0], [3, 0, 0, 0, 0, 0, 7, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 3, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 6, 0, 0, 0, 3, 0], [3, 0, 0, 0, 0, 0, 7, 0, 0, 0, 6, 0]] \$$$

$$[y_2, y_1, y_5, 0, y_4, 0, y_3, 0, 0, y_7, y_6, 2y_5]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 1, 2, 2, 4, 3] , [0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 3, 2] , [0, 0, 0, 3, 0, 4, 0, 0, 2, 2, 3, 2] , [0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 3, 2, 3] , [0, 0, 0, 2, 0, 2, 0, 0, 3, 2, 4, 3]] \$

$$[0, 0, y_2, y_1, 0, y_3, 0, y_4, y_5, y_6, y_7, y_8]$$

468 . Coloring, {4, 6, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, 3, B, C, C, C, 4, 5]

B: [6, 8, 8, 6, 3, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 1, 2, 4] , [0, 0, 0, 2, 4, 0, 3, 0, 0, 2, 4, 1] , [0, 0, 0, 4, 1, 0, 2, 0, 0, 4, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 2, 4] , [0, 0, 0, 2, 4, 0, 3, 0, 0, 2, 4, 1] , [0, 0, 0, 4, 1, 0, 2, 0, 0, 4, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 2, 4]] \$

$$[0, 0, 16 y_1, 16 y_2, -35 y_1 - 35 y_2 + 28 y_3 + 25 y_4, 0, 16 y_3, 0, 0, 16 y_4, -25 y_1 - 25 y_2 + 20 y_3 + 27 y_4, 28 y_1 + 28 y_2 - 20 y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 0, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 4, 0, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 0, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 3, 0, 2, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 0, 4, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 0, 3, 0, 2, 4, 0]] \$

$$[y_1, y_2, y_3, 0, 0, y_4, 0, y_5, 2y_3, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

469 . Coloring, {4, 6, 9, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, B, C, C, C, 1, 9]

B: [6, 8, 8, 6, 3, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 1, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 4, 3], [4, 0, 0, 0, 0, 0, 2, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 4, 0, 4, 0, 2, 3], [2, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 4], [4, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 2, 4]] \$$$

$$[2y_1, 0, 7y_1 + 7y_3 - 9y_2 + 7y_5 - 9y_4, 0, 0, 0, 2y_3, 0, 2y_2, 7y_1 + 7y_3 - 9y_2 + 7y_5 - 9y_4, 2y_5, 2y_4]$$

$$p = s^2 - s^4 - s^5 + s^7 \quad p = -s^2 - s^3 + s^5 + s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 3, 2, 0], [0, 3, 2, 2, 0, 2, 0, 3, 0, 2, 2, 0], [0, 2, 0, 2, 0, 2, 0, 5, 0, 2, 3, 0], [0, 2, 0, 3, 0, 2, 0, 2, 0, 2, 5, 0], [0, 2, 0, 5, 0, 3, 0, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 5, 0, 2, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 2, 0, 5, 2, 0], [0, 5, 0, 2, 0, 2, 0, 3, 0, 2, 2, 0]] \$$$

$$[0, y_3, y_4, y_5, y_1, y_2, 0, y_6, 0, y_7, y_8, 0]$$

470 . Coloring, {4, 6, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, 3, B, C, B, 2, 4, 5]

B: [6, 8, 8, 6, 3, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 1, 3, 1] , [0, 1, 0, 3, 1, 0, 5, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 4, 0, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[0, y_1, y_7, y_2, y_3, 0, y_4, 0, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 1, 3, 2, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 1, 5] , [1, 0, 0, 0, 0, 2, 0, 0, 5, 1, 0, 7] , [0, 0, 0, 0, 0, 1, 0, 0, 7, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0] , [0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[y_1, 0, y_2, 0, 0, y_3, 0, y_4, y_5, y_6, y_7, y_8]$$

471 . Coloring, {4, 6, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, 3, B, C, B, 2, 1, 9]

B: [6, 8, 8, 6, 3, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 3

See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 5, 0, 1, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$[y_1, y_2, y_5, 0, 0, 0, y_4, 0, y_2, y_5, y_3, y_5]$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{3, 4, 5, 6, 8, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 0, 1, 0, 2, 2, 3], [0, 0, 3, 2, 3, 1, 0, 2, 0, 2, 1, 2], [0, 0, 3, 1, 2, 2, 0, 3, 0, 1, 2, 2], [0, 0, 2, 2, 2, 1, 0, 3, 0, 2, 3, 1], [0, 0, 2, 3, 1, 2, 0, 2, 0, 1, 3, 2], [0, 0, 1, 3, 2, 3, 0, 2, 0, 2, 2, 1], [0, 0, 2, 2, 1, 3, 0, 1, 0, 3, 2, 2]] \$$

$[0, 0, y_1, y_2, y_3, y_4, 0, y_5, 0, y_6, y_7, y_8]$

472 . Coloring, $\{4, 6, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, 3, B, C, B, C, 4, 9]

B: [6, 8, 8, 6, 3, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 3, 0, 1, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$

[0, 0, y₃, y₁, 0, 0, y₂, 0, y₄, y₃, y₆, y₅]

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 0, 3, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 1, 0, 5, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 0, 3, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 3, 0, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 5, 0, 1, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 0, 2, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 2, 0, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 1, 0, 5, 0, 2, 3, 0]] \$

[y₁, y₂, y₃, 0, y₄, y₅, 0, y₆, 0, y₇, y₈, y₉]

473 . Coloring, {4, 7, 8, 9}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, A, B, C, C, 1, 5]

B: [6, 8, 8, 6, 3, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 6	8 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[2, 0, 0, 0, 2, 0, 4, 0, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[y_1, 0, 0, 0, y_2, 0, y_3, 0, 0, y_4, y_5, y_6]$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

$$\$ [[0, 2, 2, 2, 0, 2, 0, 2, 2, 0, 3, 1], [0, 0, 2, 3, 0, 2, 0, 4, 1, 0, 2, 2], [0, 0, 2, 2, 0, 3, 0, 2, 2, 0, 1, 4], [0, 0, 3, 1, 0, 2, 0, 2, 4, 0, 2, 2], [0, 0, 2, 2, 0, 1, 0, 3, 2, 0, 4, 2], [0, 0, 1, 4, 0, 2, 0, 2, 2, 0, 2, 3], [0, 0, 2, 2, 0, 4, 0, 1, 3, 0, 2, 2], [0, 0, 4, 2, 0, 2, 0, 2, 2, 0, 3, 1]] \$$$

$$[0, y_1, y_2, y_3, 0, y_4, 0, y_5, y_6, 0, y_7, y_8]$$

474 . Coloring, {4, 7, 8, 10}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^5 - 32s^7 \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 - 32s^7 - 64s^8$$

R: [7, 7, 7, 7, A, A, A, B, B, 2, 1, 5]

B: [6, 8, 8, 6, 3, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

$$\$ [[2, 2, 0, 0, 2, 0, 4, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$$$

$$[y_2, y_1, 0, 0, y_5, 0, y_4, 0, 0, y_3, y_5, 0]$$

$$p = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 0, 2, 0, 2, 2, 0, 2, 4], [0, 0, 2, 2, 0, 2, 0, 2, 4, 0, 0, 4], [0, 0, 2, 0, 0, 2, 0, 2, 4, 0, 0, 6], [0, 0, 2, 0, 0, 0, 2, 6, 0, 0, 6], [0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[0, 0, y_6, y_3, 0, y_4, 0, y_5, y_2, 0, y_6 + y_3 - y_4 - y_5 - y_2 + y_1, y_1]$$

$$p = -s^6 + s^7$$

475 . Coloring, {4, 7, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, A, A, B, B, C, 4, 5]

B: [6, 8, 8, 6, 3, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 6	6 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 2, 0, 4, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$$$

$$[0, 0, 0, y_6, y_5, 0, y_4, 0, 0, y_3, y_2, y_1]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 2, 0, 2, 2, 0, 2, 2], [2, 0, 2, 0, 0, 2, 0, 4, 2, 0, 0, 4], [0, 0, 2, 0, 0, 2, 0, 2, 4, 0, 0, 6], [0, 0, 2, 0, 0, 0, 0, 2, 6, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[y_1, y_2, -y_1 + y_6 + y_5 + y_4 - y_3, 0, 0, y_6, 0, y_5, y_4, 0, y_2, y_3]$$

$$p = s^6 - s^8 \quad p' = s^6 - s^7$$

476 . Coloring, {4, 7, 8, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, A, A, B, B, C, 1, 9]

B: [6, 8, 8, 6, 3, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	4 vs 8

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 4, 0, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 0, 2, 4, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 2, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 2, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 0, 2, 2, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 2, 2, 2]] \$

$$[y_1 - y_2 - y_5 + y_4 + y_3, 0, 0, 0, 0, 0, y_1, 0, y_2, y_5, y_4, y_3]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[0, 2, 2, 2, 2, 2, 0, 2, 0, 0, 2, 2] , [0, 0, 4, 2, 2, 2, 0, 4, 0, 0, 0, 2] , [0, 0, 4, 0, 2, 2, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$

$$[0, y_3, y_2, y_3 + y_2 - y_4, y_3 + y_2 - y_1, y_1, 0, y_2, 0, 0, y_3, y_4]$$

$$p' = s^6 - s^7 \quad p = s^4 - s^8 \quad p' = s^4 - s^7 \quad p' = s^5 - s^7$$

477 . Coloring, {4, 7, 9, 10}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^5 - 32s^7 \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 - 32s^7 + 64s^8$$

R: [7, 7, 7, 7, A, A, A, C, C, 2, 1, 5]

B: [6, 8, 8, 6, 3, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	7 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[2, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

[y₅, y₁, 0, 0, y₄, 0, y₃, 0, 0, y₂, 0, y₅]

$$p = s^3 - s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 0, 2, 0, 2, 2, 0, 4, 2] , [0, 0, 2, 4, 0, 2, 0, 2, 2, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 0, 2, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 4, 0, 2, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 0, 4, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 2, 0, 4, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 0, 4, 0, 0, 4, 0]] \$

[0, 0, y₂, y₁, 0, y₃, 0, y₆, y₅, 0, y₄, y₇]

478 . Coloring, {4, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, A, A, C, C, C, 4, 5]

B: [6, 8, 8, 6, 3, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 5	6 vs 7

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 0, 4, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

[0, 0, 0, y₅, y₄, 0, y₃, 0, 0, y₂, 0, y₁]

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 0, 2, 0, 2, 2, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 2, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 4, 0, 2, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0]] \$

[y₁, y₅, y₂, 0, 0, y₃, 0, y₄, y₅, 0, y₆, 0]

$$p = -s^2 + s^7$$

479 . Coloring, {4, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7 \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8$$

R: [7, 7, 7, 7, A, A, A, C, C, C, 1, 9]

B: [6, 8, 8, 6, 3, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 5	6 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 4, 0, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 0, 4, 4, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_2 - y_1 - y_3 + y_4, 0, 0, 0, 0, 0, y_2, 0, y_1, y_3, 0, y_4]$$

$$p = s^4 - s^5$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 2, 2, 2, 2, 2, 0, 2, 0, 0, 4, 0], [0, 0, 4, 4, 0, 2, 0, 4, 0, 0, 2, 0], [0, 0, 2, 2, 0, 4, 0, 4, 0, 0, 4, 0], [0, 0, 4, 4, 0, 2, 0, 2, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 0, 2, 0, 0, 4, 0], [0, 0, 4, 4, 0, 2, 0, 4, 0, 0, 2, 0]] \$$$

$$[0, y_3, y_1, y_2, y_3, y_4, 0, y_5, 0, 0, y_6, 0]$$

$$p = -s^2 + s^7$$

480 . Coloring, {4, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, A, C, B, 2, 4, 5]

B: [6, 8, 8, 6, 3, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

$$\$ [[0, 2, 0, 2, 2, 0, 4, 0, 0, 4, 1, 1], [0, 4, 0, 1, 1, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[0, y_1, 0, y_4, y_4, 0, y_2, 0, 0, y_3, y_5, y_5]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

$\$ [[2, 0, 2, 0, 0, 2, 0, 2, 2, 0, 3, 3], [3, 0, 2, 0, 0, 2, 0, 2, 3, 0, 2, 2], [2, 0, 2, 0, 0, 3, 0, 2, 2, 0, 2, 3], [2, 0, 3, 0, 0, 2, 0, 2, 3, 0, 2, 2], [2, 0, 2, 0, 0, 2, 0, 3, 2, 0, 2, 3], [2, 0, 2, 0, 0, 2, 0, 2, 3, 0, 3, 2], [3, 0, 2, 0, 0, 2, 0, 2, 2, 0, 2, 3]] \$$

$$[5y_6, 0, 5y_5, 0, 0, 5y_4, 0, 5y_3, 5y_2, 0, -5y_6 - 5y_5 - 5y_4 - 5y_3 + 11y_2 + 11y_1, 5y_1]$$

$$p = -s - s^2 + s^6 + s^7$$

481 . Coloring, {4, 7, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, A, C, B, 2, 1, 9]

B: [6, 8, 8, 6, 3, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 0, 4, 0, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 4, 0, 1, 4, 2, 0], [2, 4, 0, 0, 0, 0, 5, 0, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$$[y_2, y_1, 0, 0, 0, 0, y_7, 0, y_6, y_5, y_4, y_3]$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 0, 2, 0, 0, 3, 3], [0, 0, 4, 3, 3, 2, 0, 2, 0, 0, 2, 0], [0, 0, 5, 2, 0, 3, 0, 4, 0, 0, 2, 0], [0, 0, 3, 2, 0, 2, 0, 5, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 0, 3, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 0, 2, 0, 0, 3, 0], [0, 0, 4, 3, 0, 5, 0, 2, 0, 0, 2, 0]] \$$

$$[0, 0, y_1, y_6, y_5, y_4, 0, y_3, 0, 0, y_2, y_7]$$

482 . Coloring, {4, 7, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, A, C, B, C, 4, 9]

B: [6, 8, 8, 6, 3, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 0, 4, 0, 2, 4, 1, 3], [0, 0, 0, 1, 0, 0, 2, 0, 3, 4, 2, 4], [0, 0, 0, 2, 0, 0, 1, 0, 4, 2, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 1, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 2, 4, 1], [0, 0, 0, 4, 0, 0, 4, 0, 1, 3, 2, 2]] \$$$

$$[0, 0, 0, y_1 - y_2 - y_3 + y_4 + y_5, 0, 0, y_1, 0, y_2, y_3, y_4, y_5]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 0, 2, 0, 0, 3, 1], [3, 0, 4, 0, 1, 2, 0, 4, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 0, 3, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 0, 4, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0]] \$$$

$$[y_1, 2y_3, y_7, 0, y_5, y_6, 0, y_4, 0, 0, y_2, y_3]$$

$$p = -s^3 + s^8$$

483 . Coloring, {4, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, B, B, C, 2, 1, 5]

B: [6, 8, 8, 8, 6, 3, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 0, 4, 0, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 4, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 5, 0, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

[$y_2, y_1, 0, 0, y_3, 0, y_4, 0, 0, y_5, y_6, y_7$]

Omega Rank for B : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[0, 0, 2, 2, 0, 2, 0, 2, 2, 2, 1, 3] , [0, 0, 2, 1, 0, 2, 0, 2, 3, 0, 2, 4] , [0, 0, 2, 2, 0, 1, 0, 2, 4, 0, 3, 2] , [0, 0, 1, 3, 0, 2, 0, 2, 2, 0, 4, 2] , [0, 0, 2, 4, 0, 3, 0, 1, 2, 0, 2, 2] , [0, 0, 3, 2, 0, 4, 0, 2, 2, 0, 2, 1] , [0, 0, 4, 2, 0, 2, 0, 3, 1, 0, 2, 2] , [0, 0, 2, 2, 0, 2, 0, 4, 2, 0, 1, 3]] \$

[$0, 0, y_1, y_2, 0, y_3, 0, y_4, y_5, y_6, y_7, y_8$]

484 . Coloring, {4, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, B, B, C, C, 4, 5]

B: [6, 8, 8, 8, 6, 3, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	3 vs 6	9 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 3, 2, 2], [0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 3, 2, 2]] \$$

$[0, 0, 0, 2y_3, 10y_3 - 16y_1 + 4y_2, 0, 2y_2, 0, 0, 2y_1, 16y_3 - 27y_1 + 7y_2, 4y_3 + 3y_2 - 7y_1]$

$$p = -s + s^4 \quad p' = -s + s^4 \quad p'' = -s^2 + s^5$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$\$ [[2, 2, 2, 0, 0, 2, 0, 2, 2, 2, 1, 1], [1, 2, 2, 0, 0, 2, 0, 4, 1, 0, 2, 2], [2, 0, 2, 0, 0, 1, 0, 4, 2, 0, 1, 4], [1, 0, 1, 0, 0, 2, 0, 2, 4, 0, 2, 4], [2, 0, 2, 0, 0, 1, 0, 1, 4, 0, 4, 2], [4, 0, 1, 0, 0, 2, 0, 2, 2, 0, 4, 1], [4, 0, 2, 0, 0, 4, 0, 1, 1, 0, 2, 2], [2, 0, 4, 0, 0, 4, 0, 2, 2, 0, 1, 1], [1, 0, 4, 0, 0, 2, 0, 4, 1, 0, 2, 2]] \$$

$[y_1, y_2, y_3, 0, 0, y_4, 0, y_5, y_6, y_7, y_8, y_9]$

485 . Coloring, $\{4, 8, 9, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, B, B, C, C, 1, 9]

B: [6, 8, 8, 6, 3, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}, \{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 0, 4, 0, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 0, 4, 4], [4, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 3], [2, 0, 0, 0, 0, 4, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 2, 4]] \$$

$$[-7 y_4 + 9 y_5 + 9 y_1 - 7 y_2 + 9 y_3, 0, 0, 0, 0, 0, 7 y_4, 0, 7 y_5, 7 y_1, 7 y_2, 7 y_3]$$

$$p = -s^2 - s^3 + s^5 + s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[0, 2, 2, 2, 2, 2, 0, 2, 0, 2, 1, 1], [0, 2, 4, 1, 1, 2, 0, 4, 0, 0, 0, 2], [0, 0, 3, 0, 2, 1, 0, 6, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6], [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3], [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3], [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6], [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3]] \$$$

$$[0, 2 y_2 - 2 y_6, y_1, y_2, y_3, y_4, 0, y_5, 0, 2 y_6, y_6, y_7]$$

$$p = -s^4 + s^8 \quad p' = -s^4 + s^8$$

486 . Coloring, {4, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, A, B, B, B, 2, 4, 5]

B: [6, 8, 8, 6, 3, 3, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 6	5 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 0, 4, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 4, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$$$

$$[0, y_3, 0, y_2, y_1, 0, y_6, 0, 0, y_5, y_4, 0]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 2, 0, 0, 2, 0, 2, 2, 2, 0, 4], [0, 0, 2, 0, 0, 2, 0, 2, 4, 0, 0, 6], [0, 0, 2, 0, 0, 0, 0, 2, 6, 0, 0, 6], [0, 0, 0, 0, 0, 2, 6, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[y_4, 0, y_1 + y_2 + y_3 - y_5, 0, 0, y_1, 0, y_2, y_3, y_4, 0, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7$$

487 . Coloring, {4, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, A, B, B, B, 2, 1, 9]

B: [6, 8, 8, 6, 3, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 2, 0, 0, 0, 0, 4, 0, 2, 2, 4, 0], [4, 2, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$$$

$$[y_1, y_2, 0, 0, 0, 0, y_3, 0, y_4, y_4, y_5, 0]$$

$$p = -s^3 + s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[0, 0, 2, 2, 2, 2, 0, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 2, 0, 2, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6], [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2]] \$$$

$$[0, 0, y_1 + y_2 + y_3 - y_5, y_4, y_1, y_2, 0, y_3, 0, y_4, 0, y_5]$$

$$p = -s^3 + s^4 - s^5 + s^6 \quad p = -s^3 + s^7$$

488 . Coloring, {4, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 2s^3 - 8s^5 - 32s^7 \quad p' = -s^2 + 4s^4 + 8s^5 - 16s^6 + 32s^7 - 64s^8$$

R: [7, 7, 7, 7, A, A, B, B, B, C, 4, 9]

B: [6, 8, 8, 6, 3, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 6	5 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 0, 4, 0, 2, 2, 4, 2], [0, 0, 0, 4, 0, 0, 2, 0, 2, 0, 6, 2], [0, 0, 0, 6, 0, 0, 4, 0, 2, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$$$

$$[0, 0, 0, y_1, 0, 0, y_2, 0, y_3, y_4, y_5, y_6]$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 0, 2, 0, 2, 0, 2], [0, 2, 4, 0, 2, 2, 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6], [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6]] \$$$

$$[y_4, y_1, y_2 + y_3 - y_5, 0, y_2, y_1, 0, y_3, 0, y_4, 0, y_5]$$

$$p' = s^3 - s^7 \quad p = s^3 - s^7 \quad p' = s^4 - s^5 + s^6 - s^7$$

489 . Coloring, {4, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^2 + 10s^3 + 40s^5 + 32s^6 + 32s^7 + 128s^8 \quad p' = -3s^2 + 2s^3 - 8s^4 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, A, B, C, C, 2, 4, 5]

B: [6, 8, 8, 6, 3, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 0, 4, 0, 0, 2, 2, 2] , [0, 2, 0, 2, 2, 0, 4, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 4, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$$[0, y_1, 0, y_3, y_2, 0, y_4, 0, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 0, 2, 0, 2, 2, 2, 2, 2] , [2, 0, 2, 0, 0, 2, 0, 2, 2, 0, 4, 2] , [4, 0, 2, 0, 0, 2, 0, 2, 2, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 2, 0, 0, 2, 0] , [4, 0, 4, 0, 0, 4, 0, 2, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0]] \$

$$[y_7, 0, y_6, 0, 0, y_5, 0, y_1, y_2, y_3, y_4, y_8]$$

490 . Coloring, {4, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -9s^2 + 4s^4 - 24s^5 - 16s^6 + 96s^7 + 64s^8 \quad p = -3s^2 + 2s^3 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, A, B, C, C, 2, 1, 9]

B: [6, 8, 8, 6, 3, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	3 vs 7	8 vs 8

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 0, 4, 0, 2, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 4, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 2]] \$

$$[-y_1 + 2y_3, y_1, 0, 0, 0, 0, 2y_3, 0, y_3, 2y_3 - y_2, y_2, y_3]$$

$$p = s^3 - s^5 \quad p' = s^3 - s^4 \quad p'' = -s^4 + s^5 \quad p''' = -s^4 + s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 2, 0, 2, 0, 2, 2, 2] , [0, 0, 4, 2, 2, 2, 0, 2, 0, 0, 2, 2] , [0, 0, 4, 2, 2, 2, 0, 4, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 2, 0, 4, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 0, 4, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 0, 2, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 4, 0, 2, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 0, 4, 0, 0, 2, 0]] \$

$$[0, 0, y_7, y_1, y_2, y_6, 0, y_3, 0, y_4, y_5, y_8]$$

491 . Coloring, {4, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^2 + 2s^3 - 8s^5 + 32s^7 \quad p' = 3s^2 + 2s^3 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, A, B, C, C, C, 4, 9]

B: [6, 8, 8, 6, 3, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 6	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 0, 4, 0, 2, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 4, 4] , [0, 0, 0, 4, 0, 0, 2, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 4, 4] , [0, 0, 0, 4, 0, 0, 2, 0, 4, 0, 2, 4]] \$

$$[0, 0, 0, -y_1 + 2y_4 - y_3, 0, 0, y_1, 0, -y_2 + y_4, y_2, y_3, y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 0, 2, 0, 2, 2, 0], [2, 2, 4, 0, 0, 2, 0, 4, 0, 0, 2, 0], [2, 0, 2, 0, 0, 2, 0, 6, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 0, 2, 0, 0, 6, 0], [6, 0, 2, 0, 0, 4, 0, 2, 0, 0, 2, 0], [2, 0, 4, 0, 0, 6, 0, 2, 0, 0, 2, 0], [2, 0, 6, 0, 0, 2, 0, 4, 0, 0, 2, 0], [2, 0, 2, 0, 0, 2, 0, 6, 0, 0, 4, 0]] \$$$

$$[y_1, y_2, y_3, 0, y_6, y_4, 0, y_5, 0, y_6, y_7, 0]$$

$$p = s^3 - s^8$$

492 . Coloring, {4, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, B, C, B, 2, 4, 9]

B: [6, 8, 8, 6, 3, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 2, 0, 2, 0, 0, 4, 0, 2, 2, 3, 1], [0, 2, 0, 3, 0, 0, 4, 0, 1, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[0, 2y_4 - 2y_5, 0, y_1, 0, 0, y_2, 0, y_4, 2y_5, y_3, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 0, 2, 0, 2, 1, 3] , [1, 0, 4, 0, 3, 2, 0, 2, 0, 0, 2, 2] , [2, 0, 5, 0, 2, 1, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 2, 0, 5, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 3, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 5, 0, 2, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 3, 0, 4, 0, 0, 2, 0]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, 0, y_5, 0, y_6, y_7, y_8]$$

493 . Coloring, {5, 6, 7, 8}

$$\Omega p(\Delta)=0: \quad p = -9s^3 - 2s^4 + 16s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, B, B, C, 1, 5]

B: [6, 8, 8, 7, A, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 2, 2, 2] , [2, 0, 3, 0, 2, 0, 4, 0, 0, 3, 0, 2] , [0, 0, 2, 0, 2, 0, 5, 0, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 0, 2, 0, 0, 5, 0, 4] , [0, 0, 3, 0, 4, 0, 2, 0, 0, 2, 0, 5] , [0, 0, 4, 0, 5, 0, 3, 0, 0, 2, 0, 2] , [0, 0, 5, 0, 2, 0, 4, 0, 0, 3, 0, 2] , [0, 0, 2, 0, 2, 0, 5, 0, 0, 4, 0, 3]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, 0, 0, y_6, 2y_4, y_7]$$

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 2, 2, 2, 1, 1, 4] , [0, 1, 0, 1, 0, 0, 2, 2, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 1, 1, 4, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 1, 5] , [0, 0, 0, 1, 0, 0, 2, 0, 5, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 1, 0, 6, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 1, 6] , [0, 0, 0, 1, 0, 0, 2, 0, 6, 0, 2, 5]] \$

$$[0, 11y_3 - 5y_4 + 11y_5 - 5y_6 - 5y_7 - 5y_8 + 11y_1 - 5y_2, 0, 5y_3, 0, 5y_4, 5y_5, 5y_6, 5y_7, 5y_8, 5y_1, 5y_2]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

494 . Coloring, {5, 6, 7, 9}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, C, C, C, 1, 5]

B: [6, 8, 8, 7, A, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2], [0, 0, 4, 0, 2, 0, 3, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 4, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2]] \$$$

$$[2y_3, 0, y_1, 0, y_2, y_3, y_4, 0, 0, y_5, 0, y_6]$$

$$p = -s^2 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 4, 2, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 5, 1, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$$$

$$[0, y_2, 0, y_3, 0, y_1, y_4, y_5, 2y_1, y_7, y_6, 0]$$

$$p = -s^5 + s^8$$

495 . Coloring, {5, 6, 7, 10}

R: [7, 7, 7, 6, 3, 3, A, C, B, 2, 1, 5]
B: [6, 8, 8, 7, A, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	5 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6
 See Matrix

\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 2, 1, 1] , [1, 2, 3, 0, 1, 0, 6, 0, 0, 3, 0, 0] , [0, 3, 1, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[y_3, y_1, y_2, 0, y_3, y_6, y_4, 0, 0, y_5, y_6, y_6]$$

$$p = s^4 - s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6
 See Matrix

\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 3, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4]] \$

$$[0, 0, 0, 2y_5 - y_1 - y_4, 0, y_2 + y_3 - y_5, y_1, 2y_2 + 2y_3 - 2y_5, y_2, y_3, y_4, y_5]$$

$$p' = -s^3 + s^6 \quad p'' = -s^4 + s^7 \quad p''' = -s^3 + s^6$$

496 . Coloring, {5, 6, 7, 11}

R: [7, 7, 7, 6, 3, 3, A, C, B, C, 4, 5]
B: [6, 8, 8, 7, A, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 2, 1, 3], [0, 0, 3, 1, 3, 2, 2, 0, 0, 3, 0, 2], [0, 0, 5, 0, 2, 1, 3, 0, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 5, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 3, 0, 0, 5, 0, 3], [0, 0, 2, 0, 3, 0, 3, 0, 0, 3, 0, 5], [0, 0, 3, 0, 5, 0, 2, 0, 0, 3, 0, 3], [0, 0, 5, 0, 3, 0, 3, 0, 0, 2, 0, 3]] \$$

$[0, 0, y_1, y_2, y_5, y_3, y_4, 0, 0, y_6, y_7, y_8]$

Omega Rank for B : cycles: $\{\{9, 12\}, \{1, 2, 6, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 0, 2, 1, 1, 3, 2], [3, 1, 0, 0, 0, 3, 0, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 3, 0, 1, 1, 3, 2, 2], [2, 3, 0, 0, 0, 2, 0, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2], [2, 2, 0, 0, 0, 1, 0, 3, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 0, 2, 1, 1, 3, 2], [3, 1, 0, 0, 0, 3, 0, 2, 2, 2, 2, 1]] \$$

$[-3 y_2 - 3 y_6 + 8 y_3 - 3 y_4 + 5 y_7, -3 y_1 + 5 y_3 - 3 y_5 + 8 y_7, 0, 0, 0, 3 y_1, 3 y_2, 3 y_6, 3 y_3, 3 y_4, 3 y_5, 3 y_7]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

497 . Coloring, $\{5, 6, 7, 12\}$

R: $[7, 7, 7, 6, 3, 3, A, C, B, C, 1, 9]$

B: $[6, 8, 8, 7, A, A, B, B, C, 2, 4, 5]$

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6
See Matrix

\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 2, 1, 3] , [1, 0, 1, 0, 0, 0, 4, 0, 3, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 0, 2, 4, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 3, 2, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 2, 3, 2] , [3, 0, 0, 0, 0, 0, 2, 0, 2, 3, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 2, 2, 3] , [2, 0, 0, 0, 0, 0, 4, 0, 3, 3, 2, 2]] \$

$$[-y_1 + y_2 + y_3 - y_4 - y_7 + y_5 + y_6, 0, y_1, 0, 0, y_2, y_3, 0, y_4, y_7, y_5, y_6]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 2, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 3, 2, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 3, 3, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, y_1, 0, y_2, y_3, y_8, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^6 + s^9$$

498 . Coloring, {5, 6, 8, 9}

R: [7, 7, 7, 6, 3, 3, B, B, C, C, 1, 5]

B: [6, 8, 8, 7, A, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 0, 3, 3] , [3, 0, 3, 0, 3, 0, 4, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[y_6, 0, y_5, 0, y_3, y_4, y_2, 0, 0, 0, y_1, 3y_4]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 2, 2, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 4, 2, 2, 1, 2], [0, 2, 0, 1, 0, 0, 2, 2, 2, 1, 2, 4], [0, 1, 0, 2, 0, 0, 1, 2, 4, 2, 2, 2], [0, 2, 0, 2, 0, 0, 2, 1, 2, 1, 4, 2], [0, 1, 0, 4, 0, 0, 2, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 0, 4, 1, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 2, 2, 2, 4, 1, 1]] \$$$

$$[0, y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, y_7, y_9, y_8]$$

499 . Coloring, {5, 6, 8, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, B, B, 2, 1, 5]

B: [6, 8, 8, 7, A, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	5 vs 7	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 0, 6, 0, 0, 0, 3, 0], [3, 0, 0, 0, 0, 0, 7, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 3, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 6, 0, 0, 0, 3, 0], [3, 0, 0, 0, 0, 0, 7, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 3, 0, 0, 0, 7, 0]] \$$$

$$[y_5, 2y_3, y_4, 0, 2y_3, y_3, y_2, 0, 0, 0, y_1, 0]$$

$$p = s^3 - s^6 \quad p' = s^3 - s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 4, 0, 4], [0, 0, 0, 0, 0, 0, 2, 0, 4, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6], [0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 10, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$$$

$$[0, 0, 0, 2y_1, 0, y_1, y_2, 2y_1, y_3, y_4, 0, y_5]$$

$$p' = s^4 - s^6 \quad p = s^4 - s^6$$

Â» SYNC'D !RANK'D

500 . Coloring, {5, 6, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, B, B, C, 4, 5]

B: [6, 8, 8, 7, A, A, A, C, C, 2, 1, 9]

' See graph

' ' See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 0, 4, 2], [0, 0, 3, 4, 2, 2, 2, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 3, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 3, 4, 0, 0, 0, 3, 0], [0, 0, 3, 3, 0, 2, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 3, 3, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 4, 2, 0, 0, 0, 3, 0]] \$$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, 0, 0, 0, y_6, y_7]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 4, 0, 2], [0, 4, 0, 0, 0, 2, 0, 2, 2, 2, 0, 4], [0, 2, 0, 0, 0, 0, 0, 4, 4, 2, 0, 4], [0, 2, 0, 0, 0, 0, 2, 4, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$$$

$$[2y_3, y_1, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, 0, y_7]$$

$$p = -s^6 + s^8$$

501 . Coloring, {5, 6, 8, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 3s^3 + 2s^4 - 16s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, B, B, C, 1, 9]

B: [6, 8, 8, 7, A, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

$$\begin{aligned} \$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 0, 4, 2], [4, 0, 1, 0, 0, 0, 4, 0, 2, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, \\ 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, \\ 5, 0, 0, 0, 5, 0]] \$ \end{aligned}$$

$$[y_1, 0, y_3, 0, 0, y_2, y_4, 0, 2y_3 - 2y_2, 0, y_5, 2y_2]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\begin{aligned} \$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 2, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2], [0, 4, \\ 0, 0, 2, 0, 0, 4, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 2, 0, 4, 0, 4], [0, 4, 0, 0, 4, 0, \\ 0, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2]] \$ \end{aligned}$$

$$[0, y_1, 0, 2y_3, y_2, y_3, y_4, y_5, 0, y_6, 0, y_7]$$

$$p = -s^3 + s^8$$

502 . Coloring, {5, 6, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, C, C, 2, 1, 5]
B: [6, 8, 8, 7, A, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
 See Matrix

\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 0, 6, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_4, 2y_1, y_3, 0, y_2, y_1, y_6, 0, 0, 0, y_5, 2y_1]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6
 See Matrix

\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 0, 2, 2, 4, 4] , [0, 0, 0, 4, 0, 0, 2, 0, 4, 2, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 0, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 0, 2, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 0, 2, 2, 4, 4]] \$

$$[0, 0, 0, y_1, 0, y_2, y_3, 2y_2, y_4, y_5, y_6, y_7]$$

$$p = -s^2 + s^8$$

503 . Coloring, {5, 6, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, C, C, C, 4, 5]
B: [6, 8, 8, 7, A, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 0, 2, 4], [0, 0, 3, 2, 4, 2, 2, 0, 0, 0, 3, 0], [0, 0, 6, 3, 0, 2, 3, 0, 0, 0, 2, 0], [0, 0, 2, 2, 0, 3, 6, 0, 0, 0, 3, 0], [0, 0, 3, 3, 0, 2, 2, 0, 0, 0, 6, 0], [0, 0, 2, 6, 0, 3, 3, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 6, 2, 0, 0, 0, 3, 0]] \$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, 0, 0, 0, y_6, y_7]$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 4, 2, 0], [2, 4, 0, 0, 0, 2, 0, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0], [2, 2, 0, 0, 0, 4, 0, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 2, 0, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 2, 0, 4, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 0, 2, 0, 2, 4, 0]] \$$

$$[y_1, y_2, 0, 0, 0, y_3, y_4, y_5, 2y_4, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

504 . Coloring, $\{5, 6, 9, 12\}$

$$\Omega p(\Delta)=0: \quad p = -2s^2 - 5s^3 + 2s^4 + 16s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, C, C, C, 1, 9]

B: [6, 8, 8, 7, A, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 7	6 vs 8

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 0, 2, 4] , [2, 0, 1, 0, 0, 0, 4, 0, 4, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 4] , [4, 0, 0, 0, 0, 3, 0, 4, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 3, 4]] \$

$$[-3 y_1 - 3 y_2 - 3 y_3 + 5 y_4 - 3 y_5 + 5 y_6, 0, 3 y_1, 0, 0, 3 y_2, 3 y_3, 0, 3 y_4, 0, 3 y_5, 3 y_6]$$

$$p = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 2, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 2, 4, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 0, 2, 4, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 2, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 4, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 0, 4, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 2, 2, 0, 4, 2, 0]] \$

$$[0, y_1, 0, y_1 + 3 y_4 + y_5 - y_3 - y_2 + y_6, 2 y_4, y_4, y_5, y_3, 0, y_2, y_6, 0]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 \quad p = -s^2 + s^8$$

Â» SYNC'D !RANK'D

505 . Coloring, {5, 6, 10, 11}

R: [7, 7, 7, 6, 3, 3, B, C, B, 2, 4, 5]

B: [6, 8, 8, 7, A, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 0, 3, 1] , [0, 0, 3, 3, 1, 2, 4, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 3, 3, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 3, 3, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 4, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 3, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 3, 4, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 3, 0, 3, 3, 0, 0, 4, 0]] \$

$$[0, 2 y_7, y_1, y_2, y_3, y_5, y_4, 0, 0, 0, y_6, y_7]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 4, 1, 3], [1, 0, 0, 0, 0, 2, 0, 0, 3, 2, 2, 6], [2, 0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 5], [0, 0, 0, 0, 2, 0, 0, 5, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$$$

$$[y_1, 0, 0, 0, 0, y_2, y_3, 2 y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^6 + s^8$$

506 . Coloring, {5, 6, 10, 12}

R: [7, 7, 7, 6, 3, 3, B, C, B, 2, 1, 9]

B: [6, 8, 8, 7, A, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 0, 3, 1], [3, 0, 1, 0, 0, 0, 6, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0]] \$$$

$$[y_1, 2 y_4, y_2, 0, 0, y_4, y_5, 0, y_2, 0, y_3, y_4]$$

$$p' = -s^4 + s^7 \quad p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 4, 2, 4] , [0, 0, 0, 2, 4, 0, 1, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

[0, 0, 0, y_1 , y_2 , y_3 , y_4 , $2y_3$, 0, y_5 , y_6 , y_7]

$$p = -s^5 + s^8$$

507 . Coloring, {5, 6, 11, 12}

R: [7, 7, 7, 6, 3, 3, B, C, B, C, 4, 9]

B: [6, 8, 8, 7, A, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	8 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 0, 3, 3] , [0, 0, 1, 3, 0, 2, 2, 0, 3, 0, 5, 0] , [0, 0, 2, 5, 0, 3, 1, 0, 0, 0, 5, 0] , [0, 0, 3, 5, 0, 5, 2, 0, 0, 0, 1, 0] , [0, 0, 5, 1, 0, 5, 3, 0, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 1, 5, 0, 0, 0, 3, 0] , [0, 0, 1, 3, 0, 2, 5, 0, 0, 0, 5, 0]] \$

[0, 0, y_1 , y_2 , 0, y_6 , y_7 , 0, y_4 , 0, y_5 , y_3]

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 2, 0, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 1, 0, 4, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 0, 4, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 2, 0, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 4, 0, 1, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 4, 0, 2, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 3, 0, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 1, 0, 4, 0, 3, 2, 0]] \$

[y_1 , y_2 , 0, 0, y_3 , y_4 , y_8 , y_5 , 0, y_6 , y_7 , y_8]

$$p = -s^3 + s^9$$

508 . Coloring, {5, 7, 8, 9}

$$\Omega p(\Delta)=0: \quad p = -2s^2 - 5s^3 + 2s^4 - 16s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, A, B, C, C, 1, 5]

B: [6, 8, 8, 7, A, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	7 vs 8	8 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\begin{aligned} \$ [& [2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 1, 3], [1, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, \\ & 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, \\ & 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4]] \$ \end{aligned}$$

$$[y_2, 0, y_3, 0, y_1, y_6, y_4, 0, 0, y_5, y_6, y_7]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 3, 1], [0, 1, 1, 3, 0, 0, 2, 3, 1, 0, 3, 2], [0, 0, 0, 3, 0, 0, 3, 2, 2, 0, 3, 3], [0, 0, \\ & 0, 3, 0, 0, 3, 0, 3, 0, 5, 2], [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, \\ & 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, \\ & 5, 0]] \$ \end{aligned}$$

$$[0, y_8, y_7, y_6, 0, y_8 - y_7, y_5, y_4, y_3, y_8 - y_7, y_2, y_1]$$

$$p' = -s^6 + s^9 \quad p = -s^6 + s^9$$

Â» SYNC'D !RANK'D

509 . Coloring, {5, 7, 8, 10}

R: [7, 7, 7, 6, 3, A, A, B, B, 2, 1, 5]

B: [6, 8, 8, 8, 7, A, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 2, 0] , [2, 3, 2, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0]] \$

$$[y_2 + y_3, y_1, y_2, 0, 2y_3, y_3, y_4, 0, 0, y_5, 2y_3, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 2, 4] , [0, 0, 1, 2, 0, 0, 2, 1, 4, 0, 1, 5] , [0, 0, 0, 1, 0, 0, 2, 1, 5, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 1, 5] , [0, 0, 0, 1, 0, 0, 2, 0, 5, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 1, 0, 6, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 1, 6] , [0, 0, 0, 1, 0, 0, 2, 0, 6, 0, 2, 5]] \$

$$[0, 0, 11y_1 - 10y_5 + 11y_2 - 5y_3 - 5y_4 + 11y_6 - 5y_7, 5y_1, 0, 5y_5, 5y_2, 5y_3, 5y_4, 5y_5, 5y_6, 5y_7]$$

$$p = -s^4 - s^5 + s^7 + s^8 \quad p = s^4 - s^6 - s^7 + s^9$$

510 . Coloring, {5, 7, 8, 11}

R: [7, 7, 7, 6, 3, A, A, B, B, C, 4, 5]

B: [6, 8, 8, 8, 7, A, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 10

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 2, 2], [0, 0, 2, 2, 2, 2, 1, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 2, 2, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 4, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2], [0, 0, 4, 0, 2, 0, 3, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4]] \$$

$[0, 0, y_1, y_2, y_3, y_4, y_5, 0, 0, y_6, y_7, y_8]$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 2, 2], [2, 1, 1, 0, 0, 2, 0, 3, 2, 0, 1, 4], [1, 0, 2, 0, 0, 2, 0, 2, 4, 0, 0, 5], [0, 0, 2, 0, 0, 1, 0, 2, 5, 0, 0, 6], [0, 0, 1, 0, 0, 0, 0, 2, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$[-y_1 + y_2 + y_3 + y_4 - y_7, y_6, y_1, 0, 0, y_2, y_5, y_3, y_4, y_5, y_6, y_7]$

$$p' = s^8 - s^9 \quad p' = s^7 - s^9 \quad p = s^7 - s^{10}$$

511 . Coloring, $\{5, 7, 8, 12\}$

R: [7, 7, 7, 6, 3, A, A, B, B, C, 1, 9]

B: [6, 8, 8, 7, A, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 2, 2], [2, 0, 0, 0, 0, 0, 3, 0, 2, 4, 2, 3], [2, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 4], [2, 0, 0, 0, 0, 2, 0, 4, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 2, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 3, 2, 2], [2, 0, 0, 0, 0, 0, 3, 0, 2, 4, 2, 3]] \$$

$$[y_2 - y_3 - y_4 + y_5 + y_6, 0, y_1, 0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{2, 5, 8, 10, 12\}, \{4, 7, 11\}\}$

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 2, 2], [0, 1, 1, 2, 2, 0, 2, 3, 0, 2, 1, 2], [0, 2, 0, 1, 2, 0, 2, 2, 0, 2, 2, 3], [0, 2, 0, 2, 3, 0, 1, 2, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 2, 0, 3, 1, 2], [0, 3, 0, 1, 2, 0, 2, 2, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 1, 3, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 2, 0, 2, 1, 3], [0, 2, 0, 1, 3, 0, 2, 2, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 1, 2, 0, 3, 2, 2]] \$$

$$[0, -5y_1 + 11y_2 - 5y_9 - 5y_3 + 11y_4 - 5y_5 - 5y_6 + 11y_7 - 5y_8, 5y_1, 5y_2, 5y_9, 5y_3, 5y_4, 5y_5, 0, 5y_6, 5y_7, 5y_8]$$

$$p = s^3 + s^4 + s^5 - s^8 - s^9 - s^{10}$$

512 . Coloring, $\{5, 7, 9, 10\}$

R: $[7, 7, 7, 6, 3, A, A, C, C, 2, 1, 5]$

B: $[6, 8, 8, 7, A, 3, B, B, B, C, 4, 9]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 5, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$

$$[2 y_3, y_5, y_1, 0, y_2, y_3, y_4, 0, 0, y_6, 0, 2 y_3]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 4, 2], [0, 0, 1, 4, 0, 0, 2, 1, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 4, 1, 1, 0, 5, 0], [0, 0, \\ & 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, \\ & 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$ \end{aligned}$$

$$[0, 0, -y_3 + y_5, y_1, 0, y_3, y_2, 2 y_3 - y_5 + y_6, y_6, y_3, y_4, y_5]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

513 . Coloring, {5, 7, 9, 11}

R: [7, 7, 7, 6, 3, A, A, C, C, C, 4, 5]

B: [6, 8, 8, 7, A, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	7 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 0, 4], [0, 0, 2, 0, 4, 2, 1, 0, 0, 4, 0, 3], [0, 0, 4, 0, 3, 0, 2, 0, 0, 3, 0, 4], [0, 0, \\ & 3, 0, 4, 0, 4, 0, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, \\ & 3, 0, 0, 4, 0, 3]] \$ \end{aligned}$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, 0, 0, y_6, 0, y_7]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 4, 0] , [4, 1, 1, 0, 0, 2, 0, 3, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 5, 0, 2, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 3, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 2, 0, 5, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 3, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 5, 0, 2, 0, 0, 2, 0]] \$

$$[y_1, y_3, y_2, 0, 0, y_4, y_6, y_5, 2y_6, y_6, y_7, 0]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

514 . Coloring, {5, 7, 9, 12}

R: [7, 7, 7, 6, 3, A, A, C, C, C, 1, 9]

B: [6, 8, 8, 7, A, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	7 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 3, 0, 4, 4, 0, 5] , [0, 0, 0, 0, 0, 0, 0, 0, 5, 3, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[2y_4, 0, y_4, 0, 0, y_4, y_3, 0, y_2, y_1, 0, 2y_4 - y_3 + y_2 + y_1]$$

$$p' = s^4 - s^5 \quad p = s^4 - s^6 \quad p' = -s^5 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 4, 0] , [0, 1, 1, 4, 0, 0, 2, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 2, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 3, 2, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, y_4, y_1, y_2, 4y_1 - 2y_6, 2y_1 - y_6, y_3, y_5, 0, y_6, y_7, 0]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

515 . Coloring, {5, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 + 2s^4 - 16s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, A, C, B, 2, 4, 5]

B: [6, 8, 8, 7, A, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 3, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 1, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[0, y_1, y_3, y_2, y_2, y_3, y_4, 0, 0, y_5, y_6, y_6]$$

$$p' = -s^5 + s^8 \quad p = s^4 - s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 3, 3], [3, 0, 1, 0, 0, 2, 0, 1, 3, 0, 3, 3], [3, 0, 2, 0, 0, 3, 0, 1, 3, 0, 1, 3], [1, 0, 3, 0, 0, 3, 0, 2, 3, 0, 1, 3], [1, 0, 3, 0, 0, 1, 0, 3, 3, 0, 2, 3], [2, 0, 1, 0, 0, 1, 0, 3, 3, 0, 3, 3], [3, 0, 1, 0, 0, 2, 0, 1, 3, 0, 3, 3], [3, 0, 2, 0, 0, 3, 0, 1, 3, 0, 1, 3], [1, 0, 3, 0, 0, 3, 0, 2, 3, 0, 1, 3]] \$$$

$$[3 y_1, 0, -3 y_1 - 3 y_2 - 3 y_4 - 3 y_3 + 10 y_6 - 3 y_5, 0, 0, 3 y_2, 3 y_4, 3 y_3, -3 y_4 + 3 y_6, 3 y_4, 3 y_5, 3 y_6]$$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7 \quad p' = -s^3 + s^8$$

516 . Coloring, {5, 7, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, A, C, B, 2, 1, 9]

B: [6, 8, 8, 7, A, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 5, 0, 1, 4, 2, 0], [2, 4, 0, 0, 0, 0, 4, 0, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

$$[y_1, y_3, y_5, 0, 0, y_5, y_2, 0, y_6, y_7, y_4, y_5]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}, {5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 3, 3], [0, 0, 1, 3, 3, 0, 2, 1, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 3, 1, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 4, 3], [0, 0, 0, 4, 3, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 4, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 4, 3], [0, 0, 0, 4, 3, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 4, 0, 0, 3, 3, 2]] \$

$$[0, 0, y_4, y_3, y_2, -6y_4 - 6y_3 + 5y_2 + 4y_1 + 4y_6 - y_5, y_1, y_6, 0, 5y_4 + 5y_3 - 4y_2 - 2y_1 - 2y_6, y_5, -8y_4 - 8y_3 + 6y_2 + 5y_1 + 5y_6]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

517 . Coloring, {5, 7, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, A, C, B, C, 4, 9]

B: [6, 8, 8, 7, A, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 2, 1, 0, 3, 4, 2, 3] , [0, 0, 0, 2, 0, 1, 0, 0, 3, 3, 3, 4] , [0, 0, 0, 3, 0, 2, 0, 0, 4, 1, 3, 3] , [0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 4, 1] , [0, 0, 0, 4, 0, 3, 0, 0, 1, 3, 3, 2] , [0, 0, 0, 3, 0, 4, 0, 0, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 3, 0, 0, 3, 4, 2, 3]] \$

$$[0, 0, y_1, y_2, 0, y_3, y_4, 0, y_5, y_6, y_7, y_1 + y_2 - y_3 - y_4 + y_5 + y_6 - y_7]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 2, 0, 3, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 3, 0, 2, 0, 1, 3, 0] , [3, 1, 3, 0, 0, 3, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 0, 3, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0]] \$

$$[y_1, y_2, y_3, 0, y_9, y_8, y_6, y_7, 0, y_4, y_5, y_6]$$

$$p = s^5 - s^{10}$$

518 . Coloring, {5, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, B, B, C, 2, 1, 5]

B: [6, 8, 8, 7, A, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 3, 1], [3, 1, 2, 0, 1, 0, 5, 0, 0, 1, 3, 0], [3, 1, 1, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$$[y_1, y_2 + 2y_6 - y_4, y_2, 0, y_6 + y_4, y_6, y_3, 0, 0, y_4, y_5, y_6]$$

$$p' = -s^5 + s^8 \quad p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{4, 7, 9, 10, 11, 12\}\}$ order: 6
See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 1, 3], [0, 0, 1, 1, 0, 0, 2, 1, 3, 1, 2, 5], [0, 0, 0, 2, 0, 0, 1, 1, 5, 2, 3, 2], [0, 0, 0, 3, 0, 0, 2, 0, 2, 1, 5, 3], [0, 0, 0, 5, 0, 0, 3, 0, 3, 2, 2, 1], [0, 0, 0, 2, 0, 0, 5, 0, 1, 3, 3, 2], [0, 0, 0, 3, 0, 0, 2, 0, 2, 5, 1, 3], [0, 0, 0, 1, 0, 0, 3, 0, 3, 2, 2, 5], [0, 0, 0, 2, 0, 0, 1, 0, 5, 3, 3, 2]] \$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

519 . Coloring, $\{5, 8, 9, 11\}$

$$\Omega p(\Delta)=0: \quad p = 2s^2 - s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, B, B, C, C, 4, 5]

B: [6, 8, 8, 7, A, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{3, 4, 5, 6, 7, 10, 11, 12\}\}$ order: 8
 See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 1, 0, 0, 1, 3, 1], [0, 0, 3, 3, 1, 3, 2, 0, 0, 2, 1, 1], [0, 0, 1, 1, 1, 3, 3, 0, 0, 3, 2, 2], [0, 0, 1, 2, 2, 1, 1, 0, 0, 3, 3, 3], [0, 0, 2, 3, 3, 2, 1, 0, 0, 1, 1, 3], [0, 0, 3, 1, 3, 3, 2, 0, 0, 2, 1, 1], [0, 0, 3, 1, 1, 1, 3, 0, 0, 3, 2, 2]] \$$

$$[0, 0, y_1 + y_2 - y_3 + y_5 + y_4 - y_6 - y_7, y_1, y_2, y_3, y_5, 0, 0, y_4, y_6, y_7]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7
 See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 1, 1], [1, 3, 1, 0, 0, 2, 0, 3, 1, 1, 2, 2], [2, 1, 2, 0, 0, 1, 0, 4, 2, 0, 1, 3], [1, 0, 1, 0, 0, 2, 0, 3, 3, 0, 2, 4], [2, 0, 2, 0, 0, 1, 0, 1, 4, 0, 3, 3], [3, 0, 1, 0, 0, 2, 0, 2, 3, 0, 4, 1], [4, 0, 2, 0, 0, 3, 0, 1, 1, 0, 3, 2], [3, 0, 3, 0, 0, 4, 0, 2, 2, 0, 1, 1], [1, 0, 4, 0, 0, 3, 0, 3, 1, 0, 2, 2], [2, 0, 3, 0, 0, 1, 0, 4, 2, 0, 1, 3]] \$$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_9, y_6, y_{10}, y_7, y_8]$$

520 . Coloring, $\{5, 8, 9, 12\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 16s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, B, B, C, C, 1, 9]

B: [6, 8, 8, 7, A, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	4 vs 8	8 vs 10

Omega Rank for R : cycles: $\{\{9, 12\}, \{1, 7, 11\}\}$ order: 6
 See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3]] \$$

$$[-4y_3 + 3y_1 + 3y_2 + 3y_4, 0, 7y_3 - 3y_1 - 3y_2 - 3y_4, 0, 0, 7y_3 - 3y_1 - 3y_2 - 3y_4, 3y_3, 0, 3y_1, 3y_2, 3y_3, 3y_4]$$

$$p = -s^3 + s^7 \quad p' = -s^3 + s^7 \quad p = -s^3 + s^5 \quad p' = -s^3 + s^5$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 1, 1], [0, 3, 1, 1, 1, 0, 2, 3, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 1, 4, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3], [0, 3, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3]] \$$$

$$[0, y_5, y_4, y_4 + y_8, y_3, y_8, y_1, y_2, 0, y_7, y_8, y_6]$$

$$p = -s^4 + s^9 \quad p' = -s^4 + s^9$$

Â» SYNC'D !RANK'D

521 . Coloring, {5, 8, 10, 11}

R: [7, 7, 7, 6, 3, A, B, B, B, 2, 4, 5]

B: [6, 8, 8, 7, A, 3, A, C, C, C, 1, 9]

' See graph

' ' See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	5 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 4, 0], [0, 1, 2, 4, 0, 2, 3, 0, 0, 1, 3, 0], [0, 1, 0, 3, 0, 4, 3, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 1, 0, 0, 4, 3, 0], [0, 4, 0, 3, 0, 3, 2, 0, 0, 3, 1, 0], [0, 3, 0, 1, 0, 3, 4, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 1, 3, 0, 0, 3, 4, 0], [0, 3, 0, 4, 0, 2, 3, 0, 0, 1, 3, 0]] \$$$

$$[0, -y_1 + y_2 + y_3 - y_4 + y_5 + y_6 - y_7, y_1, y_2, y_3, y_4, y_5, 0, 0, y_6, y_7, 0]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 0, 4] , [0, 0, 1, 0, 0, 2, 0, 1, 4, 1, 0, 7] , [0, 0, 2, 0, 0, 0, 0, 1, 7, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[2y_4, 0, -8y_4 + y_5 + y_3 + 3y_2 - y_1, 0, 0, -5y_4 + 2y_2, y_4, y_5, y_3, y_2, 0, y_1]$$

$$p' = -s^5 + s^7 \quad p = s^5 - s^6 \quad p' = -s^5 + s^6$$

522 . Coloring, {5, 8, 10, 12}

R: [7, 7, 7, 6, 3, A, B, B, B, 2, 1, 9]

B: [6, 8, 8, 7, A, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 5, 0, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_5, y_4, y_3, 0, 0, y_3, y_2, 0, 2y_3, y_1, y_6, 0]$$

$$p' = -s^4 + s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 0, 2, 1, 0, 3, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 1, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5]] \$

$$[0, 0, y_1, 4y_1 - 2y_3, y_2, 2y_1 - y_3, y_3, y_4, 0, y_5, 0, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

523 . Coloring, {5, 8, 11, 12}

R: [7, 7, 7, 6, 3, A, B, B, B, C, 4, 9]

B: [6, 8, 8, 7, A, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 4, 2], [0, 0, 0, 4, 0, 2, 1, 0, 2, 1, 5, 1], [0, 0, 0, 5, 0, 4, 0, 0, 1, 2, 3, 1], [0, 0, 0, 3, 0, 5, 0, 0, 1, 4, 1, 2], [0, 0, 0, 1, 0, 3, 0, 0, 2, 5, 1, 4], [0, 0, 0, 1, 0, 1, 0, 0, 4, 3, 2, 5], [0, 0, 0, 2, 0, 1, 0, 0, 5, 1, 4, 3], [0, 0, 0, 4, 0, 2, 0, 0, 3, 1, 5, 1]] \$

$$[0, 0, y_1 - y_2 + y_7 + y_3 + y_4 - y_5 - y_6, y_1, 0, y_2, y_7, 0, y_3, y_4, y_5, y_6]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 0, 2], [0, 3, 1, 0, 2, 2, 0, 3, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 0, 4, 0, 2, 0, 3], [0, 2, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 2, 0, 3, 0, 5], [0, 3, 0, 0, 5, 0, 0, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2], [0, 5, 0, 0, 2, 0, 0, 4, 0, 2, 0, 3], [0, 2, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4]] \$

$$[2y_3, y_8, y_7, 0, y_6, y_5, y_3, y_4, 0, y_2, 0, y_1]$$

$$p = -s^4 + s^9$$

524 . Coloring, {5, 9, 10, 11}

R: [7, 7, 7, 6, 3, A, B, C, C, 2, 4, 5]
B: [6, 8, 8, 7, A, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6
 See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 2, 2] , [0, 1, 2, 2, 2, 2, 3, 0, 0, 1, 3, 0] , [0, 1, 2, 3, 0, 2, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 2, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 3, 2, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 3, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 3, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 2, 3, 0, 0, 2, 3, 0]] \$

$$[0, y_1, -y_1 + y_4 + y_5 - y_3 + y_2 + y_7 - y_8 - y_6, y_4, y_5, y_3, y_2, 0, 0, y_7, y_8, y_6]$$

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5
 See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 2, 2] , [2, 0, 1, 0, 0, 2, 0, 1, 2, 1, 4, 3] , [4, 0, 2, 0, 0, 2, 0, 1, 3, 0, 3, 1] , [3, 0, 2, 0, 0, 4, 0, 2, 1, 0, 4, 0] , [4, 0, 4, 0, 0, 3, 0, 2, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 0, 3, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 0, 4, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 4, 0, 3, 0, 0, 4, 0]] \$

$$[y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_9, y_6, y_7, y_8]$$

525 . Coloring, {5, 9, 10, 12}

R: [7, 7, 7, 6, 3, A, B, C, C, 2, 1, 9]
B: [6, 8, 8, 7, A, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 2, 2] , [2, 1, 0, 0, 0, 0, 5, 0, 2, 1, 3, 2] , [3, 1, 0, 0, 0, 0, 3, 0, 2, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 2]] \$

$$[-y_6 - 2y_1 - y_2 + 6y_5 - y_3 - y_4, y_6, y_1, 0, 0, y_1, y_2, 0, y_5, y_3, y_4, y_5]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 0, 2, 1, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 1, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 5, 1, 4] , [0, 0, 0, 1, 4, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[0, 0, y_4, y_5, y_1, y_2, y_3, y_6, 0, y_7, y_8, y_9]$$

526 . Coloring, {5, 9, 11, 12}

R: [7, 7, 7, 6, 3, A, B, C, C, C, 4, 9]

B: [6, 8, 8, 7, A, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 2, 4] , [0, 0, 0, 2, 0, 2, 1, 0, 4, 1, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 1, 5] , [0, 0, 0, 1, 0, 3, 0, 0, 5, 2, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_7, y_6, 0, y_5, y_4, 0, y_3, y_2, y_1, -y_7 + y_6 - y_5 + y_4 + y_3 + y_2 - y_1]$$

$$p = s^7 - s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 2, 0], [2, 3, 1, 0, 0, 2, 0, 3, 0, 3, 2, 0], [2, 3, 2, 0, 0, 2, 0, 4, 0, 0, 3, 0], [3, 0, 2, 0, 0, 2, 0, 5, 0, 0, 4, 0], [4, 0, 2, 0, 0, 3, 0, 2, 0, 0, 5, 0], [5, 0, 3, 0, 0, 4, 0, 2, 0, 0, 2, 0], [2, 0, 4, 0, 0, 5, 0, 3, 0, 0, 2, 0], [2, 0, 5, 0, 0, 2, 0, 4, 0, 0, 3, 0], [3, 0, 2, 0, 0, 2, 0, 5, 0, 0, 4, 0]] \$$$

$$[y_2, y_1, y_5, 0, 2y_3, y_4, y_3, y_7, 0, y_6, y_8, 0]$$

$$p = -s^4 + s^9$$

527 . Coloring, {5, 10, 11, 12}

$$\Omega p(\Delta)=0: p = -9s^3 + 2s^4 - 16s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, B, C, B, 2, 4, 9]

B: [6, 8, 8, 7, A, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 3, 0, 1, 1, 5, 0], [0, 1, 0, 5, 0, 3, 1, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 5, 1, 0, 0, 3, 1, 0], [0, 3, 0, 1, 0, 4, 2, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 1, 3, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 1, 5, 0, 0, 1, 3, 0], [0, 1, 0, 3, 0, 2, 4, 0, 0, 1, 5, 0], [0, 1, 0, 5, 0, 3, 1, 0, 0, 2, 4, 0]] \$$$

$$[0, -2y_7 + y_1 - y_2 + y_3 + y_4 + y_5 - y_6, y_7, y_1, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = -s^3 + s^9 \quad p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}, \{1, 3, 6, 8, 11\}\}$

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 1, 3], [1, 0, 1, 0, 3, 2, 0, 1, 0, 3, 2, 3], [2, 0, 2, 0, 3, 1, 0, 1, 0, 3, 1, 3], [1, 0, 1, 0, 3, 2, 0, 2, 0, 3, 1, 3], [1, 0, 2, 0, 3, 1, 0, 1, 0, 3, 2, 3], [2, 0, 1, 0, 3, 1, 0, 2, 0, 3, 1, 3], [1, 0, 1, 0, 3, 2, 0, 1, 0, 3, 2, 3], [2, 0, 2, 0, 3, 1, 0, 1, 0, 3, 1, 3], [1, 0, 1, 0, 3, 2, 0, 2, 0, 3, 1, 3]] \$$

$$[-3y_1 + 7y_6 - 3y_2 - 3y_4 - 3y_5, 0, 3y_1, 0, -3y_3 + 3y_6, 3y_2, 3y_3, 3y_4, 0, 3y_6, 3y_5, 3y_6]$$

$$p' = -s^3 + s^8 \quad p' = -s^2 + s^7 \quad p = -s^2 + s^7$$

528 . Coloring, $\{6, 7, 8, 9\}$

$$\Omega p(\Delta)=0: \quad p = -6s^2 + s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, 3, A, B, C, C, 1, 5]

B: [6, 8, 8, 7, 3, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 10

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 1, 3], [1, 0, 1, 0, 3, 0, 3, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 0, 2, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$

$$[y_3, 0, y_3 - y_5, 0, y_2, y_5, y_1, 0, 0, y_6, y_5, y_4]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 9

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 2, 3, 1, 1, 3, 2], [0, 1, 0, 3, 0, 0, 3, 1, 2, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 1, 3, 0, 5, 1], [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 6, 1], [0, 0, 0, 6, 0, 0, 5, 0, 1, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$$[0, y_1, y_8, y_9, 0, y_8, y_7, y_6, y_5, y_4, y_3, y_2]$$

$$p = s^7 - s^{10}$$

529 . Coloring, {6, 7, 8, 10}

R: [7, 7, 7, 6, A, 3, A, B, B, 2, 1, 5]

B: [6, 8, 8, 7, 3, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	6 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 2, 0] , [2, 3, 1, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[2y_4, y_1, y_4, 0, 2y_3, y_3, y_2, 0, 0, y_5, 2y_3, 0]$$

$$p' = -s^4 + s^7 \quad p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 1, 4, 1, 1, 5] , [0, 0, 0, 1, 0, 0, 2, 0, 5, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 1, 0, 6, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 1, 6] , [0, 0, 0, 1, 0, 0, 2, 0, 6, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 1, 5] , [0, 0, 0, 1, 0, 0, 2, 0, 5, 0, 2, 6]] \$

$$[0, 0, 5y_6, 5y_5, 0, 5y_6, 5y_4, 5y_3, 5y_2, -5y_6 + 5y_3, 5y_1, -5y_6 + 11y_5 + 11y_4 - 10y_3 - 5y_2 + 11y_1]$$

$$p' = s^4 + s^5 - s^7 - s^8 \quad p' = s^3 - s^5 - s^6 + s^8 \quad p = s^3 - s^9$$

530 . Coloring, {6, 7, 8, 11}

R: [7, 7, 7, 6, A, 3, A, B, B, C, 4, 5]

B: [6, 8, 8, 7, 3, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 2, 1, 0, 0, 5, 0, 3] , [0, 0, 2, 0, 3, 2, 1, 0, 0, 3, 0, 5] , [0, 0, 2, 0, 5, 0, 2, 0, 0, 4, 0, 3] , [0, 0, 0, 0, 3, 0, 2, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4]] \$

$$[0, 0, y_2, y_3, y_1, y_7, y_8, 0, 0, y_6, y_4, y_5]$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 2, 2] , [2, 1, 0, 0, 0, 2, 0, 3, 2, 1, 1, 4] , [1, 1, 0, 0, 0, 2, 0, 1, 4, 2, 0, 5] , [0, 2, 0, 0, 0, 1, 0, 1, 5, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 0, 2, 5, 1, 0, 6] , [0, 1, 0, 0, 0, 0, 0, 2, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_1 + y_2 - y_4 - y_5 - y_6 + y_7 + y_8, y_1, y_3, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p = -s^8 + s^9 \quad p = -s^8 + s^{10}$$

531 . Coloring, {6, 7, 8, 12}

R: [7, 7, 7, 6, A, 3, A, B, B, C, 1, 9]

B: [6, 8, 8, 7, 3, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 2, 2], [2, 0, 1, 0, 0, 0, 3, 0, 2, 3, 2, 3], [2, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 3], [2, 0, 0, 0, 0, 2, 0, 3, 3, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 2, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 2, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 3, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 3, 2, 3]] \$$

$$[-y_4 + y_1 + y_2 - y_3 - y_5 + y_6 + y_7, 0, y_4, 0, 0, y_1, y_2, 0, y_3, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}, \{4, 7, 11\}\}$ order: 12

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 2, 2], [0, 1, 2, 2, 2, 0, 2, 3, 0, 1, 1, 2], [0, 1, 2, 1, 2, 0, 2, 3, 0, 0, 2, 3], [0, 0, 2, 2, 3, 0, 1, 3, 0, 0, 2, 3], [0, 0, 3, 2, 3, 0, 2, 2, 0, 0, 1, 3], [0, 0, 3, 1, 3, 0, 2, 3, 0, 0, 2, 2], [0, 0, 3, 2, 2, 0, 1, 3, 0, 0, 2, 3], [0, 0, 2, 2, 3, 0, 2, 3, 0, 0, 1, 3], [0, 0, 3, 1, 3, 0, 2, 2, 0, 0, 2, 3], [0, 0, 3, 2, 3, 0, 1, 3, 0, 0, 2, 2]] \$$

$$[0, 5y_7, 5y_5, 5y_6, 5y_4, 5y_2, 5y_3, 5y_1, 0, -5y_7 - 5y_5 + 11y_6 - 5y_4 - 5y_2 + 11y_3 - 5y_1 + 11y_9 - 5y_8, 5y_9, 5y_8]$$

$$p = -s^4 - s^5 - s^6 + s^8 + s^9 + s^{10}$$

532 . Coloring, $\{6, 7, 9, 10\}$

R: [7, 7, 7, 6, A, 3, A, C, C, 2, 1, 5]

B: [6, 8, 8, 7, 3, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0]] \$

$$[2 y_3, y_1, y_2, 0, 2 y_2, y_3, y_4, 0, 0, y_5, 0, 2 y_3]$$

$$p = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 1, 2, 1, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, 0, y_3 - y_5, y_1, 0, y_3 - y_5, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p' = s^5 - s^8 \quad p = -s^5 + s^8$$

533 . Coloring, {6, 7, 9, 11}

R: [7, 7, 7, 6, A, 3, A, C, C, C, 4, 5]

B: [6, 8, 8, 7, 3, A, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	6 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 2, 1, 0, 0, 5, 0, 3] , [0, 0, 2, 0, 3, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 2, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5]] \$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, 0, 0, y_6, 0, y_7]$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 4, 0] , [4, 1, 0, 0, 0, 2, 0, 3, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 4, 0, 1, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 5, 0, 1, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 3, 0, 2, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 1, 0, 4, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 1, 0, 5, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 2, 0, 3, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 4, 0, 1, 0, 2, 3, 0]] \$

$$[y_1 - 2y_3 + y_2 - y_4 - y_5 + y_6, y_1, y_3, 0, 0, y_2, y_3, y_4, 2y_3, y_5, y_6, 0]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 \quad p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

534 . Coloring, {6, 7, 9, 12}

R: [7, 7, 7, 6, A, 3, A, C, C, C, 1, 9]

B: [6, 8, 8, 7, 3, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	7 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 0, 4] , [0, 0, 1, 0, 0, 0, 3, 0, 4, 3, 0, 5] , [0, 0, 0, 0, 0, 0, 1, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[2y_1, 0, -y_1 + y_2 - y_3 - y_4 + y_5, 0, 0, y_1, y_2, 0, y_3, y_4, 0, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 4, 0] , [0, 1, 2, 4, 0, 0, 2, 3, 0, 1, 3, 0] , [0, 1, 0, 3, 0, 0, 4, 3, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 3, 1, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0]] \$

$$[0, y_3, y_4, y_2, -2y_4 + 4y_6, -y_4 + 2y_6, y_1, y_7, 0, y_6, y_5, 0]$$

$$p' = -s^5 + s^8 \quad p = s^5 - s^8$$

535 . Coloring, {6, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 - 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, 3, A, C, B, 2, 4, 5]

B: [6, 8, 8, 7, 3, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	7 vs 9	7 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 1, 1] , [0, 3, 1, 1, 1, 2, 3, 0, 0, 5, 0, 0] , [0, 5, 2, 0, 0, 1, 4, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 7, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0]] \$

$$[0, y_1, y_2, y_7, y_7, y_3, y_4, 0, 0, y_5, y_6, y_6]$$

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 1, 3, 1, 3, 3] , [3, 0, 0, 0, 0, 3, 0, 0, 3, 2, 1, 4] , [1, 0, 0, 0, 0, 3, 0, 0, 4, 3, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_1 - y_3 - y_4 - y_5 + y_6 + y_7, 0, y_2, 0, 0, y_1, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^7 + s^8 \quad p = -s^7 + s^9$$

Â» SYNC'D !RANK'D

536 . Coloring, {6, 7, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, 3, A, C, B, 2, 1, 9]

B: [6, 8, 8, 7, 3, A, B, B, C, C, 4, 5]

' See graph

' ' See pair graph

,

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 1, 1], [1, 3, 1, 0, 0, 0, 5, 0, 1, 3, 2, 0], [2, 3, 0, 0, 0, 0, 5, 0, 0, 5, 1, 0], [1, 5, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$$

$$[y_1, y_2, -y_6 + y_7, 0, 0, y_6, y_3, 0, y_7, y_4, y_5, y_6]$$

$$p = s^5 - s^8 \quad p' = s^5 - s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 9

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 3, 3], [0, 0, 2, 3, 3, 0, 2, 1, 0, 1, 3, 1], [0, 0, 3, 3, 1, 0, 3, 2, 0, 0, 3, 1], [0, 0, 1, 3, 1, 0, 3, 3, 0, 0, 5, 0], [0, 0, 1, 5, 0, 0, 3, 1, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 1, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

537 . Coloring, {6, 7, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, A, C, B, C, 4, 9]

B: [6, 8, 8, 7, 3, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 10

Omega Rank for R : cycles: {{3, 4, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 1, 3] , [0, 0, 1, 1, 0, 2, 1, 0, 3, 3, 2, 3] , [0, 0, 2, 2, 0, 1, 1, 0, 3, 1, 3, 3] , [0, 0, 1, 3, 0, 2, 2, 0, 3, 1, 3, 1] , [0, 0, 2, 3, 0, 3, 1, 0, 1, 2, 3, 1] , [0, 0, 3, 3, 0, 3, 2, 0, 1, 1, 1, 2] , [0, 0, 3, 1, 0, 3, 3, 0, 2, 2, 1, 1] , [0, 0, 3, 1, 0, 1, 3, 0, 1, 3, 2, 2]] \$

$$[0, 0, -y_1 + y_2 + y_3 - y_4 - y_5 + y_6 + y_7, y_1, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 0, 3, 0, 1, 3, 0] , [3, 1, 1, 0, 0, 3, 0, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 0, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 0, 2, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 0, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 0, 3, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 0, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 0, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 0, 2, 0, 3, 3, 0]] \$

$$[y_1 + y_2 - y_3 + y_4 - y_5 - y_6 + y_7, y_1, y_2, 0, y_3, y_4, y_8, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^4 + s^{10} \quad p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

538 . Coloring, {6, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, B, B, C, 2, 1, 5]

B: [6, 8, 8, 7, 3, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 0, 5, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 5, 0, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_1, y_2, y_3 - y_7, 0, y_3, y_7, y_4, 0, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 1, 3, 2, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 5, 2] , [0, 0, 0, 5, 0, 0, 3, 0, 2, 2, 3, 1] , [0, 0, 0, 3, 0, 0, 5, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 5, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 3, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 2, 3, 3]] \$

$$[0, 0, y_2, y_1, 0, y_2, y_3, y_6, y_4, y_5, y_8, y_7]$$

$$p = -s^3 + s^9$$

539 . Coloring, {6, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, 3, B, B, C, C, 4, 5]

B: [6, 8, 8, 7, 3, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}, \{5, 10, 12\}\}$

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 3, 3], [0, 0, 1, 3, 3, 2, 1, 0, 0, 2, 3, 1], [0, 0, 2, 3, 1, 3, 1, 0, 0, 3, 1, 2], [0, 0, 3, 1, 2, 3, 2, 0, 0, 1, 1, 3], [0, 0, 3, 1, 3, 1, 3, 0, 0, 2, 2, 1], [0, 0, 1, 2, 1, 1, 3, 0, 0, 3, 3, 2], [0, 0, 1, 3, 2, 2, 1, 0, 0, 1, 3, 3], [0, 0, 2, 3, 3, 3, 1, 0, 0, 2, 1, 1]] \$$

$[0, 0, -3y_1 + 5y_2 - 3y_3 - 3y_4 + 5y_5 - 3y_6 + 5y_7, 3y_1, 3y_2, 3y_3, 3y_4, 0, 0, 3y_5, 3y_6, 3y_7]$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2], [2, 2, 0, 0, 0, 1, 0, 3, 2, 2, 1, 3], [1, 2, 0, 0, 0, 2, 0, 2, 3, 1, 2, 3], [2, 1, 0, 0, 0, 1, 0, 2, 3, 2, 3, 2], [3, 2, 0, 0, 0, 2, 0, 1, 2, 1, 3, 2], [3, 1, 0, 0, 0, 3, 0, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 3, 0, 1, 1, 3, 2, 2], [2, 3, 0, 0, 0, 2, 0, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2]] \$$

$[y_1, y_2, y_4, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$

$$p = -s^2 + s^{10}$$

540 . Coloring, $\{6, 8, 9, 12\}$

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, B, B, C, C, 1, 9]

B: [6, 8, 8, 7, 3, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	9 vs 10

Omega Rank for R : cycles: $\{\{9, 12\}, \{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 3, 3], [3, 0, 1, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3]] \$$

$$[-3y_1 - 3y_3 - 3y_2 + 10y_5 - 3y_4, 0, 3y_1, 0, 0, 3y_3, 3y_2, 0, -3y_3 + 3y_5, 3y_3, 3y_4, 3y_5]$$

$$p' = -s^4 + s^7 \quad p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8
See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 1, 1], [0, 3, 2, 1, 1, 0, 2, 3, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 1, 5, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 0, 3, 0, 1, 0, 5], [0, 1, 3, 0, 5, 0, 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$$

$$[0, y_1, y_2, y_3, y_4, y_8, y_5, y_6, 0, y_9, y_8, y_7]$$

$$p = s^6 - s^{10}$$

541 . Coloring, $\{6, 8, 10, 11\}$

R: [7, 7, 7, 6, A, 3, B, B, B, 2, 4, 5]

B: [6, 8, 8, 7, 3, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	5 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 4, 0] , [0, 1, 1, 4, 0, 2, 3, 0, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 4, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 4, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0]] \$

[0, y₈, y₇, y₅, y₆, y₄, y₃, 0, 0, y₁, y₂, 0]

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 1, 4, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[2 y₁, 0, y₁, 0, 0, -3 y₁ + 2 y₅, y₁, y₅, y₄, y₃, 0, y₂]

$$p' = -s^5 + s^7 \quad p' = s^4 - s^6 \quad p = s^4 - s^6$$

542 . Coloring, {6, 8, 10, 12}

R: [7, 7, 7, 6, A, 3, B, B, B, 2, 1, 9]

B: [6, 8, 8, 7, 3, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 4, 0] , [4, 1, 1, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_1, y_2 + y_4, y_2, 0, 0, y_4, y_3, 0, 2y_4, y_4, y_5, 0]$$

$$p' = s^3 - s^6 \quad p' = s^4 - s^7 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 2, 1, 0, 2, 0, 5], [0, 0, 4, 0, 5, 0, 0, 2, 0, 2, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$$$

$$[0, 0, y_2, 2y_3, y_1, y_3, y_4, y_7, 0, y_6, 0, y_5]$$

$$p = -s^4 + s^8$$

543 . Coloring, {6, 8, 11, 12}

R: [7, 7, 7, 6, A, 3, B, B, B, C, 4, 9]

B: [6, 8, 8, 7, 3, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 4, 2], [0, 0, 1, 4, 0, 2, 1, 0, 2, 0, 5, 1], [0, 0, 2, 5, 0, 4, 1, 0, 1, 0, 3, 0], [0, 0, 4, 3, 0, 5, 2, 0, 0, 0, 2, 0], [0, 0, 5, 2, 0, 3, 4, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 2, 5, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 3, 0, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 2, 0, 0, 0, 3, 0]] \$$$

$$[0, 0, y_1, y_2, 0, y_4, y_5, 0, y_6, y_7, y_8, y_3]$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 0, 2], [0, 3, 2, 0, 2, 2, 0, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 0, 5, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4]] \$$$

$$[2 y_2, y_1, y_5, 0, y_4, y_3, y_2, y_7, 0, y_6, 0, y_8]$$

$$p = -s^5 + s^9$$

544 . Coloring, {6, 9, 10, 11}

R: [7, 7, 7, 6, A, 3, B, C, C, 2, 4, 5]

B: [6, 8, 8, 7, 3, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 2, 2] , [0, 1, 1, 2, 2, 2, 3, 0, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 2, 2, 0, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 3, 4, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 4, 0, 0, 0, 2, 0]] \$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, 0, 0, y_7, y_8, y_9]$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 2, 2] , [2, 0, 0, 0, 0, 2, 0, 1, 2, 2, 4, 3] , [4, 0, 0, 0, 0, 2, 0, 0, 3, 2, 3, 2] , [3, 0, 0, 0, 0, 4, 0, 0, 2, 2, 3, 2] , [3, 0, 0, 0, 0, 3, 0, 0, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 3, 0, 0, 2, 3, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 3, 2, 3] , [2, 0, 0, 0, 0, 2, 0, 0, 3, 2, 4, 3] , [4, 0, 0, 0, 0, 2, 0, 0, 3, 2, 3, 2]] \$

$$[y_1, 0, y_3, 0, 0, y_2, y_3, y_4, y_7, y_5, y_6, y_8]$$

$$p = -s^3 + s^9$$

545 . Coloring, {6, 9, 10, 12}

R: [7, 7, 7, 6, A, 3, B, C, C, 2, 1, 9]
B: [6, 8, 8, 7, 3, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6
 See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 2, 2] , [2, 1, 1, 0, 0, 0, 5, 0, 2, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 2]] \$

$$[-2 y_1 - 3 y_3 - y_2 + 6 y_5 - y_4, y_1 + y_3, y_1, 0, 0, y_3, y_2, 0, y_5, y_3, y_4, y_5]$$

$$p' = -s^4 + s^7 \quad p = -s^3 + s^9 \quad p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{3, 4, 5, 7, 8, 10, 11, 12}} order: 8
 See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 1, 0, 2, 2, 3] , [0, 0, 2, 2, 3, 0, 2, 2, 0, 2, 1, 2] , [0, 0, 3, 1, 2, 0, 2, 2, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 1, 3, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 2, 0, 1, 3, 2] , [0, 0, 2, 3, 2, 0, 2, 2, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 0, 3, 2, 0, 2, 2, 2] , [0, 0, 1, 2, 2, 0, 2, 2, 0, 3, 2, 2]] \$

$$[0, 0, y_9, y_8, y_7, y_6, y_5, y_4, 0, y_3, y_2, y_1]$$

546 . Coloring, {6, 9, 11, 12}

R: [7, 7, 7, 6, A, 3, B, C, C, C, 4, 9]
B: [6, 8, 8, 7, 3, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {3, 4, 6, 7, 11}} order: 10

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 2, 4] , [0, 0, 1, 2, 0, 2, 1, 0, 4, 0, 3, 3] , [0, 0, 2, 3, 0, 2, 1, 0, 3, 0, 1, 4] , [0, 0, 2, 1, 0, 3, 2, 0, 4, 0, 1, 3] , [0, 0, 3, 1, 0, 1, 2, 0, 3, 0, 2, 4] , [0, 0, 1, 2, 0, 1, 3, 0, 4, 0, 2, 3] , [0, 0, 1, 2, 0, 2, 1, 0, 3, 0, 3, 4] , [0, 0, 2, 3, 0, 2, 1, 0, 4, 0, 1, 3]] \$

[0, 0, 7 y₇, 7 y₆, 0, 7 y₅, 7 y₄, 0, 7 y₃, 7 y₂, -7 y₇ - 7 y₆ - 7 y₅ - 7 y₄ + 9 y₃ + 9 y₂ + 9 y₁, 7 y₁]

$$p = s^2 + s^3 - s^7 - s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 2, 0] , [2, 3, 2, 0, 0, 2, 0, 3, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 2, 0, 5, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 0, 2, 0, 2, 5, 0] , [5, 2, 0, 0, 0, 3, 0, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 5, 0, 2, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 0, 2, 0, 5, 2, 0] , [2, 5, 0, 0, 0, 2, 0, 3, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 2, 0, 5, 0, 2, 3, 0]] \$

[y₁, y₂, y₃, 0, 2 y₅, y₄, y₅, y₆, 0, y₇, y₈, 0]

$$p = -s^3 + s^9$$

547 . Coloring, {6, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, 3, B, C, B, 2, 4, 9]

B: [6, 8, 8, 7, 3, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 3, 1] , [0, 1, 1, 3, 0, 2, 3, 0, 1, 0, 5, 0] , [0, 0, 2, 5, 0, 3, 2, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 5, 2, 0, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 4, 3, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 2, 5, 0, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 2, 4, 0, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 3, 2, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 5, 2, 0, 0, 0, 2, 0]] \$

$[0, y_5, y_1, y_2, 0, y_3, y_4, 0, y_5, y_7, y_6, y_7]$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 5, 6, 8, 10, 11, 12\}\}$ order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 1, 0, 2, 2, 3] , [2, 0, 3, 0, 3, 1, 0, 2, 0, 2, 1, 2] , [1, 0, 3, 0, 2, 2, 0, 3, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 1, 0, 3, 0, 2, 3, 1] , [3, 0, 2, 0, 1, 2, 0, 2, 0, 1, 3, 2] , [3, 0, 1, 0, 2, 3, 0, 2, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 3, 0, 1, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 2, 0, 2, 0, 3, 1, 3]] \$

$[y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$

548 . Coloring, {7, 8, 9, 10}

R: [7, 7, 7, 6, A, A, A, B, C, 2, 1, 5]

B: [6, 8, 8, 7, 3, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 3

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[y_2, y_1, 0, 0, y_2, y_5, y_3, 0, 0, y_4, y_5, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 2, 2, 0, 1, 1, 2, 2, 0, 3, 3], [0, 0, 1, 3, 0, 0, 2, 2, 3, 0, 3, 2], [0, 0, 0, 3, 0, 0, 3, 1, 2, 0, 5, 2], [0, 0, \\ & 0, 5, 0, 0, 3, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, \\ & 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$ \end{aligned}$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_7, 0, y_6, y_8]$$

549 . Coloring, {7, 8, 9, 11}

R: [7, 7, 7, 6, A, A, A, B, C, C, 4, 5]

B: [6, 8, 8, 7, 3, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 0, 2, 2, 1, 3, 0, 0, 4, 1, 3], [0, 0, 0, 1, 3, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 6], [0, 0, \\ & 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, \\ & 0, 0, 0, 5, 0, 5]] \$ \end{aligned}$$

$$[0, 0, 0, y_5, y_1, y_2, 3 y_4, 0, 0, y_3, y_4, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

$$\begin{aligned} \$ [& [2, 2, 2, 0, 0, 1, 1, 2, 2, 0, 3, 1], [3, 0, 1, 0, 0, 2, 0, 4, 1, 0, 3, 2], [3, 0, 2, 0, 0, 3, 0, 1, 2, 0, 1, 4], [1, 0, \\ & 3, 0, 0, 3, 0, 2, 4, 0, 2, 1], [2, 0, 3, 0, 0, 1, 0, 3, 1, 0, 4, 2], [4, 0, 1, 0, 0, 2, 0, 3, 2, 0, 1, 3], [1, 0, 2, 0, 0, 4, \\ & 0, 1, 3, 0, 2, 3], [2, 0, 4, 0, 0, 1, 0, 2, 3, 0, 3, 1], [3, 0, 1, 0, 0, 2, 0, 4, 1, 0, 3, 2]] \$ \end{aligned}$$

$$[y_1, 2y_3, y_2, 0, 0, y_4, y_3, y_7, y_8, 0, y_6, y_5]$$

$$p = -s^2 + s^9$$

550 . Coloring, {7, 8, 9, 12}

R: [7, 7, 7, 6, A, A, A, B, C, C, 1, 9]

B: [6, 8, 8, 7, 3, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	6 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 4, 1, 3], [1, 0, 0, 0, 0, 0, 2, 0, 3, 4, 0, 6], [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[2y_4 + y_1 - y_2 - y_3 + y_5, 0, 0, 0, 0, y_4, y_1, 0, y_2, y_3, y_4, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {4, 7, 11}} order: 12

See Matrix

$$\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 0, 3, 1], [0, 0, 3, 3, 1, 0, 2, 4, 0, 0, 1, 2], [0, 0, 1, 1, 2, 0, 3, 3, 0, 0, 2, 4], [0, 0, 2, 2, 4, 0, 1, 1, 0, 0, 3, 3], [0, 0, 4, 3, 3, 0, 2, 2, 0, 0, 1, 1], [0, 0, 3, 1, 1, 0, 3, 4, 0, 0, 2, 2], [0, 0, 1, 2, 2, 0, 1, 3, 0, 0, 3, 4], [0, 0, 2, 3, 4, 0, 2, 1, 0, 0, 1, 3], [0, 0, 4, 1, 3, 0, 3, 2, 0, 0, 2, 1]] \$$$

$$[0, 10y_3, 5y_4, 5y_2, 5y_1, 5y_3, 6y_4 - 5y_2 + 12y_3 + 6y_6 - 5y_5, 5y_4 - 5y_1 + 5y_3 + 5y_6, 0, 0, 5y_5, 5y_6]$$

$$p = -s^2 - s^4 + s^5 + s^7 \quad p' = -s^2 - s^4 + s^5 + s^7 \quad p = s^2 - s^5 - s^6 + s^9$$

551 . Coloring, {7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, A, B, B, 2, 4, 5]

B: [6, 8, 8, 7, 3, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 2, 0, 2, 2, 1, 3, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 2, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, \\ & 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, \\ & 6, 0, 0, 6, 0, 0]] \$ \end{aligned}$$

$$[0, y_5, 0, y_4, y_6, y_2, y_3, 0, 0, y_1, y_6, 0]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [2, 0, 2, 0, 0, 1, 1, 2, 2, 0, 2, 4], [2, 0, 1, 0, 0, 2, 0, 2, 4, 0, 1, 4], [1, 0, 2, 0, 0, 2, 0, 1, 4, 0, 0, 6], [0, 0, \\ & 2, 0, 0, 1, 0, 2, 6, 0, 0, 5], [0, 0, 1, 0, 0, 0, 0, 2, 5, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 1, 8, 0, 0, 7], [0, 0, 0, 0, 0, 0, \\ & 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$ \end{aligned}$$

$$[y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8]$$

552 . Coloring, {7, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 7s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, A, A, B, B, 2, 1, 9]

B: [6, 8, 8, 7, 3, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 4, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[y_1, y_5, 0, 0, 0, y_3, y_4, 0, 2y_3, y_2, y_6, 0]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {4, 7, 11}} order: 12

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 0, 2, 4] , [0, 0, 3, 2, 4, 0, 2, 2, 0, 0, 1, 2] , [0, 0, 4, 1, 2, 0, 2, 3, 0, 0, 2, 2] , [0, 0, 2, 2, 2, 0, 1, 4, 0, 0, 2, 3] , [0, 0, 2, 2, 3, 0, 2, 2, 0, 0, 1, 4] , [0, 0, 3, 1, 4, 0, 2, 2, 0, 0, 2, 2] , [0, 0, 4, 2, 2, 0, 1, 3, 0, 0, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 4, 0, 0, 1, 3]] \$

$$[0, 0, 5y_2, 5y_1, -5y_2 + 11y_1 - 5y_3 + 11y_4 - 5y_5 + 11y_6 - 5y_7, 5y_3, 5y_4, 5y_5, 0, 0, 5y_6, 5y_7]$$

$$p = s^2 + s^3 + s^4 - s^6 - s^7 - s^8$$

Â» SYNC'D !RANK'D

553 . Coloring, {7, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 7s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, A, A, B, B, C, 4, 9]

B: [6, 8, 8, 7, 3, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 4, 0, 0, 2, 2, 2, 2] , [0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2, 2]] \$

$[0, 0, 0, y_1 + y_5 - y_3 - y_4 + y_2 + y_6, 0, y_1, y_5, 0, y_3, y_4, y_2, y_6]$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 2, 0, 4, 0, 0, 1, 2] , [1, 0, 4, 0, 2, 2, 0, 3, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 1, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$

$[y_2, 2y_3, y_1, 0, y_5, y_4, y_3, y_6, 0, 0, y_8, y_7]$

$$p = -s^5 + s^9$$

554 . Coloring, {7, 9, 10, 11}

$$\Omega p(\Delta)=0: p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, A, A, C, C, 2, 4, 5]

B: [6, 8, 8, 7, 3, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 3

See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 2, 2, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$$

$$[0, y_1, 0, 2y_2 - 2y_3, y_2, y_3, y_4, 0, 0, y_5, 0, 2y_2 - 2y_3]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 0, 4, 2] , [4, 0, 1, 0, 0, 2, 0, 2, 2, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 1, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 5, 0, 2, 0, 0, 1, 0] , [1, 0, 5, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 1, 0, 5, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 0, 4, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 1, 0, 0, 4, 0]] \$$

$$[y_1, 0, y_2, 0, 0, y_3, y_4, y_7, y_6, 0, y_5, 2y_4]$$

$$p = s^3 - s^8$$

555 . Coloring, $\{7, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = 2s^2 + s^3 - 2s^4 + 8s^6 - 32s^8$$

R: $[7, 7, 7, 6, A, A, A, C, C, 2, 1, 9]$

B: $[6, 8, 8, 7, 3, 3, B, B, B, C, 4, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	2 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2]] \$$

$$[2y_1, -2y_1 + 2y_2, 0, 0, 0, y_1, -y_1 + 2y_2, 0, y_2, 2y_2, 0, y_2]$$

$$p = -s^2 + s^4 \quad p = -s^2 + s^7 \quad p = -s^2 + s^5 \quad p = -s^2 + s^6 \quad p = -s^2 + s^3$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 0, 4, 2], [0, 0, 3, 4, 2, 0, 2, 2, 0, 0, 3, 0], [0, 0, 2, 3, 0, 0, 4, 3, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 3, 2, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0]] \$$$

$$[0, 0, y_6, y_5, y_3, y_4, y_2, y_1, 0, 0, y_7, 2y_4]$$

$$p = -s^5 + s^8$$

556 . Coloring, {7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, A, C, C, C, 4, 9]

B: [6, 8, 8, 7, 3, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	4 vs 6	6 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 4, 0, 4], [0, 0, 0, 0, 0, 2, 0, 0, 4, 4, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[0, 0, 0, -2y_1 + 2y_2 + 2y_3 - 2y_4, 0, y_1, -3y_1 + 3y_2 + 3y_3 - 3y_4, 0, y_2, y_3, 0, y_4]$$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 0, 4, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 4, 0, 3, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 3, 0, 2, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 0, 3, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 0, 4, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 4, 0, 3, 0, 0, 4, 0]] \$

$$[y_2, 2 y_4, y_1, 0, 2 y_4, y_6, y_4, y_5, 0, 0, y_3, 0]$$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7$$

Â» SYNC'D !RANK'D

557 . Coloring, {7, 10, 11, 12}

R: [7, 7, 7, 6, A, A, A, C, B, 2, 4, 9]

B: [6, 8, 8, 7, 3, 3, B, B, C, C, 1, 5]

' See graph

' ' See pair graph

'

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 2, 0, 1, 4, 2, 0] , [0, 4, 0, 2, 0, 1, 4, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 2, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 1, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[0, y_1, 0, y_2, 0, y_3, y_5, 0, y_4, y_6, y_8, y_7]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 0, 3, 3] , [3, 0, 3, 0, 3, 2, 0, 2, 0, 0, 3, 0] , [3, 0, 5, 0, 0, 3, 0, 3, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 0, 5, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 2, 0, 3, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 3, 0, 3, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 5, 0, 2, 0, 0, 3, 0] , [3, 0, 5, 0, 0, 3, 0, 3, 0, 0, 2, 0]] \$

$$[y_2, 0, y_1, 0, y_3, y_4, y_5, y_6, 0, 0, y_7, 3 y_5]$$

$$p = -s^3 + s^8$$

558 . Coloring, {8, 9, 10, 11}

R: [7, 7, 7, 6, A, A, B, B, C, 2, 4, 5]

B: [6, 8, 8, 7, 3, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 2, 2, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 3, 2, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 3, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 3, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 2, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 2, 0, 0, 3, 3, 0]] \$

$$[0, y_7, 0, y_6, y_5, y_4, y_3, 0, 0, y_2, y_1, y_7 - y_6 + y_5 + y_4 - y_3 - y_2 + y_1]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 2, 1, 3] , [1, 0, 1, 0, 0, 2, 0, 2, 3, 1, 2, 4] , [2, 0, 2, 0, 0, 1, 0, 1, 4, 0, 3, 3] , [3, 0, 1, 0, 0, 2, 0, 2, 3, 0, 4, 1] , [4, 0, 2, 0, 0, 3, 0, 1, 1, 0, 3, 2] , [3, 0, 3, 0, 0, 4, 0, 2, 2, 0, 1, 1] , [1, 0, 4, 0, 0, 3, 0, 3, 1, 0, 2, 2] , [2, 0, 3, 0, 0, 1, 0, 4, 2, 0, 1, 3] , [1, 0, 1, 0, 0, 2, 0, 3, 3, 0, 2, 4]] \$

$$[y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, y_7, y_9, y_8]$$

559 . Coloring, {8, 9, 10, 12}

R: [7, 7, 7, 6, A, A, B, B, C, 2, 1, 9]

B: [6, 8, 8, 7, 3, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 4, 0, 1, 1, 3, 2], [3, 1, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2]] \$$

$[-3 y_7 - 3 y_6 - 3 y_5 + 13 y_4 - 3 y_3 - 3 y_2 + 13 y_1, 3 y_7, 0, 0, 0, 3 y_6, 3 y_5, 0, 3 y_4, 3 y_3, 3 y_2, 3 y_1]$

$$p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 2, 1, 3], [0, 0, 3, 1, 3, 0, 2, 2, 0, 1, 0, 4], [0, 0, 3, 0, 4, 0, 1, 3, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 0, 3, 0, 1, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4]] \$$

$[0, 0, y_1, y_2, y_3, y_6, y_4, y_5, 0, y_8, y_6, y_7]$

$$p = s^5 - s^9$$

560 . Coloring, $\{8, 9, 11, 12\}$

R: [7, 7, 7, 6, A, A, B, B, C, C, 4, 9]

B: [6, 8, 8, 7, 3, 3, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	6 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 6
See Matrix

\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 3, 4] , [0, 0, 0, 3, 0, 3, 0, 0, 4, 2, 0, 4] , [0, 0, 0, 0, 3, 0, 0, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[0, 0, 0, y₁, 0, y₂, y₃, 0, y₄, y₅, y₆, y₇]

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4
See Matrix

\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 2, 1, 1] , [1, 2, 3, 0, 1, 2, 0, 4, 0, 1, 0, 2] , [0, 1, 3, 0, 2, 1, 0, 5, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3]] \$

[y₅, y₃ + y₆, y₂ + y₁ - y₆ - y₄, 0, y₂, y₃, y₆, y₁, 0, y₅, y₆, y₄]

$$p = s^4 - s^5 - s^7 + s^{10} \quad p = s^4 - s^5 + s^6 - s^7 \quad p = -s^4 + s^8 \quad p' = -s^4 + s^8$$

561 . Coloring, {8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, B, B, B, 2, 4, 9]

B: [6, 8, 8, 7, 3, 3, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	6 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6
See Matrix

\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 2, 0, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 4, 2, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 5, 1, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 2, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 2, 4, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 1, 5, 0, 0, 2, 4, 0]] \$

$$[0, y_1, 0, y_2, 0, y_3, y_4, 0, y_5, y_6, y_7, 0]$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 2, 0, 4], [0, 0, 3, 0, 4, 2, 0, 2, 0, 1, 0, 4], [0, 0, 6, 0, 4, 0, 0, 3, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 6, 0, 0, 0, 3], [0, 0, 3, 0, 3, 0, 0, 4, 0, 0, 0, 6], [0, 0, 3, 0, 6, 0, 0, 3, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 3, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 6, 0, 0, 0, 3]] \$$$

$$[2 y_1, 0, y_2, 0, y_3, -3 y_1 + 2 y_5, y_1, y_4, 0, y_5, 0, y_6]$$

$$p = s^3 - s^7 \quad p' = s^3 - s^7$$

562 . Coloring, {9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 6s^2 + s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, A, B, C, C, 2, 4, 9]

B: [6, 8, 8, 7, 3, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 4, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 2, 2, 2], [0, 2, 0, 2, 0, 2, 2, 0, 2, 1, 3, 2], [0, 1, 0, 3, 0, 2, 2, 0, 2, 2, 2, 2], [0, 2, 0, 2, 0, 3, 1, 0, 2, 2, 2, 2], [0, 2, 0, 2, 0, 2, 2, 0, 2, 3, 1, 2], [0, 3, 0, 1, 0, 2, 2, 0, 2, 2, 2, 2], [0, 2, 0, 2, 0, 1, 3, 0, 2, 2, 2, 2], [0, 2, 0, 2, 0, 2, 2, 0, 2, 1, 3, 2]] \$$$

$$[0, -y_1 + 2 y_4, 0, y_1, 0, -y_2 + 2 y_4, y_2, 0, y_4, 2 y_4 - y_3, y_3, y_4]$$

$$p' = -s^2 + s^4 - s^5 + s^7 \quad p' = -s^2 + s^3 - s^5 + s^6 \quad p' = s - s^2 + s^4 - s^5 \quad p = s - s^3 + s^4 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 2, 2, 2] , [2, 0, 3, 0, 2, 2, 0, 2, 0, 1, 2, 2] , [2, 0, 4, 0, 2, 2, 0, 3, 0, 0, 2, 1] , [2, 0, 4, 0, 1, 2, 0, 4, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 0, 3, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 3, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 0, 4, 0, 0, 3, 0]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

563 . Coloring, {2, 3, 4, 5, 6}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, 3, B, C, B, C, 1, 5]

B: [6, 7, 7, 6, A, A, A, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[2, 0, 2, 0, 2, 0, 2, 2, 0, 0, 3, 3] , [3, 0, 2, 0, 3, 0, 2, 2, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 0, 3, 2, 0, 0, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 3, 0, 0, 3, 2] , [3, 0, 2, 0, 2, 0, 2, 2, 0, 0, 2, 3] , [2, 0, 2, 0, 3, 0, 3, 2, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 0, 2, 2, 0, 0, 3, 2]] \$

$$[7y_1, 0, 9y_1 - 7y_2 + 9y_3 - 7y_4 + 9y_5 - 7y_6, 0, 7y_2, 0, 7y_3, 7y_4, 0, 0, 7y_5, 7y_6]$$

$$p = s + s^2 + s^3 - s^5 - s^6 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 2, 2, 0, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 2, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 1, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 4, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2]] \$

$$[0, -3y_1 - 3y_2 - 3y_3 + 13y_4 - 3y_5 - 3y_6 + 13y_7, 0, 3y_1, 0, 3y_2, 3y_3, 0, 3y_4, 3y_5, 3y_6, 3y_7]$$

$$p = -s^4 - s^5 + s^7 + s^8$$

564 . Coloring, {2, 3, 4, 5, 7}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 - 8s^5 + 32s^7 \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 + 32s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, A, A, C, B, C, 1, 5]

B: [6, 7, 7, 6, A, 3, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	8 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 0, 2, 1, 0, 2, 0, 5] , [0, 0, 3, 0, 5, 0, 1, 2, 0, 2, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 3, 0, 1, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 1, 3, 1] , [0, 1, 2, 3, 0, 2, 3, 0, 1, 0, 2, 2] , [0, 0, 2, 2, 0, 3, 3, 0, 2, 0, 3, 1] , [0, 0, 3, 3, 0, 2, 2, 0, 1, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 3, 0, 2, 0, 2, 1] , [0, 0, 3, 2, 0, 3, 2, 0, 1, 0, 3, 2] , [0, 0, 3, 3, 0, 2, 3, 0, 2, 0, 2, 1] , [0, 0, 2, 2, 0, 3, 3, 0, 1, 0, 3, 2] , [0, 0, 3, 3, 0, 2, 2, 0, 2, 0, 3, 1]] \$

$$[0, -3y_4 - 3y_5 - 3y_2 - 3y_3 + 13y_1 - 3y_6 - 3y_7 + 13y_8, 3y_4, 3y_5, 0, 3y_2, 3y_3, 0, 3y_1, 3y_6, 3y_7, 3y_8]$$

$$p = -s^3 - s^4 + s^8 + s^9$$

565 . Coloring, {2, 3, 4, 5, 8}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, B, B, B, C, 1, 5]

B: [6, 7, 7, 6, A, 3, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 1, 4, 2] , [4, 0, 2, 0, 2, 0, 2, 1, 0, 0, 4, 1] , [4, 0, 2, 0, 1, 0, 4, 2, 0, 0, 3, 0] , [3, 0, 1, 0, 0, 0, 4, 2, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 3, 1, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_5, 0, y_8, y_6, y_7]$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 3, 0, 2] , [0, 3, 2, 0, 0, 2, 3, 0, 2, 2, 0, 2] , [0, 2, 2, 0, 0, 0, 5, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 3, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 3, 0, 2, 4, 0, 2]] \$

$$[0, -y_1 - y_2 - y_3 - y_4 + 6y_6 - y_5, y_1, y_2, 0, y_3, y_4, 0, y_6, y_5, 0, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

566 . Coloring, {2, 3, 4, 5, 9}

$$\Omega p(\Delta)=0: \quad p = -s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, B, C, C, C, 1, 5]

B: [6, 7, 7, 6, A, 3, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{1, 7, 11\}\}$ order: 12

See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 1, 2, 4], [2, 0, 2, 0, 4, 0, 2, 1, 0, 0, 2, 3], [2, 0, 4, 0, 3, 0, 2, 2, 0, 0, 2, 1], [2, 0, 3, 0, 1, 0, 2, 4, 0, 0, 2, 2], [2, 0, 1, 0, 2, 0, 2, 3, 0, 0, 2, 4], [2, 0, 2, 0, 4, 0, 2, 1, 0, 0, 2, 3], [2, 0, 4, 0, 3, 0, 2, 2, 0, 0, 2, 1], [2, 0, 3, 0, 1, 0, 2, 4, 0, 0, 2, 2]] \$$

$$[2y_3, 0, 5y_3 - 2y_4, 0, 5y_3 - 2y_1 - 2y_2, 0, 2y_3, 2y_1, 0, 2y_2, 2y_3, 2y_4]$$

$$p = -s^2 + s^3 - s^4 + s^5 \quad p = -s^2 + s^6 \quad p' = -s^2 + s^6 \quad p' = -s^3 + s^7$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 3, 2, 0], [0, 3, 2, 2, 0, 2, 3, 0, 0, 2, 2, 0], [0, 2, 2, 2, 0, 2, 5, 0, 0, 3, 0, 0], [0, 3, 2, 0, 0, 2, 4, 0, 0, 5, 0, 0], [0, 5, 2, 0, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0]] \$$

$$[0, y_1, y_8, y_2, 0, y_3, y_4, 0, y_5, y_6, y_7, 0]$$

567 . Coloring, $\{2, 3, 4, 5, 10\}$

$$\Omega p(\Delta)=0: \quad p = -6s^2 + s^3 + 8s^6 - 16s^7 + 64s^8 \quad p = 9s^2 + 2s^4 - 16s^6 + 16s^7 - 96s^8 \quad p = -27s^2 + 8s^5 + 48s^6 - 64s^7 + 256s^8$$

R: [7, 8, 8, 7, 3, A, B, C, B, 2, 1, 5]

B: [6, 7, 7, 6, A, 3, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{1, 7, 11\}\}$ order: 12

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 0, 2, 3, 0, 0, 2, 2] , [2, 0, 1, 0, 2, 0, 3, 3, 0, 0, 2, 3] , [2, 0, 2, 0, 3, 0, 2, 1, 0, 0, 3, 3] , [3, 0, 3, 0, 3, 0, 2, 2, 0, 0, 2, 1] , [2, 0, 3, 0, 1, 0, 3, 3, 0, 0, 2, 2] , [2, 0, 1, 0, 2, 0, 2, 3, 0, 0, 3, 3] , [3, 0, 2, 0, 3, 0, 2, 1, 0, 0, 2, 3] , [2, 0, 3, 0, 3, 0, 3, 2, 0, 0, 2, 1]] \$$

$[7y_1, 9y_1 - 7y_2 - 7y_3 + 9y_4 - 7y_5 - 7y_6 + 9y_7 - 7y_8, 7y_2, 0, 7y_3, 0, 7y_4, 7y_5, 0, 7y_6, 7y_7, 7y_8]$

$$p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 3, 1, 3] , [0, 0, 2, 1, 0, 2, 1, 0, 3, 2, 0, 5] , [0, 0, 2, 0, 0, 1, 2, 0, 5, 1, 0, 5] , [0, 0, 1, 0, 0, 0, 2, 0, 5, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$[0, 0, y_2, -y_2 + y_1 + y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, y_3, 0, y_4, y_5, y_6, y_7]$

$$p = -s^7 + s^8$$

568 . Coloring, $\{2, 3, 4, 5, 11\}$

$$\Omega p(\Delta)=0: \quad p = 3s^2 + 14s^3 - 24s^5 + 32s^6 - 32s^7 - 128s^8 \quad p' = 3s^2 + 2s^3 - 8s^4 + 8s^5 - 32s^7$$

R: [7, 8, 8, 7, 3, A, B, C, B, C, 4, 5]

B: [6, 7, 7, 6, A, 3, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{3, 5, 8, 12\}\}$ order: 12

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 0, 2, 1, 0, 0, 2, 3] , [0, 0, 3, 2, 3, 0, 3, 2, 0, 0, 2, 1] , [0, 0, 3, 2, 1, 0, 2, 3, 0, 0, 3, 2] , [0, 0, 1, 3, 2, 0, 2, 3, 0, 0, 2, 3] , [0, 0, 2, 2, 3, 0, 3, 1, 0, 0, 2, 3] , [0, 0, 3, 2, 3, 0,$

$$2, 2, 0, 0, 3, 1], [0, 0, 3, 3, 1, 0, 2, 3, 0, 0, 2, 2]] \$$$

$$[0, 0, 7y_7, 7y_6, 7y_5, 0, 7y_4, 7y_3, 0, 7y_2, 7y_1, -7y_7 + 9y_6 - 7y_5 + 9y_4 - 7y_3 - 7y_2 + 9y_1]$$

$$p = s^2 + s^3 + s^4 - s^6 - s^7 - s^8$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 3, 1, 1], [1, 3, 2, 0, 0, 2, 3, 0, 1, 2, 0, 2], [0, 2, 2, 0, 0, 1, 5, 0, 2, 3, 0, 1], [0, 3, 1, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1]] \$$$

$$[-3y_1 - 3y_2 - 3y_3 - 3y_8 + 13y_4 - 3y_5 - 3y_6 + 13y_7, 3y_1, 3y_2, 0, 0, 3y_3, 3y_8, 0, 3y_4, 3y_5, 3y_6, 3y_7]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

569 . Coloring, {2, 3, 4, 5, 12}

$$\Omega p(\Delta)=0: \quad p = -9s^2 + 4s^4 - 24s^5 + 16s^6 - 96s^7 + 64s^8 \quad p = 3s^2 + 2s^3 + 8s^5 + 32s^7$$

R: [7, 8, 8, 7, 3, A, B, C, B, C, 1, 9]

B: [6, 7, 7, 6, A, 3, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 2, 1, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 5, 1], [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[y_1, 0, y_5, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 0, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 3, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 1, 5, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$$

$$[0, y_1, y_2, y_3, y_3, y_4, y_5, 0, 0, y_6, y_7, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

570 . Coloring, {2, 3, 4, 6, 7}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 + 32s^7 \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 + 32s^7 - 64s^8$$

R: [7, 8, 8, 7, A, 3, A, C, B, C, 1, 5]

B: [6, 7, 7, 6, 3, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 3, 1, 3], [1, 0, 0, 0, 3, 0, 2, 1, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$$

$$[y_3, 0, y_4, 0, y_1, 0, y_2, y_3, 0, y_6, y_4, y_5]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 2, 3, 0, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 3, 1, 0, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 2, 0, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 3, 2, 0, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 1, 3, 0, 1, 3, 2, 2] , [0, 3, 0, 2, 0, 2, 0, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 2, 3, 0, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 3, 1, 0, 2, 2, 3, 1]] \$

$$[0, -2y_1 + 11y_5 - 2y_4 + 11y_2 + 11y_3 - 2y_6 - 39y_7, 2y_1, 2y_5, 0, 2y_4, 2y_2, 0, 3y_5 + 3y_2 + 3y_3 - 11y_7, 2y_3, 2y_6, 2y_7]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

571 . Coloring, {2, 3, 4, 6, 8}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, B, B, B, C, 1, 5]

B: [6, 7, 7, 6, 3, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 1, 4, 2] , [4, 0, 0, 0, 2, 0, 2, 1, 0, 2, 4, 1] , [4, 0, 0, 0, 1, 0, 4, 0, 0, 2, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 4, 2] , [4, 0, 0, 0, 2, 0, 3, 0, 0, 2, 4, 1] , [4, 0, 0, 0, 1, 0, 4, 0, 0, 2, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 4, 2] , [4, 0, 0, 0, 2, 0, 3, 0, 0, 2, 4, 1]] \$

$$[-2y_1 + 2y_3 + 2y_2 + 2y_5 - 2y_4, 0, 2y_1, 0, 5y_3 + 5y_2 - 2y_5 - 7y_4, 0, 2y_3, 2y_2, 0, 2y_5, 7y_3 + 7y_2 - 2y_5 - 9y_4, 2y_4]$$

$$p = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 2, 3, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 4, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2]] \$

$$[0, y_3, y_2, 2y_2, 0, y_1, -y_3 - 3y_2 - y_1 - y_4 + 6y_5, 0, y_5, y_4, 0, y_5]$$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p = s^3 - s^6$$

572 . Coloring, {2, 3, 4, 6, 9}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, 3, B, C, C, C, 1, 5]

B: [6, 7, 7, 6, 3, A, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 1, 2, 4], [2, 0, 0, 0, 4, 0, 2, 1, 0, 2, 2, 3], [2, 0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 3]] \$$$

$$[y_5, 0, y_4, 0, y_3, 0, y_5, y_2, 0, y_1, y_5, 5y_5 - y_4 - y_3 - y_2 - y_1]$$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 3, 2, 0], [0, 3, 0, 2, 0, 2, 3, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 3, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 2, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$$

$$[0, y_1, y_2, y_3, 0, y_4, y_5, 0, 2y_2, y_7, y_6, 0]$$

$$p = -s^5 + s^8$$

573 . Coloring, {2, 3, 4, 6, 10}

$$\Omega p(\Delta)=0: \quad p = s^2 + 8s^5 + 16s^6 \quad p' = s^3 + 8s^6 + 16s^7 \quad p'' = s^2 + 8s^5 + 16s^6$$

R: [7, 8, 8, 7, A, 3, B, C, B, 2, 1, 5]

B: [6, 7, 7, 6, 3, A, A, B, C, C, 4, 9]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	8 vs 9	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {2, 5, 8, 10, 12}}

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 2, 0, 2, 2, 0, 1, 3, 1], [3, 1, 0, 0, 1, 0, 2, 3, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 3, 1, 0, 1, 2, 3], [2, 1, \\ & 0, 0, 3, 0, 2, 2, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 2, 1, 0, 3, 2, 2], [2, 3, 0, 0, 2, 0, 3, 2, 0, 1, 2, 1], [2, 1, 0, 0, 1, 0, \\ & 2, 3, 0, 2, 3, 2], [3, 2, 0, 0, 2, 0, 2, 1, 0, 1, 2, 3], [2, 1, 0, 0, 3, 0, 3, 2, 0, 2, 2, 1]] \$ \end{aligned}$$

$$[7y_1, 9y_1 - 7y_2 - 7y_3 + 9y_4 - 7y_5 - 7y_8 + 9y_6 - 7y_7, 7y_2, 0, 7y_3, 0, 7y_4, 7y_5, 0, 7y_8, 7y_6, 7y_7]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 0, 2, 2, 0, 2, 3, 1, 3], [0, 0, 0, 1, 0, 2, 1, 0, 3, 4, 0, 5], [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7], [0, 0, \\ & 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, \\ & 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$ \end{aligned}$$

$$[0, 0, y_5, y_4, 0, y_3, y_4, 0, y_2, y_1, y_5, -y_3 + y_2 + y_1]$$

$$p' = -s^6 + s^7 \quad p'' = s^5 - s^6 \quad p''' = s^5 - s^7$$

574 . Coloring, {2, 3, 4, 6, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 - 8s^5 + 32s^7$$

R: [7, 8, 8, 7, A, 3, B, C, B, C, 4, 5]

B: [6, 7, 7, 6, 3, A, A, B, C, 2, 1, 9]

' See graph

' ' See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 8	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 1, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 1, 0, 2, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 0, 0, 3, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 0, 0, 3, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 2, 3]] \$

$$[0, 0, 3y_1, 7y_5 - 3y_2 - 3y_4, -3y_1 + 3y_5, 0, 3y_2, 3y_5 - 3y_3, 0, 3y_3, 3y_4, 3y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 2, 3, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 1, 3, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 4, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1]] \$

$$[-3y_1 - 6y_6 - 3y_2 - 3y_3 + 13y_4 - 3y_5 + 13y_7, 3y_1, 3y_6, 0, 0, 3y_2, 3y_3, 0, 3y_4, 3y_5, 3y_6, 3y_7]$$

$$p = s^4 + s^5 - s^7 - s^8 \quad p' = -s^4 - s^5 + s^7 + s^8$$

575 . Coloring, {2, 3, 4, 6, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 - 32s^7$$

R: [7, 8, 8, 7, A, 3, B, C, B, C, 1, 9]

B: [6, 7, 7, 6, 3, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 2, 1, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 5, 1], [5, 0, 0, 0, 0, 4, 0, 1, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$[y_1, 0, y_5, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 2, 0, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 3, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 1, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$[0, y_6, y_5, y_4, y_4, y_3, y_2, 0, 0, y_1, -y_5 + y_3, -y_5 + y_3]$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

576 . Coloring, $\{2, 3, 4, 7, 8\}$

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 - 32s^7$$

R: [7, 8, 8, 7, A, A, A, B, B, C, 1, 5]

B: [6, 7, 7, 6, 3, 3, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	6 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6
See Matrix

$\$ [[2, 0, 0, 0, 2, 0, 2, 2, 0, 4, 2, 2], [2, 0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 4], [2, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$$

$$[y_1, 0, 0, 0, y_2, 0, y_3, y_4, 0, y_6, y_5, y_7]$$

Omega Rank for B : cycles: {{9, 12}, {3, 4, 6, 7, 11}} order: 10
See Matrix

$\$ [[0, 2, 2, 2, 0, 2, 2, 0, 2, 0, 2, 2], [0, 0, 2, 2, 0, 2, 4, 0, 2, 0, 2, 2], [0, 0, 2, 2, 0, 2, 2, 0, 2, 0, 4, 2], [0, 0, 2, 4, 0, 2, 2, 0, 2, 0, 2, 2], [0, 0, 2, 2, 0, 4, 2, 0, 2, 0, 2, 2], [0, 0, 4, 2, 0, 2, 2, 0, 2, 0, 2, 2], [0, 0, 2, 2, 0, 2, 4, 0, 2, 0, 2, 2], [0, 0, 2, 2, 0, 2, 2, 0, 2, 0, 4, 2]] \$$

$$[0, y_2, y_3, y_4, 0, y_5, y_6, 0, y_1, 0, -y_2 - y_3 - y_4 - y_5 - y_6 + 6y_1, y_1]$$

$$p' = s^2 - s^7 \quad p = s^2 - s^7$$

577 . Coloring, {2, 3, 4, 7, 9}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 - 32s^7 \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 - 32s^7 - 64s^8$$

R: [7, 8, 8, 7, A, A, A, C, C, C, 1, 5]

B: [6, 7, 7, 6, 3, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	6 vs 7

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 0, 2, 2, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

[y₅, 0, 0, 0, y₄, 0, y₃, y₅, 0, y₂, 0, y₁]

$$p = s^3 - s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 2, 0, 2, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 4, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 2, 0, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 4, 2, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 4, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 2, 4, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 4, 0, 0, 0, 4, 0]] \$

[0, y₆, y₁, y₂, 0, y₄, y₅, 0, y₆, 0, y₃, 0]

$$p = -s^2 + s^7$$

578 . Coloring, {2, 3, 4, 7, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, A, A, C, B, 2, 1, 5]

B: [6, 7, 7, 6, 3, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	6 vs 7

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 0, 2, 2, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 0, 2, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 1, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3] , [0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2]] \$

$$[y_8, y_1, 0, 0, y_2, 0, y_3, y_4, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{9, 12}, {3, 4, 6, 7, 11}} order: 10

See Matrix

$$\$ [[0, 0, 2, 2, 0, 2, 2, 0, 2, 0, 3, 3], [0, 0, 2, 3, 0, 2, 2, 0, 3, 0, 2, 2], [0, 0, 2, 2, 0, 3, 2, 0, 2, 0, 2, 3], [0, 0, 3, 2, 0, 2, 2, 0, 3, 0, 2, 2], [0, 0, 2, 2, 0, 2, 3, 0, 2, 0, 2, 3], [0, 0, 2, 2, 0, 2, 2, 0, 3, 0, 3, 2], [0, 0, 2, 3, 0, 2, 2, 0, 2, 0, 2, 3]] \$$$

$$[0, 0, 5 y_1, -5 y_1 - 5 y_6 - 5 y_5 + 11 y_4 - 5 y_3 + 11 y_2, 0, 5 y_6, 5 y_5, 0, 5 y_4, 0, 5 y_3, 5 y_2]$$

$$p = -s - s^2 + s^6 + s^7$$

579 . Coloring, {2, 3, 4, 7, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, A, A, C, B, C, 4, 5]

B: [6, 7, 7, 6, 3, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 2, 0, 2, 2, 0, 4, 1, 3], [0, 0, 0, 1, 3, 0, 2, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 1, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5]] \$$$

$$[0, 0, 0, y_6, y_5, 0, y_4, 2 y_2, 0, y_3, y_2, y_1]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 2, 2, 0, 0, 2, 2, 0, 2, 0, 3, 1] , [3, 0, 2, 0, 0, 2, 4, 0, 1, 0, 2, 2] , [2, 0, 2, 0, 0, 3, 2, 0, 2, 0, 4, 1] , [4, 0, 3, 0, 0, 2, 2, 0, 1, 0, 2, 2] , [2, 0, 2, 0, 0, 4, 3, 0, 2, 0, 2, 1] , [2, 0, 4, 0, 0, 2, 2, 0, 1, 0, 3, 2] , [3, 0, 2, 0, 0, 2, 4, 0, 2, 0, 2, 1] , [2, 0, 2, 0, 0, 3, 2, 0, 1, 0, 4, 2]] \$

$$[3 y_5, 3 y_4, 3 y_3, 0, 0, 3 y_2, -3 y_5 - 3 y_4 - 3 y_3 - 3 y_2 + 13 y_1 - 3 y_7 + 13 y_6, 0, 3 y_1, 0, 3 y_7, 3 y_6]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

580 . Coloring, {2, 3, 4, 7, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, A, A, C, B, C, 1, 9]

B: [6, 7, 7, 6, 3, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 2, 2, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 2, 2, 6] , [2, 0, 0, 0, 0, 0, 1, 0, 6, 2, 3, 2] , [3, 0, 0, 0, 0, 0, 2, 0, 2, 1, 6, 2] , [6, 0, 0, 0, 0, 0, 3, 0, 2, 2, 2, 1] , [2, 0, 0, 0, 0, 0, 6, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 0, 2, 6, 1, 3]] \$

$$[y_3, 0, 0, 0, 0, 0, y_1, y_2, y_7, y_6, y_4, y_5]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 2, 2, 0, 0, 0, 3, 1] , [0, 0, 4, 3, 1, 2, 4, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 4, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0]] \$

$$[0, 2 y_1, y_7, y_6, y_5, y_4, y_3, 0, 0, 0, y_2, y_1]$$

$$p = -s^3 + s^8$$

581 . Coloring, {2, 3, 4, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, A, B, B, C, C, 1, 5]

B: [6, 7, 7, 6, 3, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 0, 2, 2, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 0, 2, 0, 0, 2, 4, 2], [4, 0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 4, 0, 0, 2, 3, 3]] \$$$

$$[2y_1, 0, 0, 0, 2y_2, 0, 7y_1 - 27y_2 - 2y_3 + 16y_4, 2y_3, 0, 3y_1 - 7y_2 + 4y_4, 2y_4, 4y_1 - 16y_2 + 10y_4]$$

$$p' = -s^3 + s^6 \quad p = -s^2 + s^5 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

$$\$ [[0, 2, 2, 2, 0, 2, 2, 0, 2, 2, 1, 1], [0, 2, 2, 1, 0, 2, 4, 0, 1, 2, 2, 0], [0, 2, 2, 2, 0, 1, 4, 0, 0, 4, 1, 0], [0, 4, 1, 1, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 1, 5, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[0, y_1, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8, y_9]$$

582 . Coloring, {2, 3, 4, 8, 10}

$$\Omega p(\Delta)=0: \quad p = s^2 - 8s^5 - 16s^6 \quad p' = s^2 - 8s^5 - 16s^6 \quad p'' = s^3 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, A, A, B, B, B, 2, 1, 5]

B: [6, 7, 7, 6, 3, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	7 vs 7	6 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 0, 2, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 4, 2, 0, 0, 4, 0], [4, 0, 0, 0, 0, 4, 2, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$$

$$[y_2, y_1, 0, 0, y_5, 0, y_4, y_3, 0, y_7, y_6, 0]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 0, 2, 2, 0, 2, 2, 0, 4], [0, 0, 2, 0, 0, 2, 2, 0, 4, 2, 0, 4], [0, 0, 2, 0, 0, 0, 2, 0, 4, 2, 0, 6], [0, 0, 0, 0, 0, 2, 0, 6, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[0, 0, -y_1 + y_2 + y_3 - y_5 - y_6 + y_4, y_1, 0, y_2, y_3, 0, y_5, y_6, 0, y_4]$$

$$p = s^6 - s^7$$

583 . Coloring, {2, 3, 4, 8, 11}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7 \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8$$

R: [7, 8, 8, 7, A, A, B, B, B, C, 4, 5]

B: [6, 7, 7, 6, 3, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	4 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 0, 2, 2, 0, 2, 2, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 4, 0, 0, 2, 2, 2], [0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 4, 0, 0, 2, 2, 2], [0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 4, 2]] \$$

$$[0, 0, 0, -y_1 - y_2 - y_3 + 5y_4, y_4, 0, y_1, y_2, 0, y_4, y_3, y_4]$$

$$p' = -s^2 + s^5 \quad p = -s^2 + s^5 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 2, 0, 0, 2, 2, 0, 2, 2, 0, 2], [0, 2, 2, 0, 0, 2, 4, 0, 2, 2, 0, 2], [0, 2, 2, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2]] \$$

$$[-y_2 + 2y_4, -y_1 + 2y_4, y_1, 0, 0, 2y_4 - y_3, y_2, 0, y_4, y_3, 0, y_4]$$

$$p = s^4 - s^8 \quad p' = s^6 - s^7 \quad p' = s^5 - s^7 \quad p' = s^4 - s^7$$

584 . Coloring, $\{2, 3, 4, 8, 12\}$

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7 \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 + 32s^7 - 64s^8$$

R: [7, 8, 8, 7, A, A, B, B, B, C, 1, 9]

B: [6, 7, 7, 6, 3, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 7	6 vs 8

$b_1 = \{7\}$, , $b_2 = \{10\}$, , $b_3 = \{11\}$, , $b_4 = \{2, 3\}$, , $b_5 = \{12\}$, , $b_6 = \{8, 9\}$, , $b_7 = \{5, 6\}$, ,
 $b_8 = \{1, 4\}$

Action of R and B on the blocks of the partitions: = [8, 7, 1, 2, 6, 4, 5, 3] [4, 1, 6, 7, 2, 5, 8, 3]
with invariant measure [1, 1, 1, 1, 1, 1, 1, 1]

N by blocks, check: true . ‘ See partition graph.

‘ ‘ See level-8 partition graph.

‘

586 . Coloring, {2, 3, 4, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^2 + 2s^3 + 8s^5 + 32s^7 \quad p = -9s^2 + 4s^4 - 24s^5 + 16s^6 - 96s^7 + 64s^8$$

R: [7, 8, 8, 7, A, A, B, C, C, C, 4, 5]

B: [6, 7, 7, 6, 3, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	8 vs 8

Omega Rank for R : cycles: {{5, 10, 12}, {4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 0, 0, 2, 2, 0, 2, 2, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 0, 2, 0, 0, 4, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 0, 2, 0, 0, 4, 2, 4]] \$$$

$$[0, 0, 0, y_3, -y_1 - y_2 + 5y_3 - y_4, 0, y_3, y_1, 0, y_2, y_3, y_4]$$

$$p' = -s^2 + s^5 \quad p' = -s^3 + s^6 \quad p = -s^2 + s^5$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 2, 2, 0, 2, 2, 2, 0], [2, 2, 2, 0, 0, 2, 4, 0, 0, 2, 2, 0], [2, 2, 2, 0, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$$$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, 0, y_6, y_7, y_8, 0]$$

587 . Coloring, {2, 3, 4, 9, 12}

$$\Omega p(\Delta)=0: \quad p' = 3s^2 + 2s^3 - 8s^4 + 8s^5 - 32s^7 \quad p = 9s^2 - 28s^4 + 40s^5 - 16s^6 - 96s^7 + 64s^8$$

R: [7, 8, 8, 7, A, A, B, C, C, C, 1, 9]

B: [6, 7, 7, 6, 3, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	3 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 0, 2, 2, 2, 2, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4]] \$$

$$[y_2, 0, 0, 0, 0, 0, y_2, y_1, 5y_2 - 2y_1 - y_3, y_1, y_2, y_3]$$

$$p' = -s^2 + s^4 \quad p = -s^2 + s^6 \quad p' = -s^2 + s^6 \quad p = -s^2 + s^4$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 2, 2, 2, 2, 2, 0, 0, 2, 2, 0], [0, 2, 4, 2, 0, 2, 4, 0, 0, 2, 0, 0], [0, 2, 2, 0, 0, 2, 6, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$$

$$[0, y_1, y_5, y_3, y_7, y_4, y_2, 0, 0, y_6, y_7, 0]$$

$$p = -s^5 + s^8$$

588 . Coloring, $\{2, 3, 4, 10, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 8s^6 + 16s^7 \quad p' = s^3 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, A, A, B, C, B, 2, 4, 5]

B: [6, 7, 7, 6, 3, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{2, 5, 8, 10, 12\}\}$
See Matrix

$\$ [[0, 2, 0, 2, 2, 0, 2, 2, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 2, 2, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 3, 2, 0, 1, 2, 2], [0, 1, 0, 2, 2, 0, 2, 2, 0, 2, 3, 2], [0, 2, 0, 3, 2, 0, 2, 1, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 3, 2, 0, 2, 2, 1], [0, 2, 0, 2, 1, 0, 2, 2, 0, 2, 3, 2], [0, 2, 0, 3, 2, 0, 2, 2, 0, 1, 2, 2]] \$$

$$[0, 9y_1 - 7y_2 + 9y_3 - 7y_4 - 7y_5 + 9y_6 - 7y_7, 0, 7y_1, 7y_2, 0, 7y_3, 7y_4, 0, 7y_5, 7y_6, 7y_7]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8
See Matrix

$\$ [[2, 0, 2, 0, 0, 2, 2, 0, 2, 2, 1, 3], [1, 0, 2, 0, 0, 2, 2, 0, 3, 2, 0, 4], [0, 0, 2, 0, 0, 1, 2, 0, 4, 2, 0, 5], [0, 0, 1, 0, 0, 0, 2, 0, 5, 2, 0, 6], [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 0], [0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[-y_2 + y_1 + y_5 - y_3 - y_4 + y_7 + y_6, 0, y_2, 0, 0, y_1, y_5, 0, y_3, y_4, y_7, y_6]$$

$$p = -s^7 + s^8$$

589 . Coloring, $\{2, 3, 4, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 8s^5 - 8s^6 - 16s^7 \quad p' = s^3 - 8s^5 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, A, A, B, C, B, 2, 1, 9]

B: [6, 7, 7, 6, 3, 3, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
 See Matrix

\$ [[2, 2, 0, 0, 0, 0, 2, 2, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 0, 2, 2, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 2, 2, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$[y_1, y_8, 0, 0, 0, 0, y_7, y_6, y_5, y_4, y_3, y_2]$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
 See Matrix

\$ [[0, 0, 2, 2, 2, 2, 0, 0, 2, 1, 3] , [0, 0, 4, 1, 3, 2, 2, 0, 0, 2, 0, 2] , [0, 0, 5, 0, 2, 1, 4, 0, 0, 2, 0, 2] , [0, 0, 3, 0, 2, 0, 5, 0, 0, 4, 0, 2] , [0, 0, 2, 0, 2, 0, 3, 0, 0, 5, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 0, 0, 3, 0, 5] , [0, 0, 4, 0, 5, 0, 2, 0, 0, 2, 0, 3] , [0, 0, 5, 0, 3, 0, 4, 0, 0, 2, 0, 2]] \$

$[0, 0, y_8, y_7, y_6, y_5, y_4, 0, 0, y_3, y_2, y_1]$

590 . Coloring, $\{2, 3, 4, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, A, B, C, B, C, 4, 9]

B: [6, 7, 7, 6, 3, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6
 See Matrix

\$ [[0, 0, 0, 2, 0, 0, 2, 2, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 0, 4, 4] , [0, 0, 0, 4, 0, 0, 3, 0, 4, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0]] \$

$$[0, 0, 0, y_4, 0, 0, y_1, y_3, y_2, y_3, y_5, y_6]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 2, 0, 0, 2, 1, 1], [1, 2, 4, 0, 1, 2, 4, 0, 0, 2, 0, 0], [0, 2, 3, 0, 0, 1, 6, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[y_3, y_2, y_1, 0, y_3, y_7, y_6, 0, 0, y_5, y_4, y_4]$$

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

591 . Coloring, {2, 3, 5, 6, 7}

R: [7, 8, 8, 6, 3, 3, A, C, B, C, 1, 5]

B: [6, 7, 7, 7, A, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 2, 1, 3], [1, 0, 3, 0, 3, 0, 2, 2, 0, 1, 0, 4], [0, 0, 3, 0, 4, 0, 1, 3, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 0, 3, 0, 1, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4]] \$$$

$$[y_3, 0, y_2, 0, y_1, y_6, y_7, y_8, 0, y_5, y_6, y_4]$$

$$p = s^5 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$[0, 2y_2 - 2y_1, 0, -2y_2 + 4y_1, 0, -y_2 + 2y_1, y_2, 0, y_1, 2y_1, 0, y_1]$$

$$p' = s^4 - s^6 \quad p' = s^3 - s^6 \quad p' = s^2 - s^6 \quad p = s^2 - s^7 \quad p' = s^5 - s^6$$

593 . Coloring, {2, 3, 5, 6, 9}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 7s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, C, C, C, 1, 5]

B: [6, 7, 7, 7, A, A, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 8	6 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}, {1, 7, 11}} order: 12

See Matrix

$$\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 0, 2, 4], [2, 0, 3, 0, 4, 0, 2, 2, 0, 0, 1, 2], [1, 0, 4, 0, 2, 0, 2, 3, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 1, 4, 0, 0, 2, 3], [2, 0, 2, 0, 3, 0, 2, 2, 0, 0, 1, 4], [1, 0, 3, 0, 4, 0, 2, 2, 0, 0, 2, 2], [2, 0, 4, 0, 2, 0, 1, 3, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 2, 4, 0, 0, 1, 3]] \$$$

$$[5y_1, 0, 11y_1 - 5y_2 - 5y_3 + 11y_7 - 5y_6 + 11y_4 - 5y_5, 0, 5y_2, 5y_3, 5y_7, 5y_6, 0, 0, 5y_4, 5y_5]$$

$$p = -s^2 - s^3 - s^4 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 4, 2, 0], [0, 4, 0, 2, 0, 0, 4, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$$$

$$[0, y_3, 0, y_4, 0, y_5, y_6, 0, 2y_5, y_1, y_2, 0]$$

$$p = -s^4 + s^7$$

Â» SYNC'D !RANK'D

594 . Coloring, {2, 3, 5, 6, 10}

R: [7, 8, 8, 6, 3, 3, B, C, B, 2, 1, 5]

B: [6, 7, 7, 7, A, A, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	5 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}, {1, 7, 11}} order: 12

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 0, 3, 1] , [3, 0, 3, 0, 1, 0, 2, 4, 0, 0, 1, 2] , [1, 0, 1, 0, 2, 0, 3, 3, 0, 0, 2, 4] , [2, 0, 2, 0, 4, 0, 1, 1, 0, 0, 3, 3] , [3, 0, 4, 0, 3, 0, 2, 2, 0, 0, 1, 1] , [1, 0, 3, 0, 1, 0, 3, 4, 0, 0, 2, 2] , [2, 0, 1, 0, 2, 0, 1, 3, 0, 0, 3, 4] , [3, 0, 2, 0, 4, 0, 2, 1, 0, 0, 1, 3] , [1, 0, 4, 0, 3, 0, 3, 2, 0, 0, 2, 1]] \$

[5 y₃, 10 y₆, 5 y₂, 0, 5 y₁, 5 y₆, -5 y₃ + 12 y₆ + 6 y₂ + 6 y₅ - 5 y₄, 5 y₂ - 5 y₁ + 5 y₆ + 5 y₅, 0, 0, 5 y₄, 5 y₅]

$p = -s^2 - s^4 + s^5 + s^7$ $p' = -s^2 - s^4 + s^5 + s^7$ $p = s^2 - s^5 - s^6 + s^9$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 4, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 8]] \$

[0, 0, 0, y₅, 0, y₄, y₃, 0, y₂, y₁, y₄, y₅ - y₃ + y₂ + y₁ - 2 y₄]

$p' = s^5 - s^6$ $p = s^5 - s^7$

595 . Coloring, {2, 3, 5, 6, 11}

R: [7, 8, 8, 6, 3, 3, B, C, B, C, 4, 5]

B: [6, 7, 7, 7, A, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 0, 3, 3], [0, 0, 3, 3, 3, 2, 0, 2, 0, 0, 1, 2], [0, 0, 5, 1, 2, 3, 0, 3, 0, 0, 0, 2], [0, 0, 5, 0, 2, 1, 0, 5, 0, 0, 0, 3], [0, 0, 3, 0, 3, 0, 0, 5, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 3, 0, 0, 0, 5], [0, 0, 5, 0, 5, 0, 0, 3, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 5, 0, 0, 0, 3]] \$$

$$[0, 0, y_2, y_1, y_2 + y_1 - y_5 + y_4 - y_3 - y_7 + y_6, y_5, y_4, y_3, 0, 0, y_7, y_6]$$

$$p = s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 4, 1, 1], [1, 4, 0, 0, 0, 2, 2, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 1, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2]] \$$

$$[3y_1, -3y_1 - 3y_2 - 3y_3 + 13y_4 - 3y_5 - 3y_6 + 13y_7, 0, 0, 0, 3y_2, 3y_3, 0, 3y_4, 3y_5, 3y_6, 3y_7]$$

$$p = -s^4 - s^5 + s^7 + s^8$$

596 . Coloring, {2, 3, 5, 6, 12}

R: [7, 8, 8, 6, 3, 3, B, C, B, C, 1, 9]

B: [6, 7, 7, 7, A, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	5 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
 See Matrix

\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 0, 3, 3] , [3, 0, 1, 0, 0, 0, 2, 2, 3, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 1, 2, 0, 5, 2] , [5, 0, 0, 0, 0, 3, 0, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_6, 0, y_5, 0, 0, y_4, y_2, y_3, y_1, 0, y_7, y_8]$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 3
 See Matrix

\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[0, y_3, 0, y_2, y_2, y_5, y_1, 0, 0, y_4, y_5, y_5]$$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p = s^3 - s^6$$

597 . Coloring, {2, 3, 5, 7, 8}

R: [7, 8, 8, 6, 3, A, A, B, B, C, 1, 5]
B: [6, 7, 7, 7, A, 3, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	5 vs 9

Omega Rank for R : cycles: $\{\{1, 3, 5, 7, 8, 10, 11, 12\}\}$ order: 8
 See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 1, 0, 2, 2, 3] , [2, 0, 2, 0, 3, 0, 2, 2, 0, 2, 1, 2] , [1, 0, 3, 0, 2, 0, 2, 2, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 0, 1, 3, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 2, 0, 1, 3, 2] , [3, 0, 2, 0, 2, 0, 2, 2, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 0, 3, 2, 0, 2, 2, 2] , [2, 0, 1, 0, 2, 0, 2, 2, 0, 3, 2, 2]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 2, 2], [0, 1, 1, 2, 0, 0, 5, 0, 2, 0, 3, 2], [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 5, 2], [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 4, 2], [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 3, 2], [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 5, 2], [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 4, 2], [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 3, 2], [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 5, 2]] \$$$

$$[0, y_1 + y_3, y_1, y_2, 0, y_3, -2y_1 - 3y_3 - y_2 - y_4 + 6y_5, 0, y_5, y_3, y_4, y_5]$$

$$p' = -s^5 + s^8 \quad p' = -s^4 + s^7 \quad p = s^3 - s^6 \quad p' = s^3 - s^6$$

598 . Coloring, {2, 3, 5, 7, 9}

R: [7, 8, 8, 6, 3, A, A, C, C, C, 1, 5]

B: [6, 7, 7, 7, A, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	5 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 2, 1, 0, 2, 0, 5], [0, 0, 4, 0, 5, 0, 0, 2, 0, 2, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$$$

$$[2y_3, 0, y_1, 0, y_2, y_3, y_4, y_5, 0, y_6, 0, y_7]$$

$$p = -s^4 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 4, 0], [0, 1, 1, 4, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[0, y_1 + y_5, y_1, y_2, 0, y_5, y_3, 0, 2y_5, y_5, y_4, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

599 . Coloring, {2, 3, 5, 7, 10}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, A, C, B, 2, 1, 5]

B: [6, 7, 7, 7, A, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 10	5 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 1, 1], [1, 3, 2, 0, 1, 0, 2, 3, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 1, 5, 0, 2, 0, 3], [0, 2, \\ & 2, 0, 3, 0, 0, 3, 0, 1, 0, 5], [0, 1, 3, 0, 5, 0, 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, \\ & 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, \\ & 0, 4]] \$ \end{aligned}$$

$$[y_1, y_2, y_3, 0, y_4, y_8, y_5, y_6, 0, y_7, y_8, y_9]$$

$$p = s^6 - s^{10}$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 3, 3], [0, 0, 1, 3, 0, 0, 3, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3], [0, 0, \\ & 0, 3, 0, 0, 3, 0, 3, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, \\ & 3, 0, 3, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3]] \$ \end{aligned}$$

$$[0, 0, 3y_1, -3y_1 + 7y_5 - 3y_4 + 10y_3 - 3y_2, 0, 3y_5, 3y_4, 0, 3y_3, 3y_5, 3y_2, 3y_5 + 3y_3]$$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p = s^3 - s^6$$

600 . Coloring, {2, 3, 5, 7, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, A, C, B, C, 4, 5]

B: [6, 7, 7, 7, A, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 2, 0, 1, 0, 2, 0, 5] , [0, 0, 3, 0, 5, 1, 0, 2, 0, 2, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 3, 0, 1, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4]] \$

$$[0, 0, y_1, y_2, y_3, y_4, y_7, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^5 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 3, 1] , [3, 1, 1, 0, 0, 2, 3, 0, 1, 0, 3, 2] , [3, 0, 2, 0, 0, 3, 2, 0, 2, 0, 3, 1] , [3, 0, 3, 0, 0, 3, 2, 0, 1, 0, 2, 2] , [2, 0, 3, 0, 0, 3, 3, 0, 2, 0, 2, 1] , [2, 0, 3, 0, 0, 2, 3, 0, 1, 0, 3, 2] , [3, 0, 2, 0, 0, 2, 3, 0, 2, 0, 3, 1] , [3, 0, 2, 0, 0, 3, 2, 0, 1, 0, 3, 2] , [3, 0, 3, 0, 0, 3, 2, 0, 2, 0, 2, 1]] \$

$$[-3y_1 - 3y_2 - 3y_3 - 3y_4 + 13y_5 - 3y_6 - 3y_8 + 13y_7, 3y_1, 3y_2, 0, 0, 3y_3, 3y_4, 0, 3y_5, 3y_6, 3y_8, 3y_7]$$

$$p = -s^3 - s^4 + s^8 + s^9$$

601 . Coloring, {2, 3, 5, 7, 12}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, A, C, B, C, 1, 9]

B: [6, 7, 7, 7, A, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 1, 3, 2, 2, 5] , [2, 0, 0, 0, 0, 0, 1, 0, 5, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 3, 1, 5, 2] , [5, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 1] , [3, 0, 0, 0, 0, 0, 5, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 3, 0, 2, 5, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 5] , [2, 0, 0, 0, 0, 0, 1, 0, 5, 2, 3, 3]] \$

[$y_8, 0, y_7, 0, 0, y_7, y_6, y_5, y_3, y_4, y_2, y_1$]

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 3, 1] , [0, 1, 1, 3, 1, 0, 5, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 5, 0, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

[$0, y_1, y_7 - y_5, y_6, y_7, y_5, y_4, 0, 0, y_2, y_3, y_5$]

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

602 . Coloring, {2, 3, 5, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, B, B, C, C, 1, 5]

B: [6, 7, 7, 7, A, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 9

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 3, 3], [3, 0, 2, 0, 3, 0, 2, 1, 0, 1, 3, 1], [3, 0, 3, 0, 1, 0, 3, 2, 0, 0, 3, 1], [3, 0, 1, 0, 1, 0, 3, 3, 0, 0, 5, 0], [5, 0, 1, 0, 0, 0, 3, 1, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 1, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$$

$$[y_4, 0, y_3, 0, y_2, y_1, y_9, y_8, 0, y_7, y_6, y_5]$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 1, 1], [0, 3, 1, 1, 0, 0, 5, 0, 1, 3, 2, 0], [0, 3, 0, 2, 0, 0, 5, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$

$$[0, y_1, -y_4 + y_5, y_3, 0, y_4, y_2, 0, y_5, y_6, y_7, y_4]$$

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

603 . Coloring, $\{2, 3, 5, 8, 10\}$

R: [7, 8, 8, 6, 3, A, B, B, B, 2, 1, 5]

B: [6, 7, 7, 7, A, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 4, 0] , [4, 1, 2, 0, 0, 0, 2, 3, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 0, 4, 3, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 3, 1, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0]] \$

$$[y_1, y_6, y_7, 0, -2y_7 + 4y_3, -y_7 + 2y_3, y_5, y_4, 0, y_3, y_2, 0]$$

$$p = s^5 - s^8 \quad p' = s^5 - s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 0, 4] , [0, 0, 1, 0, 0, 0, 3, 0, 4, 3, 0, 5] , [0, 0, 0, 0, 0, 0, 1, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, -y_1 + y_2 - y_3 - y_4 + y_5, 2y_1, 0, y_1, y_2, 0, y_3, y_4, 0, y_5]$$

$$p = -s^5 + s^7 \quad p = -s^5 + s^6$$

604 . Coloring, {2, 3, 5, 8, 11}

R: [7, 8, 8, 6, 3, A, B, B, B, C, 4, 5]

B: [6, 7, 7, 7, A, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 8

Omega Rank for R : cycles: {{3, 4, 5, 6, 8, 10, 11, 12}} order: 8
See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 2, 0, 1, 0, 1, 3, 1] , [0, 0, 2, 3, 1, 4, 0, 2, 0, 2, 1, 1] , [0, 0, 1, 1, 1, 3, 0, 2, 0, 4, 2, 2] , [0, 0, 1, 2, 2, 1, 0, 1, 0, 3, 2, 4] , [0, 0, 2, 2, 4, 2, 0, 1, 0, 1, 1, 3] , [0, 0, 4, 1, 3, 2, 0, 2, 0, 2, 1, 1] , [0, 0, 3, 1, 1, 1, 0, 4, 0, 2, 2, 2] , [0, 0, 1, 2, 2, 1, 0, 3, 0, 1, 4, 2]] \$

$$[0, 0, y_1, y_1 - y_8 + y_7 - y_6 - y_5 - y_4 + y_3 + y_2, y_8, y_7, y_6, y_5, 0, y_4, y_3, y_2]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 0, 2], [0, 3, 1, 0, 0, 2, 3, 0, 2, 3, 0, 2], [0, 3, 2, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2]] \$$$

$$[y_5, y_4, y_3, 0, 0, y_2, y_1, 0, y_6, -y_5 - y_4 - y_3 - y_2 - y_1 + 6y_6, 0, y_6]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

605 . Coloring, {2, 3, 5, 8, 12}

R: [7, 8, 8, 6, 3, A, B, B, B, C, 1, 9]

B: [6, 7, 7, 7, A, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 4, 2], [4, 0, 0, 0, 0, 0, 2, 1, 2, 1, 5, 1], [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 1], [5, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[y_1, 0, y_5 - y_7, 0, 0, y_5 - y_7, y_4, y_5, y_6, y_7, y_2, y_3]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0]] \$

$$[0, y_5, y_4, 2 y_3, 2 y_4, y_3, y_2, 0, 0, y_1, 0, 2 y_3]$$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p = s^3 - s^6$$

606 . Coloring, {2, 3, 5, 9, 10}

R: [7, 8, 8, 6, 3, A, B, C, C, 2, 1, 5]

B: [6, 7, 7, 7, A, 3, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 0, 2, 3, 0, 1, 1, 2] , [1, 1, 2, 0, 2, 0, 2, 3, 0, 0, 2, 3] , [2, 0, 2, 0, 3, 0, 1, 3, 0, 0, 2, 3] , [2, 0, 3, 0, 3, 0, 2, 2, 0, 0, 1, 3] , [1, 0, 3, 0, 3, 0, 2, 3, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 0, 1, 3, 0, 0, 2, 3] , [2, 0, 2, 0, 3, 0, 2, 3, 0, 0, 1, 3] , [1, 0, 3, 0, 3, 0, 2, 2, 0, 0, 2, 3] , [2, 0, 3, 0, 3, 0, 1, 3, 0, 0, 2, 2]] \$

$$[5 y_3, 5 y_2, 5 y_1, 0, 11 y_3 - 5 y_2 - 5 y_1 - 5 y_9 + 11 y_8 - 5 y_7 - 5 y_6 + 11 y_5 - 5 y_4, 5 y_9, 5 y_8, 5 y_7, 0, 5 y_6, 5 y_5, 5 y_4]$$

$$p = -s^4 - s^5 - s^6 + s^8 + s^9 + s^{10}$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 2, 2] , [0, 0, 1, 2, 0, 0, 3, 0, 2, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 3, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 3, 2, 3]] \$

$$[0, 0, -y_1 + y_2 + y_3 - y_4 - y_5 + y_6 + y_7, y_1, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

607 . Coloring, {2, 3, 5, 9, 11}

R: [7, 8, 8, 6, 3, A, B, C, C, C, 4, 5]

B: [6, 7, 7, 7, A, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 2, 4] , [0, 0, 2, 2, 4, 2, 0, 1, 0, 1, 1, 3] , [0, 0, 4, 1, 3, 2, 0, 2, 0, 2, 0, 2] , [0, 0, 3, 0, 2, 1, 0, 4, 0, 2, 0, 4] , [0, 0, 2, 0, 4, 0, 0, 3, 0, 1, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4] , [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2] , [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4] , [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6]] \$

$$[0, 0, y_1, y_1 - y_8 + y_7 - y_6 - y_5 - y_4 + y_3 + y_2, y_8, y_7, y_6, y_5, 0, y_4, y_3, y_2]$$

$$p = s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 2, 0] , [2, 3, 1, 0, 0, 2, 3, 0, 0, 3, 2, 0] , [2, 3, 2, 0, 0, 2, 4, 0, 0, 3, 0, 0] , [0, 3, 2, 0, 0, 2, 5, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, y_3, 0, 0, y_6, y_4, 0, y_5, y_7, y_8, 0]$$

608 . Coloring, {2, 3, 5, 9, 12}

R: [7, 8, 8, 6, 3, A, B, C, C, C, 1, 9]

B: [6, 7, 7, 7, A, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	5 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 2, 4], [2, 0, 0, 0, 0, 0, 2, 1, 4, 1, 1, 5], [1, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 6], [2, 0, 0, 0, 0, 0, 1, 0, 6, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 1, 6], [1, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 5], [2, 0, 0, 0, 0, 0, 1, 0, 5, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 1, 5], [1, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 6]] \$$

$[5 y_1, 0, 5 y_4 - 5 y_6, 0, 0, 5 y_4 - 5 y_6, 5 y_3, 5 y_4, 5 y_5, 5 y_6, 5 y_2, 11 y_1 - 15 y_4 + 5 y_6 + 11 y_3 - 5 y_5 + 11 y_2]$

$$p = -s^3 + s^9 \quad p = s^3 - s^5 - s^6 + s^8 \quad p = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 3

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 2, 0], [0, 3, 1, 2, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$

$[0, y_1, y_2, 2 y_2, 2 y_3, y_3, y_4, 0, 0, y_5, 2 y_3, 0]$

$$p' = -s^4 + s^7 \quad p' = -s^3 + s^6 \quad p = s^3 - s^6$$

609 . Coloring, $\{2, 3, 5, 10, 11\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, B, C, B, 2, 4, 5]

B: [6, 7, 7, 7, A, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8
See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 0, 3, 0, 1, 1, 2] , [0, 1, 1, 1, 2, 3, 0, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 1, 0, 2, 0, 3, 0, 3] , [0, 3, 3, 0, 3, 0, 0, 4, 0, 1, 0, 2] , [0, 1, 3, 0, 2, 0, 0, 6, 0, 0, 0, 4] , [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4] , [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2] , [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4]] \$

$$[0, -y_1 + y_2 + y_3 - y_4 + y_6 + y_5 + y_7 - y_8 - y_9, y_1, y_2, y_3, y_4, y_6, y_5, 0, y_7, y_8, y_9]$$

$$p = -s^7 + s^8 - s^9 + s^{10}$$

Omega Rank for B : cycles: {{9, 12}} order: 8
See Matrix

\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 1, 3] , [1, 0, 1, 0, 0, 2, 1, 0, 3, 3, 0, 5] , [0, 0, 2, 0, 0, 1, 1, 0, 5, 1, 0, 6] , [0, 0, 1, 0, 0, 0, 2, 0, 6, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_1, 0, -y_1 + y_3 + y_2 - y_7 - y_6 + y_5 + y_4, 0, 0, y_3, y_2, 0, y_7, y_6, y_5, y_4]$$

$$p = s^7 - s^8$$

610 . Coloring, {2, 3, 5, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 6s^2 + s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, B, C, B, 2, 1, 9]

B: [6, 7, 7, 7, A, 3, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 10	6 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 9
See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 2, 3, 1, 1, 3, 2], [3, 1, 0, 0, 0, 0, 3, 1, 2, 0, 3, 3], [3, 0, 0, 0, 0, 3, 1, 3, 0, 5, 1], [5, 0, 0, 0, 0, 0, 3, 0, 1, 0, 6, 1], [6, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$[y_1, y_2, y_3, 0, 0, y_3, y_4, y_5, y_6, y_9, y_7, y_8]$

$$p = -s^7 + s^{10}$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6
See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 1, 3], [0, 0, 1, 1, 3, 0, 3, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 0, 2, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$

$[0, 0, y_6, y_5, y_4, -y_6 + y_5, y_3, 0, 0, y_2, -y_6 + y_5, y_1]$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

611 . Coloring, $\{2, 3, 5, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = -6s^2 + s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: $[7, 8, 8, 6, 3, A, B, C, B, C, 4, 9]$

B: $[6, 7, 7, 7, A, 3, A, B, C, 2, 1, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 9

Omega Rank for R : cycles: $\{\{4, 6, 9, 10, 11, 12\}\}$ order: 6
See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 3, 3], [0, 0, 0, 3, 0, 2, 0, 1, 3, 1, 3, 3], [0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 3, 2], [0, 0, 0, 3, 0, 0, 2, 3, 3, 2], [0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 2, 3], [0, 0, 0, 2, 0, 3, 0, 0, 3, 3, 2, 3], [0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3, 3], [0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 3, 2]] \$$

$$[0, 0, y_2, y_3, 0, y_3 + y_1 + y_7 + y_4 - y_5 - y_6, y_2, y_1, y_7, y_4, y_5, y_6]$$

$$p = -s^3 + s^9 \quad p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6
See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 1, 1], [1, 3, 1, 0, 1, 2, 3, 0, 0, 5, 0, 0], [0, 5, 2, 0, 0, 1, 4, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 7, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0]] \$$$

$$[y_3, y_1, y_2, 0, y_3, y_4, y_5, 0, 0, y_6, y_7, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

612 . Coloring, {2, 3, 6, 7, 8}

R: [7, 8, 8, 6, A, 3, A, B, B, C, 1, 5]

B: [6, 7, 7, 7, 3, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 9

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 2, 2], [2, 0, 1, 0, 2, 0, 2, 1, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 2, 1, 0, 4, 1, 3], [1, 0, 0, 0, 3, 0, 2, 0, 0, 5, 1, 4], [1, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, 0, y_9, y_7, y_8]$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 2, 2] , [0, 1, 0, 2, 0, 0, 5, 0, 2, 1, 3, 2] , [0, 1, 0, 3, 0, 0, 3, 0, 2, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5, 2]] \$

$$[0, y_6, y_5, y_4, 0, y_5, y_3, 0, y_2, y_1, -y_6 - y_4 - 2y_5 - y_3 - y_1 + 6y_2, y_2]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7 \quad p' = s^5 - s^8$$

613 . Coloring, {2, 3, 6, 7, 9}

R: [7, 8, 8, 6, A, 3, A, C, C, C, 1, 5]

B: [6, 7, 7, 7, 3, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 0, 2, 1, 0, 3, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 1, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5]] \$

$$[2y_5, 0, y_2, 0, y_1, y_5, 2y_2 - y_5, y_4, 0, y_3, 0, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 5, 0, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, y_1, y_3, y_2, 0, y_3, y_4, 0, 2y_3, y_5, y_6, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

614 . Coloring, {2, 3, 6, 7, 10}

$$\Omega p(\Delta)=0: \quad p = 3s^3 - 2s^4 - 16s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, A, C, B, 2, 1, 5]

B: [6, 7, 7, 7, 3, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	8 vs 10	4 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 1, 1] , [1, 3, 1, 0, 1, 0, 2, 3, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 1, 4, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 0, 3]] \$

$$[y_2 + y_8, y_1, y_2, 0, y_3, y_8, y_4, y_5, 0, y_6, y_8, y_7]$$

$$p' = s^4 - s^9 \quad p = s^4 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 0, 3, 0, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3]] \$

$$[0, 0, 3y_1, -3y_1 + 3y_2, 0, 3y_1, 3y_2, 0, 3y_3, 3y_4, 3y_2, -3y_1 + 7y_2 - 3y_3 - 3y_4]$$

$$p = -s^3 + s^5 \quad p' = -s^3 + s^5 \quad p' = -s^3 + s^7 \quad p = -s^3 + s^7$$

Â» SYNC'D !RANK'D

615 . Coloring, {2, 3, 6, 7, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 16s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, A, C, B, C, 4, 5]

B: [6, 7, 7, 7, 3, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 2, 0, 1, 0, 3, 0, 5] , [0, 0, 2, 0, 5, 1, 0, 1, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 0, 0, 2, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 1, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5]] \$

$$[0, 0, y_1, y_2, y_3, y_4, y_7, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 3, 0, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 3, 1, 0, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 3, 1, 0, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 3, 2, 0, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 1, 3, 0, 1, 3, 2, 2] , [2, 3, 0, 0, 0, 1, 3, 0, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 3, 0, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 3, 1, 0, 2, 2, 3, 1]] \$

$$[3y_2, 3y_3, 3y_1, 0, 0, -3y_3 - 3y_1 + 8y_7 - 3y_5 + 5y_4, -3y_2 + 5y_7 - 3y_6 + 8y_4, 0, 3y_7, 3y_6, 3y_5, 3y_4]$$

$$p = s^2 - s^8 \quad p' = s^2 - s^8$$

Â» SYNC'D !RANK'D

616 . Coloring, {2, 3, 6, 7, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, A, C, B, C, 1, 9]

B: [6, 7, 7, 7, 3, A, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 1, 3] , [1, 0, 1, 0, 0, 0, 2, 1, 3, 1, 2, 5] , [2, 0, 0, 0, 0, 0, 1, 1, 5, 2, 3, 2] , [3, 0, 0, 0, 0, 2, 0, 2, 1, 5, 3] , [5, 0, 0, 0, 0, 0, 3, 0, 3, 2, 2, 1] , [2, 0, 0, 0, 0, 0, 5, 0, 1, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 2, 0, 2, 5, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 2, 2, 5] , [2, 0, 0, 0, 0, 0, 1, 0, 5, 3, 3, 2]] \$

$$[y_3, 0, y_2, 0, 0, y_1, y_9, y_8, y_7, y_6, y_5, y_4]$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 0, 5, 0, 0, 1, 3, 0] , [0, 1, 1, 3, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, y_3, y_3 - 2y_4 + y_6, y_2, y_4 + y_6, y_4, y_1, 0, 0, y_6, y_5, y_4]$$

$$p' = -s^5 + s^8 \quad p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

617 . Coloring, {2, 3, 6, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, B, B, C, C, 1, 5]

B: [6, 7, 7, 7, 3, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 3, 3], [3, 0, 1, 0, 3, 0, 2, 1, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 3, 1, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 4, 3], [4, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 4, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 3, 0, 0, 1, 4, 3], [4, 0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 1], [3, 0, 0, 0, 1, 0, 4, 0, 0, 3, 3, 2]] \$$

$[y_2, 0, y_3, 0, -2y_2 - 2y_3 + 5y_1 + 5y_5 - 4y_6, y_1, 4y_2 + 4y_3 - 6y_1 - y_4 - 6y_5 + 5y_6, y_4, 0, 5y_2 + 5y_3 - 8y_1 - 8y_5 + 6y_6, y_5, y_6]$

$$p' = -s^4 + s^7 \quad p' = -s^5 + s^8 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 5, 0, 1, 4, 2, 0], [0, 4, 0, 2, 0, 0, 4, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$$

$[0, y_1, y_7, y_2, 0, y_7, y_6, 0, y_3, y_4, y_5, y_7]$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

618 . Coloring, $\{2, 3, 6, 8, 10\}$

R: [7, 8, 8, 6, A, 3, B, B, B, 2, 1, 5]

B: [6, 7, 7, 7, 3, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	4 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 4, 0] , [4, 1, 1, 0, 0, 0, 2, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 4, 2, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 3, 2, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_3, y_2, y_1, 0, 4y_1 - 2y_7, 2y_1 - y_7, y_4, y_6, 0, y_7, y_5, 0]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 4
See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 3, 0, 4, 4, 0, 5] , [0, 0, 0, 0, 0, 0, 0, 0, 5, 3, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_1, 2y_1, 0, y_1, 2y_1 + y_2 + y_3 - y_4, 0, y_2, y_3, 0, y_4]$$

$$p = -s^4 + s^7 \quad p = -s^4 + s^5 \quad p = -s^4 + s^6$$

619 . Coloring, {2, 3, 6, 8, 11}

R: [7, 8, 8, 6, A, 3, B, B, B, C, 4, 5]
B: [6, 7, 7, 7, 3, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	5 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}, {5, 10, 12}}
See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 4, 2] , [0, 0, 1, 4, 2, 2, 0, 1, 0, 2, 3, 1] , [0, 0, 2, 3, 1, 4, 0, 1, 0, 2, 1, 2] , [0, 0, 4, 1, 2, 3, 0, 2, 0, 1, 1, 2] , [0, 0, 3, 1, 2, 1, 0, 4, 0, 2, 2, 1] , [0, 0, 1, 2, 1, 1, 0, 3, 0, 2, 4, 2] , [0, 0, 1, 4, 2, 2, 0, 1, 0, 1, 3, 2] , [0, 0, 2, 3, 2, 4, 0, 1, 0, 2, 1, 1] , [0, 0, 4, 1, 1, 3, 0, 2, 0, 2, 1, 2]] \$

$$[0, 0, 5 y_8, 5 y_5, 5 y_6, 5 y_7, 5 y_3, 5 y_4, 0, 5 y_1, -5 y_8 - 5 y_5 + 11 y_6 - 5 y_7 - 5 y_3 - 5 y_4 + 11 y_1 + 11 y_2, 5 y_2]$$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 2, 3, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2]] \$$$

$$[2 y_1, -3 y_1 - y_2 - y_3 - y_4 + 6 y_5, y_1, 0, 0, y_2, y_3, 0, y_5, y_4, 0, y_5]$$

$$p' = s^4 - s^7 \quad p = s^3 - s^6 \quad p' = s^3 - s^6$$

620 . Coloring, {2, 3, 6, 8, 12}

R: [7, 8, 8, 6, A, 3, B, B, B, C, 1, 9]

B: [6, 7, 7, 7, 3, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 4, 2], [4, 0, 1, 0, 0, 0, 2, 1, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 4, 1, 1, 0, 5, 0], [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[y_1, 0, y_6 - y_3 + y_4, 0, 0, y_6, y_5, y_3, y_4, y_6, y_2, 2 y_6 - y_3 + y_4]$$

$$p' = -s^5 + s^8 \quad p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[0, y_5, y_4, 2 y_2, y_3, y_2, y_1, 0, 0, y_6, 0, 2 y_2]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

621 . Coloring, {2, 3, 6, 9, 10}

R: [7, 8, 8, 6, A, 3, B, C, C, 2, 1, 5]

B: [6, 7, 7, 7, 3, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	6 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}, {1, 7, 11}}

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 2, 2] , [2, 1, 1, 0, 2, 0, 2, 3, 0, 2, 1, 2] , [1, 2, 0, 0, 2, 0, 2, 2, 0, 2, 2, 3] , [2, 2, 0, 0, 3, 0, 1, 2, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 0, 2, 2, 0, 3, 1, 2] , [1, 3, 0, 0, 2, 0, 2, 2, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 0, 1, 3, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 0, 2, 2, 0, 2, 1, 3] , [1, 2, 0, 0, 3, 0, 2, 2, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 0, 1, 2, 0, 3, 2, 2]] \$

$$[5 y_8, 5 y_7, 5 y_6, 0, 5 y_5, 5 y_4, 5 y_3, 5 y_2, 0, 11 y_8 - 5 y_7 - 5 y_6 - 5 y_5 - 5 y_4 + 11 y_3 - 5 y_2 + 11 y_1 - 5 y_9, 5 y_1, 5 y_9]$$

$$p = -s^3 - s^4 - s^5 + s^8 + s^9 + s^{10}$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 4, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 4, 2, 3]] \$

$$[0, 0, y_1, y_3, 0, y_1, y_3 + y_2 + y_4 - y_5 - y_6, 0, y_2, y_4, y_5, y_6]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 \quad p' = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

622 . Coloring, {2, 3, 6, 9, 11}

R: [7, 8, 8, 6, A, 3, B, C, C, C, 4, 5]

B: [6, 7, 7, 7, 3, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 2, 4] , [0, 0, 1, 2, 4, 2, 0, 1, 0, 2, 1, 3] , [0, 0, 2, 1, 3, 2, 0, 1, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 1, 0, 2, 0, 3, 0, 5] , [0, 0, 1, 0, 5, 0, 0, 2, 0, 3, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 1, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 3, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 3, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 2, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0]] \$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, 0, 2y_3, y_6, y_7, 0]$$

$$p = -s^5 + s^8$$

623 . Coloring, {2, 3, 6, 9, 12}

R: [7, 8, 8, 6, A, 3, B, C, C, C, 1, 9]

B: [6, 7, 7, 7, 3, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 2, 4], [2, 0, 1, 0, 0, 0, 2, 1, 4, 0, 1, 5], [1, 0, 0, 0, 0, 0, 2, 1, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 1, 0, 5, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 1, 5], [1, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 6], [2, 0, 0, 0, 0, 0, 1, 0, 6, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 1, 6], [1, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 5]] \$$

$[5 y_4, 0, 5 y_3, 0, 0, 5 y_7, 5 y_2, 5 y_1, 11 y_4 - 5 y_3 - 10 y_7 + 11 y_2 - 5 y_1 + 11 y_6 - 5 y_5, 5 y_7, 5 y_6, 5 y_5]$

$$p = s^4 - s^6 - s^7 + s^9 \quad p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 3

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 2, 0], [0, 3, 2, 2, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0]] \$$

$[0, y_1, y_2 - y_3, y_2, 2 y_3, y_3, y_4, 0, 0, y_5, 2 y_3, 0]$

$$p = s^3 - s^6 \quad p' = s^3 - s^6 \quad p' = s^4 - s^7$$

624 . Coloring, $\{2, 3, 6, 10, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, B, C, B, 2, 4, 5]

B: [6, 7, 7, 7, 3, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	10 vs 10	5 vs 8

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 10
See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 3, 1], [0, 1, 1, 3, 1, 2, 0, 3, 0, 2, 1, 2], [0, 2, 2, 1, 2, 3, 0, 2, 0, 1, 0, 3], [0, 1, 3, 0, 3, 1, 0, 4, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 0, 4, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4]] \$$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_7, 0, y_8, y_{10}, y_9]$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 1, 3], [1, 0, 0, 0, 0, 2, 1, 0, 3, 4, 0, 5], [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[y_5, 0, y_4, 0, 0, y_3, y_5 + y_4, 0, y_2, y_1, y_4, -y_4 - y_3 + y_2 + y_1]$$

$$p' = s^6 - s^7 \quad p' = s^5 - s^7 \quad p = s^5 - s^8$$

625 . Coloring, $\{2, 3, 6, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = -2s^2 + 5s^3 + 2s^4 + 16s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, B, C, B, 2, 1, 9]

B: [6, 7, 7, 7, 3, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	8 vs 10	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 3, 1] , [3, 1, 1, 0, 0, 0, 2, 3, 1, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 2, 2, 0, 3, 3] , [3, 0, 0, 0, 0, 3, 0, 3, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_1, y_2 + y_6, y_2, 0, 0, y_6, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p' = -s^6 + s^9 \quad p = -s^6 + s^9$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5
See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4]] \$

$$[0, 0, y_4, y_2, y_3, y_6, y_1, 0, 0, y_5, y_6, y_7]$$

$$p = s^3 - s^8$$

Â» SYNC'D !RANK'D

626 . Coloring, {2, 3, 6, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 5s^3 - 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, B, C, B, C, 4, 9]

B: [6, 7, 7, 7, 3, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 10	9 vs 10	8 vs 9	6 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7
See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 3, 3] , [0, 0, 1, 3, 0, 2, 0, 1, 3, 0, 3, 3] , [0, 0, 2, 3, 0, 3, 0, 1, 3, 0, 3, 1] , [0, 0, 3, 3, 0, 3, 0, 2, 1, 0, 3, 1] , [0, 0, 3, 3, 0, 3, 0, 3, 1, 0, 1, 2] , [0, 0, 3, 1, 0, 3, 0, 3, 2, 0, 1, 3] , [0, 0, 3, 1, 0, 1, 0, 3, 3, 0, 2, 3] , [0, 0, 1, 2, 0, 1, 0, 3, 3, 0, 3, 3] , [0, 0, 1, 3, 0, 2, 0, 1, 3, 0, 3, 3]] \$

[0, 0, y₇, y₈, 0, y₅, y₆, y₄, y₃, y₆, y₁, y₂]

$$p = -s^2 + s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

[y₂, y₁, y₃, 0, y₂, y₃, y₄, 0, 0, y₅, y₆, y₆]

$$p' = s^4 - s^7 \quad p' = s^5 - s^8 \quad p = -s^4 + s^7$$

Â» SYNC'D !RANK'D

627 . Coloring, {2, 3, 7, 8, 9}

R: [7, 8, 8, 6, A, A, A, B, C, C, 1, 5]

B: [6, 7, 7, 7, 3, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	5 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 4] , [2, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[y_1, 0, 0, 0, y_4, y_5, y_6, 2y_5, 0, y_7, y_2, y_3]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 0, 3, 1], [0, 0, 1, 3, 0, 0, 6, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0]] \$$$

$$[0, 2y_5, y_3, y_1, 0, y_5, y_2, 0, y_3, 0, y_4, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

628 . Coloring, {2, 3, 7, 8, 10}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + 5s^3 + 2s^4 - 16s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, A, B, B, 2, 1, 5]

B: [6, 7, 7, 7, 3, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 8	6 vs 7

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 2, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 2, 4, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 2, 4, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 4, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 4, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 2, 2, 0, 4, 2, 0]] \$$$

$$[y_1, y_1 - 3y_2 - y_5 + y_6 + y_4 - y_3, 0, 0, 2y_2, y_2, y_5, y_6, 0, y_4, y_3, 0]$$

$$p = -s^2 + s^8 \quad p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 0, 2, 4] , [0, 0, 1, 2, 0, 0, 4, 0, 4, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 0, 4, 4] , [0, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 3, 4]] \$

$$[0, 0, -3y_2 - 3y_1 - 3y_3 + 5y_4 - 3y_6 + 5y_5, 3y_2, 0, 3y_1, 3y_3, 0, 3y_4, 0, 3y_6, 3y_5]$$

$$p = s^3 + s^4 - s^6 - s^7$$

Â» SYNC'D !RANK'D

629 . Coloring, {2, 3, 7, 8, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 5s^3 - 2s^4 - 16s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, A, B, B, C, 4, 5]

B: [6, 7, 7, 7, 3, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 2, 0, 0, 0, 4, 2, 4] , [0, 0, 0, 2, 4, 2, 0, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 0] , [0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

$$[0, 0, 0, y_1, y_2, y_3, y_4, 2y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 7, 11}} order: 10

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 0, 2, 2] , [2, 0, 1, 0, 0, 2, 4, 0, 2, 0, 3, 2] , [3, 0, 2, 0, 0, 2, 1, 0, 2, 0, 4, 2] , [4, 0, 2, 0, 0, 3, 2, 0, 2, 0, 1, 2] , [1, 0, 3, 0, 0, 4, 2, 0, 2, 0, 2, 2] , [2, 0, 4, 0, 0, 1, 3, 0, 2, 0, 2, 2] , [2, 0, 1, 0, 0, 2, 4, 0, 2, 0, 3, 2] , [3, 0, 2, 0, 0, 2, 1, 0, 2, 0, 4, 2]] \$

$$[-y_1 - y_2 - y_3 - y_4 + 6y_5 - y_6, y_1, y_2, 0, 0, y_3, y_4, 0, y_5, 0, y_6, y_5]$$

$$p' = -s^2 + s^7 \quad p = -s^2 + s^7$$

630 . Coloring, {2, 3, 7, 8, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, A, B, B, C, 1, 9]

B: [6, 7, 7, 7, 3, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 4, 2, 2], [2, 0, 0, 0, 0, 0, 2, 0, 2, 2, 4, 4], [4, 0, 0, 0, 0, 0, 2, 0, 4, 2, 2, 2], [2, 0, 0, 0, 0, 4, 0, 2, 2, 4, 2], [4, 0, 0, 0, 0, 0, 2, 0, 2, 4, 2, 2], [2, 0, 0, 0, 0, 4, 0, 2, 2, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 4, 2, 2], [2, 0, 0, 0, 0, 0, 2, 0, 2, 2, 4, 4]] \$$$

$$[y_1, 0, 0, 0, 0, y_2, y_7, 2y_2, y_6, y_5, y_4, y_3]$$

$$p = s^2 - s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 0, 2, 2], [0, 0, 3, 2, 2, 0, 6, 0, 0, 0, 3, 0], [0, 0, 2, 3, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[0, 2y_3, y_1, y_4, y_5, y_3, y_2, 0, 0, 0, y_6, 2y_3]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

631 . Coloring, {2, 3, 7, 9, 10}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 + 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, A, C, C, 2, 1, 5]

B: [6, 7, 7, 7, 3, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	5 vs 7

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\begin{aligned} \$ [& [2, 2, 0, 0, 2, 1, 1, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 2, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2], [0, 4, \\ & 0, 0, 2, 0, 0, 4, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 2, 0, 4, 0, 4], [0, 4, 0, 0, 4, 0, \\ & 0, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2]] \$ \end{aligned}$$

$$[2y_6, y_1, 0, 0, y_5, y_6, y_4, y_2, 0, y_3, 0, y_7]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\begin{aligned} \$ [& [0, 0, 2, 2, 0, 1, 3, 0, 2, 0, 4, 2], [0, 0, 1, 4, 0, 0, 4, 0, 2, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, \\ & 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, \\ & 5, 0, 0, 0, 5, 0]] \$ \end{aligned}$$

$$[0, 0, y_1, y_2, 0, y_3, y_5, 0, 2y_1 - 2y_3, 0, y_4, 2y_3]$$

$$p = s^3 - s^6 \quad p' = s^3 - s^6$$

632 . Coloring, {2, 3, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 3s^3 + 2s^4 - 16s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, A, C, C, C, 4, 5]

B: [6, 7, 7, 7, 3, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	5 vs 7	6 vs 7

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

[0, 0, 0, 2 y₄, y₁, y₂, y₄, 2 y₄, 0, y₃, 0, y₅]

$$p = s^3 - s^6 \quad p' = s^3 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 4, 0, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 1, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 5, 2, 0, 0, 0, 1, 0] , [1, 0, 5, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 1, 5, 0, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 4, 0, 0, 0, 5, 0]] \$

[y₁, y₅, y₂, 0, 0, y₃, y₄, 0, y₅, 0, y₆, 0]

$$p = -s^2 + s^7$$

Â» SYNC'D !RANK'D

633 . Coloring, {2, 3, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, A, C, C, C, 1, 9]

B: [6, 7, 7, 7, 3, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	5 vs 7	5 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 0, 4, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$

[2 y₄, 0, 0, 0, 0, y₄, y₃, 2 y₄, y₁, y₂, 0, y₅]

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 3

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 0, 6, 0, 0, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 7, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 6, 0, 0, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 7, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 0, 0, 0, 7, 0]] \$

[0, 2 y₁, y₃, y₄, 2 y₁, y₁, y₂, 0, 0, 0, y₅, 0]

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Â» SYNC'D !RANK'D

634 . Coloring, {2, 3, 7, 10, 11}

R: [7, 8, 8, 6, A, A, A, C, B, 2, 4, 5]

B: [6, 7, 7, 7, 3, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 7

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5
See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 4, 1, 1], [0, 4, 0, 1, 1, 2, 0, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 1, 0, 4, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4]] \$$

$$[0, y_1, 0, y_2, y_3, y_4, y_8, y_5, 0, y_6, y_8, y_7]$$

$$p = s^4 - s^9$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{1, 3, 6, 7, 11\}\}$ order: 10
See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 0, 3, 3], [3, 0, 1, 0, 0, 2, 2, 0, 3, 0, 3, 2], [3, 0, 2, 0, 0, 3, 1, 0, 2, 0, 2, 3], [2, 0, 3, 0, 0, 3, 2, 0, 3, 0, 1, 2], [1, 0, 3, 0, 0, 2, 3, 0, 2, 0, 2, 3], [2, 0, 2, 0, 0, 1, 3, 0, 3, 0, 3, 2], [3, 0, 1, 0, 0, 2, 0, 2, 0, 2, 0, 3, 3]] \$$

$$[-5 y_3 - 5 y_1 - 5 y_2 + 11 y_4 - 5 y_5 + 11 y_6, 0, 5 y_3, 0, 0, 5 y_1, 5 y_2, 0, 5 y_4, 0, 5 y_5, 5 y_6]$$

$$p = -s - s^2 + s^6 + s^7$$

635 . Coloring, $\{2, 3, 7, 10, 12\}$

R: [7, 8, 8, 6, A, A, A, C, B, 2, 1, 9]

B: [6, 7, 7, 7, 3, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 7

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 9, 10, 11, 12\}\}$ order: 8
 See Matrix

\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 0, 2, 2, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 1, 4, 2, 2, 1, 2] , [1, 2, 0, 0, 0, 0, 2, 2, 1, 2, 4] , [2, 1, 0, 0, 0, 0, 1, 2, 4, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 2, 1, 2, 1, 4, 2] , [4, 1, 0, 0, 0, 0, 2, 2, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 0, 4, 1, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 2, 2, 2, 4, 1, 1]] \$

$$[y_1, y_2, 0, 0, 0, y_7, y_3, y_4, y_5, y_6, y_8, y_9]$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 6
 See Matrix

\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 0, 3, 3] , [0, 0, 3, 3, 3, 0, 4, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_1, y_2, y_3, y_4, y_6, 0, 0, 0, y_5, 3y_4]$$

$$p = -s^4 + s^7$$

636 . Coloring, $\{2, 3, 7, 11, 12\}$

R: [7, 8, 8, 6, A, A, A, C, B, C, 4, 9]
B: [6, 7, 7, 7, 3, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{4, 6, 9, 10, 11, 12\}\}$ order: 6
 See Matrix

\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 2, 2, 6] , [0, 0, 0, 2, 0, 1, 0, 0, 6, 2, 3, 2] , [0, 0, 0, 3, 0, 2, 0, 0, 2, 1, 6, 2] , [0, 0, 0, 6, 0, 3, 0, 0, 2, 2, 2, 1] , [0, 0, 0, 2, 0, 6, 0, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 6, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 2, 2, 6]] \$

$$[0, 0, 0, y_1, 0, y_2, y_3, 2y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 0, 3, 1], [3, 0, 3, 0, 1, 2, 4, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 3, 3, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 3, 3, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 4, 3, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 3, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 3, 4, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 3, 3, 0, 0, 0, 4, 0]] \$$$

$$[y_1, 2y_6, y_2, 0, y_3, y_4, y_5, 0, 0, 0, y_7, y_6]$$

$$p = -s^3 + s^8$$

637 . Coloring, {2, 3, 8, 9, 10}

R: [7, 8, 8, 6, A, A, B, B, C, 2, 1, 5]

B: [6, 7, 7, 7, 3, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 2, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 3, 2, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 3, 3, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[y_1, y_3, 0, 0, y_2, y_8, y_4, y_5, 0, y_7, y_6, y_8]$$

$$p = s^6 - s^9$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 2, 1, 3] , [0, 0, 1, 1, 0, 0, 4, 0, 3, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 0, 2, 4, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 2, 0, 2, 3, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 2, 2, 3] , [0, 0, 0, 2, 0, 0, 4, 0, 3, 3, 2, 2]] \$

$$[0, 0, -y_1 + y_2 + y_3 - y_4 - y_5 + y_6 + y_7, y_1, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

638 . Coloring, {2, 3, 8, 9, 11}

R: [7, 8, 8, 6, A, A, B, B, C, C, 4, 5]

B: [6, 7, 7, 7, 3, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 2, 0, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 3, 0, 0, 0, 5, 0, 3] , [0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[0, 0, 0, y_1, y_2, y_3, y_4, 2y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 2, 1, 1] , [1, 2, 1, 0, 0, 2, 4, 0, 1, 3, 2, 0] , [2, 3, 2, 0, 0, 1, 3, 0, 0, 4, 1, 0] , [1, 4, 1, 0, 0, 2, 5, 0, 0, 3, 0, 0] , [0, 3, 2, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 1, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, 0, y_6, y_7, y_8, y_9]$$

639 . Coloring, {2, 3, 8, 9, 12}

R: [7, 8, 8, 6, A, A, B, B, C, C, 1, 9]

B: [6, 7, 7, 7, 3, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	6 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 0, 3, 1, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4]] \$

$$[-y_1 - y_4 + 2 y_5, 0, 0, 0, 0, y_2 + y_3 - y_5, y_1, 2 y_2 + 2 y_3 - 2 y_5, y_2, y_3, y_4, y_5]$$

$$p = s^3 - s^6 \quad p' = s^3 - s^6 \quad p'' = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 2, 1, 1] , [0, 2, 3, 1, 1, 0, 6, 0, 0, 3, 0, 0] , [0, 3, 1, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[0, y_1, y_2, y_4, y_4, y_6, y_3, 0, 0, y_5, y_6, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

640 . Coloring, {2, 3, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, B, B, B, 2, 4, 5]

B: [6, 7, 7, 7, 3, 3, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 7

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 4, 0, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 3, 0, 3, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 2, 0, 4, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 3, 0, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 2, 0, 3, 3, 0]] \$

$$[0, y_1, 0, y_2, 2y_4, y_3, y_4, y_5, 0, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 2, 0, 4] , [0, 0, 1, 0, 0, 2, 2, 0, 4, 3, 0, 4] , [0, 0, 2, 0, 0, 0, 1, 0, 4, 2, 0, 7] , [0, 0, 0, 0, 0, 2, 0, 7, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[-y_1 + y_4 + y_5 - y_6 - y_2 + y_3, 0, y_1, 0, 0, y_4, y_5, 0, y_6, y_2, 0, y_3]$$

$$p = -s^6 + s^7$$

641 . Coloring, {2, 3, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 16s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, B, B, B, 2, 1, 9]

B: [6, 7, 7, 7, 3, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 7

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 2, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 4, 2, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 5, 1, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$$

$$[y_1, y_2, 0, 0, 0, y_5, y_6, y_7, 2y_5, y_3, y_4, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2], [0, 0, 4, 0, 2, 0, 3, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 4, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2]] \$$

$$[0, 0, y_1, 2y_3, y_2, y_3, y_4, 0, 0, y_5, 0, y_6]$$

$$p = -s^2 + s^7$$

642 . Coloring, $\{2, 3, 8, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, B, B, B, C, 4, 9]

B: [6, 7, 7, 7, 3, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 1, 5, 2] , [0, 0, 0, 5, 0, 4, 0, 0, 2, 2, 2, 1] , [0, 0, 0, 2, 0, 5, 0, 0, 1, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 5, 1, 4] , [0, 0, 0, 1, 0, 2, 0, 0, 4, 2, 2, 5] , [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 1, 5, 2]] \$

[0, 0, 0, y₇, 0, y₆, y₅, 2 y₅, y₄, y₃, y₂, y₁]

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6
See Matrix

\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 2, 4, 0, 0, 3, 0, 0] , [0, 3, 4, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0]] \$

[2 y₃ - 2 y₆, y₂, y₁, 0, y₃, y₆, y₅, 0, 0, y₄, 0, 2 y₃ - 2 y₆]

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Â» SYNC'D !RANK'D

643 . Coloring, {2, 3, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -6s^2 + 5s^3 - 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, B, C, C, 2, 4, 5]

B: [6, 7, 7, 7, 3, 3, A, B, B, C, 1, 9]

' See graph

' ' See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5
See Matrix

\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 2, 2, 2] , [0, 2, 0, 2, 2, 2, 0, 2, 0, 3, 1, 2] , [0, 3, 0, 1, 2, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 1, 0, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2]] \$

$$[0, y_1, 0, y_9, y_8, y_6, y_7, y_5, 0, y_4, y_3, y_2]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 2, 2, 2] , [2, 0, 1, 0, 0, 2, 2, 0, 2, 3, 2, 2] , [2, 0, 2, 0, 0, 2, 1, 0, 2, 2, 2, 3] , [2, 0, 2, 0, 0, 2, 2, 0, 3, 1, 2, 2] , [2, 0, 2, 0, 0, 2, 2, 0, 2, 2, 3, 1] , [3, 0, 2, 0, 0, 2, 2, 0, 1, 2, 2, 2] , [2, 0, 2, 0, 0, 3, 2, 0, 2, 2, 1, 2] , [1, 0, 3, 0, 0, 2, 2, 0, 2, 2, 2, 2]] \$

$$[-y_1 + y_2 + y_3 - y_6 - y_7 + y_4 + y_5, 0, y_1, 0, 0, y_2, y_3, 0, y_6, y_7, y_4, y_5]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

644 . Coloring, {2, 3, 9, 10, 12}

$$\Omega p(\Delta)=0: p = -9s^3 + 2s^4 + 16s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, B, C, C, 2, 1, 9]

B: [6, 7, 7, 7, 3, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 2, 2, 2, 1, 1, 4] , [1, 1, 0, 0, 0, 0, 2, 2, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 1, 1, 4, 0, 2, 6] , [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 1, 5] , [1, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 6] , [2, 0, 0, 0, 0, 0, 1, 0, 6, 0, 2, 5] , [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 1, 6] , [1, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 5]] \$

$$[5y_8, 5y_7, 0, 0, 0, 5y_6, 5y_5, 5y_4, 5y_3, 5y_2, 5y_1, 11y_8 - 5y_7 - 5y_6 + 11y_5 - 5y_4 - 5y_3 - 5y_2 + 11y_1]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 2, 2, 2], [0, 0, 3, 2, 2, 0, 4, 0, 0, 3, 0, 2], [0, 0, 2, 0, 2, 0, 5, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 2, 0, 0, 5, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 2, 0, 5], [0, 0, 4, 0, 5, 0, 3, 0, 0, 2, 0, 2], [0, 0, 5, 0, 2, 0, 4, 0, 0, 3, 0, 2], [0, 0, 2, 0, 2, 0, 5, 0, 0, 4, 0, 3]] \$$$

$$[0, 0, y_6, y_7, y_3, y_4, y_5, 0, 0, y_2, 2y_4, y_1]$$

$$p = -s^3 + s^8$$

645 . Coloring, {2, 3, 9, 11, 12}

$$\Omega p(\Delta)=0: p = 9s^3 + 2s^4 - 16s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, B, C, C, C, 4, 9]

B: [6, 7, 7, 7, 3, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 2, 2, 4], [0, 0, 0, 2, 0, 2, 0, 0, 4, 1, 1, 6], [0, 0, 0, 1, 0, 2, 0, 0, 6, 2, 0, 5], [0, 0, 0, 0, 1, 0, 0, 5, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[0, 0, 0, y_2, 0, y_1, y_7, 2y_7, y_6, y_5, y_4, y_3]$$

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 2, 2, 0] , [2, 2, 3, 0, 0, 2, 4, 0, 0, 3, 0, 0] , [0, 3, 2, 0, 0, 2, 5, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, y_3, 0, y_7, y_4, y_5, 0, 0, y_6, y_7, 0]$$

$$p = -s^5 + s^8$$

646 . Coloring, {2, 3, 10, 11, 12}

R: [7, 8, 8, 6, A, A, B, C, B, 2, 4, 9]

B: [6, 7, 7, 7, 3, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 0, 2, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 3, 0, 2, 2, 2, 1, 2] , [0, 2, 0, 1, 0, 3, 0, 1, 2, 3, 2, 2] , [0, 3, 0, 2, 0, 1, 0, 2, 2, 3, 2, 1] , [0, 3, 0, 2, 0, 2, 0, 3, 1, 1, 2, 2] , [0, 1, 0, 2, 0, 2, 0, 3, 2, 2, 1, 3] , [0, 2, 0, 1, 0, 2, 0, 1, 3, 2, 2, 3] , [0, 2, 0, 2, 0, 1, 0, 2, 3, 2, 3, 1]] \$

$$[0, y_9, 0, y_8, 0, y_7, y_6, y_5, y_4, y_3, y_2, y_1]$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 2, 1, 3] , [1, 0, 3, 0, 3, 2, 2, 0, 0, 3, 0, 2] , [0, 0, 5, 0, 2, 1, 3, 0, 0, 2, 0, 3] , [0, 0, 3, 0, 3, 0, 5, 0, 0, 3, 0, 2] , [0, 0, 3, 0, 2, 0, 3, 0, 0, 5, 0, 3] , [0, 0, 2, 0, 3, 0, 3, 0, 0, 3, 0, 5] , [0, 0, 3, 0, 5, 0, 2, 0, 0, 3, 0, 3] , [0, 0, 5, 0, 3, 0, 3, 0, 0, 2, 0, 3]] \$

$$[y_8, 0, y_7, 0, y_6, y_5, y_4, 0, 0, y_3, y_2, y_1]$$

647 . Coloring, {2, 4, 5, 6, 7}

R: [7, 8, 7, 7, 3, 3, A, C, B, C, 1, 5]

B: [6, 7, 8, 6, A, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 2, 1, 3] , [1, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3]] \$

$[y_7, 0, y_6, 0, y_5, 0, y_3, y_4, 0, y_2, y_4, y_1]$

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{9, 12}, {2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 2, 0, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 3, 2, 0, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 2, 0, 1, 3, 2, 2] , [0, 3, 0, 2, 0, 2, 2, 0, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 2, 3, 0, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 2, 2, 0, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 2, 0, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 3, 2, 0, 2, 2, 2, 1]] \$

$[0, -3y_1 + 8y_4 - 3y_6 + 5y_7, 0, -3y_2 - 3y_3 + 5y_4 - 3y_5 + 8y_7, 0, 3y_1, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

648 . Coloring, {2, 4, 5, 6, 8}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, B, B, C, 1, 5]

B: [6, 7, 8, 6, A, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	6 vs 7	6 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 0, 4, 2], [4, 0, 2, 0, 2, 0, 4, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_5, 0, 0, y_6, 2y_5]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 4, 0, 2], [0, 4, 0, 0, 0, 2, 2, 0, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 4, 0, 2], [0, 4, 0, 0, 0, 3, 0, 2, 4, 0, 3], [0, 4, 0, 0, 0, 0, 4, 0, 3, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 0, 2, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 3, 0, 3]] \$$

$$[0, y_6, 0, 10y_6 + 10y_5 + 10y_4 - 22y_3 + 10y_2 - 22y_1, 0, y_5, y_4, 5y_6 + 5y_5 + 5y_4 - 11y_3 + 5y_2 - 11y_1, y_3, y_2, 0, y_1]$$

$$p = s^3 - s^5 - s^6 + s^8 \quad p = -s^3 - s^4 + s^6 + s^7$$

649 . Coloring, $\{2, 4, 5, 6, 9\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, C, C, C, 1, 5]

B: [6, 7, 8, 6, A, A, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 0, 2, 4], [2, 0, 2, 0, 4, 0, 4, 0, 0, 0, 3, 1], [3, 0, 4, 0, 1, 0, 4, 0, 0, 0, 4, 0], [4, 0, 1, 0, 0, 0, 7, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0]] \$$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_5, 0, 0, y_6, y_7]$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 4, 2, 0], [0, 4, 0, 2, 0, 2, 2, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 3, 3, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$$

$$[0, y_5, 0, y_6, 0, y_1, y_2, y_3, 2y_3, y_4, y_7, 0]$$

$$p = -s^5 + s^8$$

650 . Coloring, $\{2, 4, 5, 6, 10\}$

R: $[7, 8, 7, 7, 3, 3, B, C, B, 2, 1, 5]$

B: $[6, 7, 8, 6, A, A, A, B, C, C, 4, 9]$

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 0, 3, 1] , [3, 0, 2, 0, 1, 0, 4, 2, 0, 0, 3, 1] , [3, 0, 1, 0, 1, 0, 5, 0, 0, 0, 4, 2] , [4, 0, 1, 0, 2, 0, 4, 0, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$

[y₈, y₇, y₆, 0, y₅, 0, y₄, y₃, 0, 0, y₂, y₁]

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 1, 6] , [0, 0, 0, 1, 0, 1, 0, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[0, 0, 0, y₁, 0, y₄, y₅, y₅, y₂, y₃, y₇, y₆]

$$p = s^6 - s^8$$

651 . Coloring, {2, 4, 5, 6, 11}

R: [7, 8, 7, 7, 3, 3, B, C, B, C, 4, 5]

B: [6, 7, 8, 6, A, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	8 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 0, 3, 3] , [0, 0, 2, 3, 3, 0, 4, 0, 0, 0, 3, 1] , [0, 0, 3, 3, 1, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 1, 4, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

[0, 0, y₃, y₁, y₂, 0, y₅, y₆, 0, 0, y₇, y₄]

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 2, 2, 0, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 1, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 1, 3, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1]] \$

$$[-3 y_1 - 3 y_2 - 3 y_3 - 3 y_4 + 13 y_5 - 3 y_6 - 3 y_7 + 13 y_8, 3 y_1, 0, 0, 0, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7, 3 y_8]$$

$$p = s^5 + s^6 - s^8 - s^9$$

652 . Coloring, {2, 4, 5, 6, 12}

R: [7, 8, 7, 7, 3, 3, B, C, B, C, 1, 9]

B: [6, 7, 8, 6, A, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 3, 0, 1, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$

$$[y_1, 0, 2 y_3, 0, 0, 0, y_2, y_3, y_6, 0, y_5, y_4]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 2, 2, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_1, 0, y_2, y_7 + y_6, y_3, y_4, y_7, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8 \quad p' = s^5 - s^8$$

653 . Coloring, {2, 4, 5, 7, 8}

R: [7, 8, 7, 7, 3, A, A, B, B, C, 1, 5]

B: [6, 7, 8, 6, A, 3, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	10 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 0, 3, 0, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3]] \$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{9, 12}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 2, 2] , [0, 1, 2, 2, 0, 2, 2, 1, 2, 0, 1, 3] , [0, 0, 2, 1, 0, 2, 1, 2, 3, 0, 2, 3] , [0, 0, 2, 2, 0, 1, 0, 2, 3, 0, 1, 5] , [0, 0, 1, 1, 0, 2, 0, 2, 5, 0, 0, 5] , [0, 0, 2, 0, 0, 1, 0, 1, 5, 0, 0, 7] , [0, 0, 1, 0, 0, 0, 0, 2, 7, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 1, 6, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, y_7, y_8, y_6, 0, y_5, y_4, y_2, y_3, y_1, y_9, y_{10}]$$

654 . Coloring, {2, 4, 5, 7, 9}

R: [7, 8, 7, 7, 3, A, A, C, C, C, 1, 5]

B: [6, 7, 8, 6, A, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2] , [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4]] \$

$$[2 y_4, 0, y_2, 0, y_1, 0, y_3, y_4, 0, y_5, 0, y_6]$$

$$p = -s^2 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 4, 0] , [0, 1, 2, 4, 0, 2, 2, 1, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 1, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 0, 4, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 0, 3, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0]] \$

$$[0, y_1, y_2, y_3, 0, y_4, y_5, y_6, 2 y_7, y_7, y_8, 0]$$

$$p = s^4 - s^9$$

655 . Coloring, {2, 4, 5, 7, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, A, C, B, 2, 1, 5]

B: [6, 7, 8, 6, A, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 9

Omega Rank for R : cycles: $\{\{2, 3, 5, 7, 8, 10, 12\}\}$ order: 7
See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 1, 1], [1, 3, 2, 0, 1, 0, 3, 2, 0, 3, 0, 1], [0, 3, 1, 0, 1, 0, 3, 3, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 1, 3, 0, 3, 0, 3], [0, 3, 2, 0, 3, 0, 1, 3, 0, 1, 0, 3], [0, 1, 3, 0, 3, 0, 2, 3, 0, 1, 0, 3], [0, 1, 3, 0, 3, 0, 3, 1, 0, 2, 0, 3], [0, 2, 3, 0, 3, 0, 3, 1, 0, 3, 0, 1], [0, 3, 3, 0, 1, 0, 3, 2, 0, 3, 0, 1]] \$$

$$[y_7, y_6, y_5, 0, y_4, 0, y_3, y_2, 0, y_1, y_8, y_9]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}, \{9, 12\}\}$ order: 10
See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 3, 3], [0, 0, 2, 3, 0, 2, 0, 1, 3, 0, 2, 3], [0, 0, 2, 2, 0, 3, 0, 2, 3, 0, 1, 3], [0, 0, 3, 1, 0, 2, 0, 2, 3, 0, 2, 3], [0, 0, 2, 2, 0, 1, 0, 3, 3, 0, 2, 3], [0, 0, 1, 2, 0, 2, 0, 2, 3, 0, 3, 3], [0, 0, 2, 3, 0, 2, 0, 1, 3, 0, 2, 3], [0, 0, 2, 2, 0, 3, 0, 2, 3, 0, 1, 3], [0, 0, 3, 1, 0, 2, 0, 2, 3, 0, 2, 3]] \$$

$$[0, 0, -3y_1 - 3y_6 - 3y_3 - 3y_2 + 10y_5 - 3y_4, 3y_1, 0, 3y_6, 3y_3, 3y_2, -3y_3 + 3y_5, 3y_3, 3y_4, 3y_5]$$

$$p' = s^3 - s^8 \quad p = -s^2 + s^7 \quad p' = -s^2 + s^7$$

656 . Coloring, $\{2, 4, 5, 7, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, A, C, B, C, 4, 5]

B: [6, 7, 8, 6, A, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3]] \$

[0, 0, y₂, y₁, y₅, 0, y₃, y₄, 0, y₆, y₄, y₇]

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 8, 11}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 3, 1] , [3, 1, 2, 0, 0, 2, 2, 1, 1, 0, 2, 2] , [2, 0, 2, 0, 0, 3, 1, 2, 2, 0, 3, 1] , [3, 0, 3, 0, 0, 2, 0, 2, 1, 0, 3, 2] , [3, 0, 2, 0, 0, 3, 0, 3, 2, 0, 2, 1] , [2, 0, 3, 0, 0, 3, 0, 2, 1, 0, 3, 2] , [3, 0, 3, 0, 0, 2, 0, 3, 2, 0, 2, 1] , [2, 0, 2, 0, 0, 3, 0, 3, 1, 0, 3, 2] , [3, 0, 3, 0, 0, 2, 0, 2, 2, 0, 3, 1] , [3, 0, 2, 0, 0, 3, 0, 3, 1, 0, 2, 2]] \$

[3 y₂, -3 y₂ - 3 y₁ - 3 y₃ - 3 y₄ - 3 y₅ + 13 y₆ - 3 y₇ - 3 y₈ + 13 y₉, 3 y₁, 0, 0, 3 y₃, 3 y₄, 3 y₅, 3 y₆, 3 y₇, 3 y₈, 3 y₉]

$$p = s^4 + s^5 - s^9 - s^{10}$$

657 . Coloring, {2, 4, 5, 7, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, A, C, B, C, 1, 9]

B: [6, 7, 8, 6, A, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 0, 4, 3, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 3, 1, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 2, 3, 1] , [3, 0, 0, 0, 0, 0, 4, 0, 1, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 4]] \$

$[y_1, 0, y_3, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 2, 1, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 3, 1, 2, 0, 1, 3, 0] , [0, 1, 3, 3, 0, 2, 2, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 3, 1, 3, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 3, 0, 2, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 4, 0, 3, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 0, 3, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 2, 0, 4, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 3, 0, 4, 0, 0, 4, 0]] \$

$[0, y_6, y_7, y_8, y_1, y_2, y_{10}, y_3, 0, y_4, y_5, y_9]$

658 . Coloring, {2, 4, 5, 8, 9}

$$\Omega p(\Delta)=0: \quad p = 3s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, B, B, C, C, 1, 5]

B: [6, 7, 8, 6, A, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 0, 3, 0, 0, 0, 4, 1] , [4, 0, 3, 0, 1, 0, 5, 0, 0, 0, 3, 0] , [3, 0, 1, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0]] \$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_5, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 9, 11, 12}, {2, 7, 10}}

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 1, 1], [0, 3, 2, 1, 0, 2, 2, 1, 1, 1, 2, 1], [0, 1, 2, 2, 0, 1, 3, 2, 1, 2, 1, 1], [0, 2, 1, 1, 0, 2, 1, 2, 1, 3, 1, 2], [0, 3, 2, 1, 0, 1, 2, 1, 2, 1, 1, 2], [0, 1, 1, 1, 0, 1, 3, 2, 2, 2, 2, 1], [0, 2, 1, 2, 0, 1, 1, 1, 3, 2, 2], [0, 3, 1, 2, 0, 2, 2, 1, 2, 1, 1, 1], [0, 1, 2, 1, 0, 2, 3, 1, 1, 2, 2, 1], [0, 2, 2, 2, 0, 1, 1, 2, 1, 3, 1, 1]] \$$$

$$[0, 3y_1, 3y_8, 5y_1 - 3y_8 - 3y_2 + 5y_3 - 3y_4 - 3y_5 + 5y_6 - 3y_7 - 3y_9, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_9]$$

$$p = -s - s^2 - s^3 + s^8 + s^9 + s^{10}$$

659 . Coloring, {2, 4, 5, 8, 10}

R: [7, 8, 7, 7, 3, A, B, B, B, 2, 1, 5]

B: [6, 7, 8, 6, A, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 4, 0], [4, 1, 2, 0, 0, 0, 3, 2, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 1, 0, 0, 5, 0], [5, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$$$

$$[y_1, y_2, 2y_2 - 3y_6, 0, 2y_6, 0, y_3, y_4, 0, y_6, y_5, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 0, 4] , [0, 0, 2, 0, 0, 2, 0, 1, 4, 1, 0, 6] , [0, 0, 2, 0, 0, 0, 0, 2, 6, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_5, 2y_2, 0, -4y_2 + 2y_1, y_2, y_4, y_3, y_1, 0, -y_5 - 7y_2 + y_4 + y_3 + 3y_1]$$

$$p' = s^6 - s^7 \quad p' = s^5 - s^7 \quad p = s^5 - s^8$$

660 . Coloring, {2, 4, 5, 8, 11}

R: [7, 8, 7, 7, 3, A, B, B, B, C, 4, 5]

B: [6, 7, 8, 6, A, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 0, 3, 0, 0, 0, 4, 1] , [0, 0, 2, 4, 1, 0, 6, 0, 0, 0, 3, 0] , [0, 0, 1, 3, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_4, y_2, y_3, 0, y_1, y_6, 0, y_6, y_7, y_5]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 0, 2] , [0, 3, 2, 0, 0, 2, 2, 1, 2, 1, 0, 3] , [0, 1, 2, 0, 0, 0, 3, 2, 3, 2, 0, 3] , [0, 2, 0, 0, 0, 0, 1, 2, 3, 3, 0, 5] , [0, 3, 0, 0, 0, 0, 2, 0, 5, 1, 0, 5] , [0, 1, 0, 0, 0, 0, 3, 0, 5, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 1, 0, 5, 3, 0, 5] , [0, 3, 0, 0, 0, 0, 2, 0, 5, 1, 0, 5] , [0, 1, 0, 0, 0, 0, 3, 0, 5, 2, 0, 5]] \$

$$[-5y_1 + 5y_2 + 5y_7 + 5y_6 - 5y_5, 6y_2 - 5y_3 + 6y_7 + 6y_6 - 5y_4, 5y_1, 0, 0, 5y_2, 5y_3, 5y_7, 5y_6, 5y_4, 0, 5y_5]$$

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

661 . Coloring, {2, 4, 5, 8, 12}

R: [7, 8, 7, 7, 3, A, B, B, B, C, 1, 9]

B: [6, 7, 8, 6, A, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 1] , [6, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

[y₁, 0, y₆, 0, 0, 0, y₂, y₆, y₅, y₆, y₃, y₄]

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 2, 2, 1, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 3, 2, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 3, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 4, 0, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

[0, y₁, y₂, y₃, y₄, y₅, y₈, y₉, 0, y₆, 0, y₇]

662 . Coloring, {2, 4, 5, 9, 10}

R: [7, 8, 7, 7, 3, A, B, C, C, 2, 1, 5]

B: [6, 7, 8, 6, A, 3, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 9

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 2, 2], [2, 1, 2, 0, 2, 0, 3, 2, 0, 0, 3, 1], [3, 0, 2, 0, 1, 0, 4, 1, 0, 0, 3, 2], [3, 0, 1, 0, 2, 0, 5, 0, 0, 0, 4, 1], [4, 0, 2, 0, 1, 0, 4, 0, 0, 0, 5, 0], [5, 0, 1, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$$

$[y_2, y_7, y_1, 0, y_6, 0, y_5, y_4, 0, y_3, y_8, y_9]$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 2, 2], [0, 0, 2, 2, 0, 2, 0, 1, 2, 1, 3, 3], [0, 0, 2, 3, 0, 2, 0, 2, 3, 0, 3, 1], [0, 0, 2, 3, 0, 3, 0, 2, 1, 0, 5, 0], [0, 0, 3, 5, 0, 3, 0, 2, 0, 0, 3, 0], [0, 0, 3, 3, 0, 5, 0, 3, 0, 0, 2, 0], [0, 0, 5, 2, 0, 3, 0, 3, 0, 0, 3, 0], [0, 0, 3, 3, 0, 2, 0, 5, 0, 0, 3, 0], [0, 0, 2, 3, 0, 3, 0, 3, 0, 0, 5, 0]] \$$

$[0, 0, y_6, y_4, 0, y_5, y_3, y_2, y_9, y_1, y_7, y_8]$

663 . Coloring, $\{2, 4, 5, 9, 11\}$

R: [7, 8, 7, 7, 3, A, B, C, C, C, 4, 5]

B: [6, 7, 8, 6, A, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 2, 4] , [0, 0, 2, 2, 4, 0, 3, 0, 0, 0, 3, 2] , [0, 0, 4, 3, 2, 0, 4, 0, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 0, 7, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0]] \$

$$[0, 0, y_1, y_2, y_5, 0, y_4, y_3, 0, y_3, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {2, 7, 10}}
See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 2, 0] , [2, 3, 2, 0, 0, 2, 2, 1, 0, 1, 3, 0] , [3, 1, 2, 0, 0, 2, 3, 2, 0, 2, 1, 0] , [1, 2, 2, 0, 0, 3, 1, 2, 0, 3, 2, 0] , [2, 3, 3, 0, 0, 1, 2, 2, 0, 1, 2, 0] , [2, 1, 1, 0, 0, 2, 3, 3, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 2, 1, 1, 0, 3, 3, 0] , [3, 3, 2, 0, 0, 2, 2, 2, 0, 1, 1, 0] , [1, 1, 2, 0, 0, 3, 3, 2, 0, 2, 2, 0]] \$

$$[5y_1 - 3y_2 - 3y_3 + 5y_4 - 3y_5 - 3y_6 + 5y_7 - 3y_8, 3y_1, 3y_2, 0, 0, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8, 0]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

664 . Coloring, {2, 4, 5, 9, 12}

R: [7, 8, 7, 7, 3, A, B, C, C, C, 1, 9]
B: [6, 7, 8, 6, A, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4]] \$

$$[-y_2 - y_1 + 2y_4 - y_3, 0, y_2, 0, 0, 0, y_1, y_2, -2y_2 + y_4, y_2, y_3, y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}, {2, 7, 10}}

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 2, 0], [0, 3, 2, 2, 0, 2, 2, 1, 0, 3, 1, 0], [0, 3, 2, 1, 0, 2, 3, 2, 0, 2, 1, 0], [0, 2, 2, 1, 0, 1, 3, 2, 0, 3, 2, 0], [0, 3, 1, 2, 0, 1, 2, 2, 0, 3, 2, 0], [0, 3, 1, 2, 0, 2, 3, 1, 0, 2, 2, 0], [0, 2, 2, 2, 0, 2, 3, 1, 0, 3, 1, 0], [0, 3, 2, 1, 0, 2, 2, 2, 0, 3, 1, 0], [0, 3, 2, 1, 0, 1, 3, 2, 0, 2, 2, 0]] \$$$

$$[0, y_1 + y_2 - y_3 + y_4 - y_7 + y_8 - y_5 + y_6, y_1, y_2, y_3, y_4, y_7, y_8, 0, y_5, y_6, 0]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

665 . Coloring, {2, 4, 5, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, B, C, B, 2, 4, 5]

B: [6, 7, 8, 6, A, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 9

See Matrix

$$\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 3, 1], [0, 1, 2, 3, 1, 0, 3, 2, 0, 0, 3, 1], [0, 0, 1, 3, 1, 0, 5, 1, 0, 0, 3, 2], [0, 0, 1, 3, 2, 0, 4, 0, 0, 0, 5, 1], [0, 0, 2, 5, 1, 0, 4, 0, 0, 0, 4, 0], [0, 0, 1, 4, 0, 0, 7, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0]] \$$$

$$[0, y_8, y_9, y_7, y_6, 0, y_5, y_4, 0, y_3, y_2, y_1]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 1, 3] , [1, 0, 2, 0, 0, 2, 0, 1, 3, 1, 1, 5] , [1, 0, 2, 0, 0, 1, 0, 2, 5, 0, 1, 4] , [1, 0, 1, 0, 0, 1, 0, 2, 4, 0, 2, 5] , [2, 0, 1, 0, 0, 1, 0, 1, 5, 0, 2, 4] , [2, 0, 1, 0, 0, 2, 0, 1, 4, 0, 1, 5] , [1, 0, 2, 0, 0, 2, 0, 1, 5, 0, 1, 4] , [1, 0, 2, 0, 0, 1, 0, 2, 4, 0, 1, 5] , [1, 0, 1, 0, 0, 1, 0, 2, 5, 0, 2, 4]] \$

[7 y₂, 0, 7 y₁, 0, 0, 7 y₈, 7 y₇, 7 y₆, 7 y₅, 7 y₄, 7 y₃, 9 y₂ + 9 y₁ + 9 y₈ - 7 y₇ + 9 y₆ - 7 y₅ - 7 y₄ + 9 y₃]

$$p = s^3 + s^4 - s^8 - s^9$$

666 . Coloring, {2, 4, 5, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, B, C, B, 2, 1, 9]

B: [6, 7, 8, 6, A, 3, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 0, 3, 2, 1, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 3, 1, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0]] \$

[y₂, y₁, y₅, 0, 0, 0, y₈, y₆, y₇, y₅, y₃, y₄]

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}, {5, 10, 12}}

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 2, 0, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 1, 0, 2, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 1, 0, 2, 0, 3, 2, 3] , [0, 0, 1, 2, 3, 1, 0, 1, 0, 3, 2, 3] , [0, 0, 1, 2, 3, 2, 0, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 2, 0, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 1, 3] , [0, 0, 2, 1, 3, 1, 0, 2, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 1, 0, 2, 0, 3, 2, 3]] \$

$$[0, 0, 3y_4, 3y_3, 3y_2, 3y_1, -3y_2 + 3y_5, -3y_4 - 3y_3 - 3y_1 + 7y_5 - 3y_6, 0, 3y_5, 3y_6, 3y_5]$$

$$p' = -s^2 + s^7 \quad p' = -s^3 + s^8 \quad p = -s^2 + s^7$$

667 . Coloring, {2, 4, 5, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, B, C, B, C, 4, 9]

B: [6, 7, 8, 6, A, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 10

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 5, 2], [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[0, 0, y_6, y_5, 0, 0, y_4, y_6, y_3, y_6, y_2, y_1]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {2, 7, 10}}

See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 1, 1], [1, 3, 2, 0, 1, 2, 2, 1, 0, 3, 1, 0], [1, 3, 2, 0, 0, 1, 3, 2, 0, 3, 1, 0], [1, 3, 1, 0, 0, 1, 3, 2, 0, 3, 2, 0], [2, 3, 1, 0, 0, 1, 3, 1, 0, 3, 2, 0], [2, 3, 1, 0, 0, 2, 3, 1, 0, 3, 1, 0], [1, 3, 2, 0, 0, 2, 3, 1, 0, 3, 1, 0], [1, 3, 2, 0, 0, 1, 3, 2, 0, 3, 1, 0], [1, 3, 1, 0, 0, 1, 3, 2, 0, 3, 2, 0], [2, 3, 1, 0, 0, 1, 3, 1, 0, 3, 2, 0]] \$$$

$$[-3y_4 - 3y_2 - 3y_1 + 7y_5 - 3y_7, 3y_5 - 3y_6, 3y_4, 0, 3y_3, 3y_2, -3y_3 + 3y_5, 3y_1, 0, 3y_5, 3y_7, 3y_6]$$

$$p' = s^3 - s^8 \quad p = s^3 - s^8 \quad p' = s^4 - s^9$$

668 . Coloring, {2, 4, 6, 7, 8}

R: [7, 8, 7, 7, A, 3, A, B, B, C, 1, 5]

B: [6, 7, 8, 6, 3, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 2, 2] , [2, 0, 0, 0, 2, 0, 3, 0, 0, 5, 1, 3] , [1, 0, 0, 0, 3, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[y_1, 0, y_2, 0, y_3, 0, y_7, y_2, 0, y_4, y_5, y_6]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 2, 2] , [0, 1, 0, 2, 0, 2, 2, 1, 2, 2, 1, 3] , [0, 2, 0, 1, 0, 2, 1, 0, 3, 2, 2, 3] , [0, 2, 0, 2, 0, 1, 2, 0, 3, 2, 1, 3] , [0, 2, 0, 1, 0, 2, 2, 0, 3, 1, 2, 3] , [0, 1, 0, 2, 0, 1, 2, 0, 3, 2, 2, 3] , [0, 2, 0, 2, 0, 2, 1, 0, 3, 1, 2, 3] , [0, 1, 0, 2, 0, 2, 2, 0, 3, 2, 1, 3] , [0, 2, 0, 1, 0, 2, 1, 0, 3, 2, 2, 3] , [0, 2, 0, 2, 0, 1, 2, 0, 3, 2, 1, 3]] \$

$$[0, 3y_2, 3y_7 + 3y_6 - 3y_3, 3y_1, 0, -3y_2 + 10y_7 + 10y_6 - 3y_1 - 3y_8 - 3y_5 - 3y_4, 3y_8, 3y_7, 3y_6, 3y_5, 3y_4, 3y_3]$$

$$p = s^3 - s^9 \quad p' = -s^3 + s^9$$

669 . Coloring, {2, 4, 6, 7, 9}

R: [7, 8, 7, 7, A, 3, A, C, C, C, 1, 5]

B: [6, 7, 8, 6, 3, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 0, 4] , [0, 0, 0, 0, 4, 0, 3, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$

$$[2 y_3, 0, y_3, 0, y_1, 0, y_2, y_3, 0, y_4, 0, y_5]$$

$$p' = -s^3 + s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 4, 0] , [0, 1, 0, 4, 0, 2, 2, 1, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 4, 1, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 4, 2, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 3, 2, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 1, 4, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 4, 0, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 2, 3, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 4, 1, 0, 0, 2, 3, 0]] \$

$$[0, y_7, y_8, y_6, 0, y_5, y_4, y_3, 2 y_8, y_2, y_1, 0]$$

$$p = -s^3 + s^9$$

670 . Coloring, {2, 4, 6, 7, 10}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, 3, A, C, B, 2, 1, 5]

B: [6, 7, 8, 6, 3, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5
See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 1, 1], [1, 3, 0, 0, 1, 0, 3, 2, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 1, 3, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 5, 0, 2, 0, 3], [0, 2, 0, 0, 3, 0, 0, 4, 0, 2, 0, 5], [0, 2, 0, 0, 5, 0, 0, 2, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 2, 0, 5, 0, 2], [0, 5, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 5, 0, 2, 0, 3]] \$$

$[y_6, y_7, y_5, 0, y_4, 0, y_2, y_3, 0, y_1, y_5, y_8]$

$$p = s^4 - s^9$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8
See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 3, 3], [0, 0, 0, 3, 0, 2, 0, 1, 3, 2, 2, 3], [0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 1, 5], [0, 0, 0, 1, 0, 2, 0, 0, 5, 3, 0, 5], [0, 0, 0, 0, 0, 1, 0, 0, 5, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$[0, 0, y_8, y_7, 0, y_6, y_8, y_5, y_4, y_3, y_2, y_1]$

$$p = s^7 - s^9$$

671 . Coloring, $\{2, 4, 6, 7, 11\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 - 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, A, C, B, C, 4, 5]

B: [6, 7, 8, 6, 3, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 1, 3] , [0, 0, 0, 1, 3, 0, 3, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

[0, 0, y₆, y₅, y₄, 0, y₃, y₆, 0, y₂, y₆, y₁]

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}, {9, 12}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 2, 1, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 3, 1, 0, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 2, 0, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 3, 2, 0, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 1, 3, 0, 1, 3, 2, 2] , [2, 3, 0, 0, 0, 2, 2, 0, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 3, 0, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 3, 1, 0, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 2, 0, 1, 3, 1, 2]] \$

[11 y₁ + 11 y₂ + 11 y₃ - 2 y₄ - 2 y₅ - 39 y₆ - 2 y₈ + 11 y₇, 2 y₁, 2 y₂, 0, 0, 2 y₃, 2 y₄, 2 y₅, 2 y₆, 2 y₈, 2 y₇, 3 y₁ + 3 y₂ + 3 y₃ - 11 y₆ + 3 y₇]

$$p' = -s^3 + s^9 \quad p = -s^3 + s^9$$

672 . Coloring, {2, 4, 6, 7, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, A, C, B, C, 1, 9]

B: [6, 7, 8, 6, 3, A, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 0, 4, 3, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 3, 1, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 2, 3, 1] , [3, 0, 0, 0, 0, 0, 4, 0, 1, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 4]] \$

$[y_1, 0, y_6, 0, 0, 0, y_5, y_6, y_3, y_2, y_4, y_7]$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 2, 1, 0, 2, 2, 0] , [0, 2, 1, 2, 0, 3, 1, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 2, 2, 1, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 3, 2, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 3, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 2, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 2, 3, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 2, 3, 0, 0, 3, 3, 0]] \$

$[0, y_8, y_9, y_{10}, y_1, y_2, y_3, y_4, 0, y_5, y_6, y_7]$

673 . Coloring, {2, 4, 6, 8, 9}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, B, B, C, C, 1, 5]

B: [6, 7, 8, 6, 3, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	4 vs 8	10 vs 10

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 3, 3] , [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1] , [4, 0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 3, 3] , [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1] , [4, 0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 3, 3] , [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1]] \$

$$[-7 y_4 - 6 y_3 + 4 y_2 + 5 y_1, 0, y_4, 0, 5 y_4 + 5 y_3 - 2 y_2 - 4 y_1, 0, y_3, y_4, 0, -8 y_4 - 8 y_3 + 5 y_2 + 6 y_1, y_2, y_1]$$

$$p' = -s^4 + s^7 \quad p' = s^3 - s^6 \quad p' = s^2 - s^5 \quad p = s^2 - s^5$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 2, 1, 1, 3, 2, 1], [0, 3, 0, 2, 0, 1, 3, 0, 1, 4, 1, 1], [0, 4, 0, 1, 0, 2, 3, 0, 1, 4, 1, 0], [0, 4, 0, 1, 0, 1, 4, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 1, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 1, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[0, y_1, y_8, y_9, 0, y_{10}, y_4, y_5, y_6, y_7, y_3, y_2]$$

674 . Coloring, {2, 4, 6, 8, 10}

R: [7, 8, 7, 7, A, 3, B, B, B, 2, 1, 5]

B: [6, 7, 8, 6, 3, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	4 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 3, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 4, 1, 0, 0, 5, 0], [5, 0, 0, 0, 0, 4, 2, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[y_1, y_2, y_3, 0, 2 y_3, 0, y_4, y_5, 0, y_6, y_7, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 1, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_1, 2 y_1, 0, 2 y_2 + 2 y_3 - 2 y_4, y_1, y_2 + y_3 - y_4, y_2, y_3, 0, y_4]$$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6 \quad p = -s^4 + s^7 \quad p = -s^4 + s^8$$

675 . Coloring, {2, 4, 6, 8, 11}

R: [7, 8, 7, 7, A, 3, B, B, B, C, 4, 5]

B: [6, 7, 8, 6, 3, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	5 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 4, 2] , [0, 0, 0, 4, 2, 0, 3, 0, 0, 2, 4, 1] , [0, 0, 0, 4, 1, 0, 4, 0, 0, 2, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 4, 2] , [0, 0, 0, 4, 2, 0, 3, 0, 0, 2, 4, 1] , [0, 0, 0, 4, 1, 0, 4, 0, 0, 2, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 4, 2] , [0, 0, 0, 4, 2, 0, 3, 0, 0, 2, 4, 1]] \$

$$[0, 0, 2 y_2, 7 y_2 - 2 y_3 + 9 y_1 - 11 y_4, -2 y_2 + 2 y_3 - 2 y_1 + 2 y_4, 0, 2 y_1, 2 y_2, 0, 7 y_2 - 2 y_3 + 7 y_1 - 9 y_4, 2 y_3, 2 y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^3 + s^6 \quad p = -s^2 + s^8 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 2, 2, 1, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3] , [0, 4, 0, 0, 0, 3, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3]] \$

$$[6 y_5, 3 y_4, 3 y_5, 0, 0, 6 y_3, 3 y_2, 3 y_3, 3 y_5 - 3 y_3 + 3 y_1, -3 y_4 + 4 y_5 - 3 y_2 - 6 y_3 + 10 y_1, 0, 3 y_1]$$

$$p' = s^4 - s^7 \quad p = -s^3 + s^6 \quad p = -s^3 + s^9 \quad p' = -s^3 + s^6$$

676 . Coloring, {2, 4, 6, 8, 12}

R: [7, 8, 7, 7, A, 3, B, B, B, C, 1, 9]

B: [6, 7, 8, 6, 3, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 1], [6, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[y_1, 0, y_2, 0, 0, 0, y_4, y_2, y_5, y_2, y_3, y_6]$$

$$p' = s^4 - s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {2, 7, 10}} order: 12

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 2, 2, 1, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 2, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 4, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 3, 1, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 3, 2, 0, 3, 0, 1], [0, 3, 1, 0, 1, 0, 4, 2, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 3, 1, 0, 4, 0, 2]] \$$$

$$[0, 3 y_6, 3 y_5, 3 y_4, 3 y_3, 3 y_1, 3 y_2, 3 y_5 - 3 y_3 + 3 y_7, 0, -3 y_6 + 10 y_5 - 3 y_4 - 3 y_1 - 3 y_2 + 10 y_7, 0, 3 y_7]$$

$$p = s^3 + s^5 - s^6 - s^8 \quad p' = s^3 + s^5 - s^6 - s^8$$

677 . Coloring, {2, 4, 6, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^4 - 16s^8 \quad p' = s^4 - 8s^7 \quad p'' = s^5 - 4s^7 \quad p''' = s^6 - 2s^7$$

R: [7, 8, 7, 7, A, 3, B, C, C, 2, 1, 5]

B: [6, 7, 8, 6, 3, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}, {1, 7, 11}}

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 2, 2] , [2, 1, 0, 0, 2, 0, 3, 2, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 2, 1, 0, 2, 3, 2] , [3, 2, 0, 0, 2, 0, 3, 2, 0, 1, 2, 1] , [2, 1, 0, 0, 1, 0, 3, 2, 0, 2, 3, 2] , [3, 2, 0, 0, 2, 0, 2, 1, 0, 1, 3, 2] , [3, 1, 0, 0, 2, 0, 3, 2, 0, 2, 2, 1] , [2, 2, 0, 0, 1, 0, 3, 1, 0, 2, 3, 2] , [3, 2, 0, 0, 2, 0, 2, 2, 0, 1, 3, 1]] \$

$$[y_1, y_2, -y_1 + y_2 + y_3 - y_4 + y_5 + y_6 - y_7 + y_8, 0, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 1, 2, 3, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 2, 3, 2] , [0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 2, 3] , [0, 0, 0, 2, 0, 3, 0, 0, 3, 3, 2, 3] , [0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3, 3]] \$

$$[0, 0, y_4, y_1 + 2y_4 - y_3 - y_2 - y_5 + y_7 + y_6, 0, y_1, y_4, y_3, y_2, y_5, y_7, y_6]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

678 . Coloring, {2, 4, 6, 9, 11}

R: [7, 8, 7, 7, A, 3, B, C, C, C, 4, 5]

B: [6, 7, 8, 6, 3, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 2, 4], [0, 0, 0, 2, 4, 0, 3, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 2, 0, 0, 4, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 3, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 2, 0, 0, 4, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 3, 0, 0, 2, 3, 2]] \$$

$[0, 0, -y_2 - 2y_1 + 2y_3 + y_4, y_2 + y_1 - y_3, 2y_1 - y_4, 0, y_1, -y_2 - 2y_1 + 2y_3 + y_4, 0, y_2, y_3, y_4]$

$$p' = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p' = -s^2 + s^5 \quad p = s^2 - s^5$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 2, 0], [2, 3, 0, 0, 0, 2, 2, 1, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 3, 0, 0, 4, 1, 0], [1, 4, 0, 0, 0, 3, 3, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 1, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$

$[y_5, y_4, y_3, 0, 0, y_2, y_1, y_8, 2y_3, y_7, y_6, 0]$

$$p = s^6 - s^9$$

679 . Coloring, $\{2, 4, 6, 9, 12\}$

R: [7, 8, 7, 7, A, 3, B, C, C, C, 1, 9]

B: [6, 7, 8, 6, 3, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4]] \$

$$[y_1, 0, y_4, 0, 0, 0, y_2, y_4, y_3, y_4, -y_1 - y_2 + 3y_4 + 2y_3, 2y_4 + y_3]$$

$$p' = -s^2 + s^5 \quad p' = -s^3 + s^6 \quad p = -s^2 + s^8 \quad p = -s^2 + s^5$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 2, 2, 1, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 2, 3, 2, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 1, 3, 0, 0, 5, 2, 0] , [0, 5, 0, 2, 0, 1, 4, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 2, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0]] \$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_7, 0, y_9, y_8, 0]$$

680 . Coloring, {2, 4, 6, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, B, C, B, 2, 4, 5]

B: [6, 7, 8, 6, 3, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {2, 5, 8, 10, 12}}

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 3, 1] , [0, 1, 0, 3, 1, 0, 3, 2, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 3, 1, 0, 1, 3, 2] , [0, 1, 0, 3, 2, 0, 3, 2, 0, 1, 3, 1] , [0, 1, 0, 3, 1, 0, 3, 1, 0, 2, 3, 2] , [0, 2, 0, 3, 2, 0, 3, 1, 0, 1, 3, 1] , [0, 1, 0, 3, 1, 0, 3, 2, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 3, 1, 0, 1, 3, 2] , [0, 1, 0, 3, 2, 0, 3, 2, 0, 1, 3, 1]] \$

$$[0, -3y_2 + 7y_5 - 3y_1 - 3y_4 - 3y_6, -3y_3 + 3y_5, 3y_3, 3y_2, 0, 3y_5, 3y_1, 0, 3y_4, 3y_5, 3y_6]$$

$$p' = s^2 - s^7 \quad p' = s^3 - s^8 \quad p = s^2 - s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 1, 3], [1, 0, 0, 0, 0, 2, 0, 1, 3, 3, 1, 5], [1, 0, 0, 0, 0, 1, 0, 0, 5, 2, 1, 6], [1, 0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 7], [0, 0, 0, 0, 0, 1, 0, 0, 7, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[y_1 + 2y_2 - y_3 - y_7 - y_4 + y_5 + y_6, 0, y_2, 0, 0, y_1, y_2, y_3, y_7, y_4, y_5, y_6]$$

$$p = -s^7 + s^8 \quad p = -s^7 + s^9$$

681 . Coloring, {2, 4, 6, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, B, C, B, 2, 1, 9]

B: [6, 7, 8, 6, 3, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 3, 2, 1, 0, 5, 1], [5, 0, 0, 0, 0, 0, 3, 1, 1, 0, 4, 2], [4, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 7, 0], [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0]] \$$$

$$[y_4, y_5, y_7, 0, 0, 0, y_2, y_3, y_1, y_7, y_8, y_6]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{3, 4, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 2, 0, 1, 0, 3, 1, 3] , [0, 0, 3, 1, 3, 1, 0, 2, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 1, 0, 3, 0, 1, 2, 2] , [0, 0, 3, 2, 2, 1, 0, 3, 0, 1, 3, 1] , [0, 0, 2, 3, 1, 2, 0, 3, 0, 1, 3, 1] , [0, 0, 1, 3, 1, 3, 0, 2, 0, 2, 3, 1] , [0, 0, 1, 3, 1, 3, 0, 1, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 3, 0, 1, 0, 3, 1, 3]] \$

$$[0, 0, y_3, y_2, -y_2 + y_5 + y_4, y_1, -y_3 + y_5 + y_4 - y_1, y_5 + y_4 - y_6, 0, y_6, y_5, y_4]$$

$$p' = -s^2 + s^4 - s^6 + s^8 \quad p' = -s^2 + s^3 - s^6 + s^7 \quad p = s^2 - s^3 + s^6 - s^7$$

682 . Coloring, {2, 4, 6, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, B, C, B, C, 4, 9]

B: [6, 7, 8, 6, 3, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 8	10 vs 10

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, 0, y_5, y_1, 0, 0, y_6, y_5, y_4, y_5, y_3, y_2]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 2, 1, 0, 3, 1, 0] , [1, 3, 1, 0, 0, 1, 3, 2, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 1, 3, 1, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 1, 4, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 2, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 1, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[y_{10}, y_9, y_8, 0, y_7, y_6, y_5, y_4, 0, y_3, y_2, y_1]$$

683 . Coloring, {2, 4, 7, 8, 9}

R: [7, 8, 7, 7, A, A, A, B, C, C, 1, 5]

B: [6, 7, 8, 6, 3, 3, B, C, B, 2, 4, 9]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 0, 2, 0, 0, 5, 1, 4] , [1, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_4, 0, 0, 0, y_2, 0, y_3, y_1, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 0, 3, 1] , [0, 0, 2, 3, 0, 2, 2, 2, 1, 0, 3, 1] , [0, 0, 2, 3, 0, 3, 0, 2, 1, 0, 3, 2] , [0, 0, 3, 3, 0, 3, 0, 2, 2, 0, 1, 2] , [0, 0, 3, 1, 0, 3, 0, 3, 2, 0, 2, 2] , [0, 0, 3, 2, 0, 1, 0, 3, 2, 0, 2, 3] , [0, 0, 1, 2, 0, 2, 0, 3, 3, 0, 2, 3] , [0, 0, 2, 2, 0, 2, 0, 1, 3, 0, 3, 3] , [0, 0, 2, 3, 0, 2, 0, 2, 3, 0, 3, 1]] \$

$$[0, y_1, y_2, y_5, 0, y_6, y_7, y_8, y_9, 0, y_3, y_4]$$

684 . Coloring, {2, 4, 7, 8, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, A, B, B, 2, 1, 5]

B: [6, 7, 8, 6, 3, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 2, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 2, 4, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 1, 5, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 2, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 4, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 5, 1, 0, 4, 2, 0]] \$$

$$[y_4, y_5, 0, 0, y_3, 0, y_1, y_2, 0, y_6, y_7, 0]$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 0, 2, 4], [0, 0, 2, 2, 0, 2, 0, 2, 4, 0, 1, 3], [0, 0, 2, 1, 0, 2, 0, 2, 3, 0, 0, 6], [0, 0, 2, 0, 0, 1, 0, 2, 6, 0, 0, 5], [0, 0, 1, 0, 0, 0, 0, 2, 5, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 1, 8, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8]$$

685 . Coloring, $\{2, 4, 7, 8, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, A, B, B, C, 4, 5]

B: [6, 7, 8, 6, 3, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 0, 2, 0, 0, 5, 1, 4] , [0, 0, 0, 1, 4, 0, 2, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

[0, 0, 0, y₄, y₁, 0, y₂, y₃, 0, y₅, y₆, y₇]

Omega Rank for B : cycles: {{9, 12}} order: 8
See Matrix

\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 0, 2, 2] , [2, 0, 2, 0, 0, 2, 2, 2, 2, 0, 1, 3] , [1, 0, 2, 0, 0, 2, 0, 2, 3, 0, 2, 4] , [2, 0, 2, 0, 0, 1, 0, 2, 4, 0, 0, 5] , [0, 0, 1, 0, 0, 2, 0, 2, 5, 0, 0, 6] , [0, 0, 2, 0, 0, 0, 0, 1, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[y₄, y₃, y₂, 0, 0, y₁, y₉, y₈, y₇, 0, y₆, y₅]

686 . Coloring, {2, 4, 7, 8, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, A, B, B, C, 1, 9]

B: [6, 7, 8, 6, 3, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 0, 2, 3, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 2, 2, 3] , [2, 0, 0, 0, 0, 0, 3, 0, 3, 2, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 0, 2, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 2, 2, 3] , [2, 0, 0, 0, 0, 0, 3, 0, 3, 4, 2, 2]] \$

$$[y_1, 0, 0, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [0, 2, 2, 2, 2, 2, 1, 1, 0, 0, 2, 2], [0, 0, 4, 2, 2, 2, 2, 2, 0, 0, 1, 1], [0, 0, 4, 1, 1, 2, 0, 4, 0, 0, 2, 2], [0, 0, \\ & 3, 2, 2, 1, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 2, 0, 3, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 3, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, \\ & 0, 6, 0, 0, 0, 3], [0, 0, 3, 0, 3, 0, 0, 4, 0, 0, 0, 6], [0, 0, 3, 0, 6, 0, 0, 3, 0, 0, 0, 4]] \$ \end{aligned}$$

$$[0, y_8, y_9, y_7, y_5, y_6, y_4, y_3, 0, 0, y_1, y_2]$$

687 . Coloring, {2, 4, 7, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, A, C, C, 2, 1, 5]

B: [6, 7, 8, 6, 3, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\begin{aligned} \$ [& [2, 2, 0, 0, 2, 0, 3, 1, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 2, 2, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2], [0, 4, \\ & 0, 0, 2, 0, 0, 5, 0, 1, 0, 4], [0, 1, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5], [0, 2, 0, 0, 5, 0, 0, 1, 0, 4, 0, 4], [0, 4, 0, 0, 4, 0, \\ & 0, 2, 0, 5, 0, 1]] \$ \end{aligned}$$

$$[y_1, y_2, 0, 0, y_3, 0, y_4, y_5, 0, y_6, 0, y_7]$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\begin{aligned} \$ [& [0, 0, 2, 2, 0, 2, 1, 1, 2, 0, 4, 2], [0, 0, 2, 4, 0, 2, 0, 2, 2, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 2, 0, 0, 4, 0], [0, 0, \\ & 4, 4, 0, 4, 0, 2, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, \\ & 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 2, 0, 0, 4, 0]] \$ \end{aligned}$$

$$[0, 0, y_7, y_1, 0, y_2, y_3, y_4, y_5, 0, y_6, 2 y_3]$$

$$p = -s^3 + s^8$$

688 . Coloring, {2, 4, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, A, C, C, C, 4, 5]

B: [6, 7, 8, 6, 3, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$$

$$[0, 0, 0, 2 y_2, y_1, 0, y_4, y_2, 0, y_3, 0, y_5]$$

$$p = s^3 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 0, 4, 0], [4, 0, 2, 0, 0, 2, 2, 2, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 0, 2, 0, 0, 4, 0], [4, 0, 4, 0, 0, 4, 0, 2, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 0, 4, 0, 0, 2, 0], [2, 0, 4, 0, 0, 2, 0, 4, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 0, 2, 0, 0, 4, 0]] \$$$

$$[y_1, y_5, y_6, 0, 0, y_2, y_3, y_4, y_5, 0, y_7, 0]$$

$$p = -s^3 + s^8$$

689 . Coloring, {2, 4, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, A, C, C, C, 1, 9]

B: [6, 7, 8, 6, 3, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 0, 4, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[2 y_2, 0, 0, 0, 0, 0, y_1, y_2, y_5, y_4, 0, y_3]$$

$$p = s^4 - s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 2, 2, 2, 0, 0, 2, 0] , [0, 0, 2, 2, 0, 4, 0, 4, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 2, 0, 2, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 0, 4, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 0, 2, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 2, 0, 4, 0, 0, 2, 0] , [0, 0, 2, 2, 0, 4, 0, 4, 0, 0, 4, 0]] \$

$$[0, y_7, y_5, y_6, y_7, y_4, y_2, y_3, 0, 0, y_1, 0]$$

$$p = s^3 - s^8$$

690 . Coloring, {2, 4, 7, 10, 11}

R: [7, 8, 7, 7, A, A, A, C, B, 2, 4, 5]

B: [6, 7, 8, 6, 3, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 4, 1, 1], [0, 4, 0, 1, 1, 0, 2, 2, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 1, 4, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5], [0, 2, 0, 0, 5, 0, 0, 2, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2], [0, 5, 0, 0, 2, 0, 0, 4, 0, 3, 0, 2]] \$$

$$[0, y_1, 0, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 0, 3, 3], [3, 0, 2, 0, 0, 2, 0, 2, 3, 0, 2, 2], [2, 0, 2, 0, 0, 3, 0, 2, 2, 0, 2, 3], [2, 0, 3, 0, 0, 2, 0, 2, 3, 0, 2, 2], [2, 0, 2, 0, 0, 2, 0, 3, 2, 0, 2, 3], [2, 0, 2, 0, 0, 2, 0, 2, 3, 0, 3, 2], [3, 0, 2, 0, 0, 2, 0, 2, 2, 0, 2, 3], [2, 0, 2, 0, 0, 3, 0, 2, 3, 0, 2, 2]] \$$

$$[-5 y_1 - 5 y_2 - 5 y_3 - 5 y_7 + 11 y_6 - 5 y_4 + 11 y_5, 0, 5 y_1, 0, 0, 5 y_2, 5 y_3, 5 y_7, 5 y_6, 0, 5 y_4, 5 y_5]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

691 . Coloring, $\{2, 4, 7, 10, 12\}$

R: [7, 8, 7, 7, A, A, A, C, B, 2, 1, 9]

B: [6, 7, 8, 6, 3, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 9, 10, 11, 12\}\}$ order: 8
 See Matrix

$\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 2, 2, 1, 3, 2, 1], [2, 3, 0, 0, 0, 0, 1, 4, 1, 2, 1, 2], [1, 2, 0, 0, 0, 0, 2, 3, 2, 1, 1, 4], [1, 1, 0, 0, 0, 0, 1, 2, 4, 2, 2, 3], [2, 2, 0, 0, 0, 0, 1, 1, 3, 1, 4, 2], [4, 1, 0, 0, 0, 0, 2, 2, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 4, 1, 1, 2, 2, 2]] \$$

$[y_1, y_2, 0, 0, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8]$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5
 See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 0, 3, 3], [0, 0, 4, 3, 3, 2, 0, 2, 0, 0, 2, 0], [0, 0, 5, 2, 0, 3, 0, 4, 0, 0, 2, 0], [0, 0, 3, 2, 0, 2, 0, 5, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 0, 3, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 0, 2, 0, 0, 3, 0], [0, 0, 4, 3, 0, 5, 0, 2, 0, 0, 2, 0], [0, 0, 5, 2, 0, 3, 0, 4, 0, 0, 2, 0]] \$$

$[0, 0, y_1, y_2, y_3, y_4, y_7, y_5, 0, 0, y_6, 3 y_7]$

$$p = -s^3 + s^8$$

692 . Coloring, $\{2, 4, 7, 11, 12\}$

R: $[7, 8, 7, 7, A, A, A, C, B, C, 4, 9]$

B: $[6, 7, 8, 6, 3, 3, B, B, C, 2, 1, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 9, 10, 11, 12\}\}$ order: 6
 See Matrix

$\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 4, 1, 3], [0, 0, 0, 1, 0, 0, 2, 0, 3, 3, 2, 5], [0, 0, 0, 2, 0, 0, 1, 0, 5, 2, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 5, 2], [0, 0, 0, 5, 0, 0, 3, 0, 2, 2, 3, 1], [0, 0, 0, 3, 0, 0, 5, 0, 1, 3, 2, 2], [0, 0, 0, 2, 0, 0, 3, 0, 2, 5, 1, 3]] \$$

$$[0, 0, 0, y_3, 0, 0, y_1, y_2, y_6, y_4, y_5, y_7]$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}\}$ order: 5

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 0, 3, 1], [3, 0, 4, 0, 1, 2, 2, 2, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 0, 3, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 0, 4, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 0, 3, 0, 0, 4, 0]] \$$$

$$[y_1, 2 y_7, y_2, 0, y_3, y_4, 2 y_3 - 3 y_7, y_5, 0, 0, y_6, y_7]$$

$$p' = -s^3 + s^8 \quad p = -s^3 + s^8$$

693 . Coloring, $\{2, 4, 8, 9, 10\}$

R: [7, 8, 7, 7, A, A, B, B, C, 2, 1, 5]

B: [6, 7, 8, 6, 3, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 2, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 3, 2, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 4, 2, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[y_1, y_2, 0, 0, y_8, 0, y_6, y_7, 0, y_3, y_4, y_5]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$$\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 2, 1, 3], [0, 0, 2, 1, 0, 2, 0, 2, 3, 1, 2, 3], [0, 0, 2, 2, 0, 1, 0, 2, 3, 0, 3, 3], [0, 0, 1, 3, 0, 2, 0, 2, 3, 0, 3, 2], [0, 0, 2, 3, 0, 3, 0, 1, 2, 0, 3, 2], [0, 0, 3, 3, 0, 3, 0, 2, 2, 0, 2, 1], [0, 0, 3, 2, 0, 3, 0, 3, 1, 0, 2, 2], [0, 0, 3, 2, 0, 2, 0, 3, 2, 0, 1, 3], [0, 0, 2, 1, 0, 2, 0, 3, 3, 0, 2, 3]] \$$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

694 . Coloring, {2, 4, 8, 9, 11}

R: [7, 8, 7, 7, A, A, B, B, C, C, 4, 5]

B: [6, 7, 8, 6, 3, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	9 vs 10

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 3, 2, 2], [0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 3, 2, 2], [0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 3, 3]] \$$$

$$[0, 0, 0, 2y_1, 2y_2, 0, 7y_1 - 27y_2 - 2y_3 + 16y_4, 2y_3, 0, 3y_1 - 7y_2 + 4y_4, 2y_4, 4y_1 - 16y_2 + 10y_4]$$

$$p' = -s^2 + s^5 \quad p = -s^2 + s^5 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}, {2, 7, 10}}

See Matrix

$$\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 2, 1, 1], [1, 2, 2, 0, 0, 2, 2, 2, 1, 1, 2, 1], [2, 1, 2, 0, 0, 1, 2, 2, 1, 2, 1, 2], [1, 2, 1, 0, 0, 2, 1, 2, 2, 2, 1, 2], [1, 2, 2, 0, 0, 1, 2, 1, 2, 1, 2, 2], [2, 1, 1, 0, 0, 1, 2, 2, 2, 2, 2, 1], [2, 2, 1, 0, 0, 2, 1, 1, 1, 2, 2, 2], [2, 2, 2, 0, 0, 2, 2, 1, 2, 1, 1, 1], [1, 1, 2, 0, 0, 2, 2, 2, 1, 2, 2, 1], [2, 2, 2, 0, 0, 1, 1, 2, 1, 2, 1, 2, 1, 2]] \$$$

$$[11y_9 - 5y_8 - 5y_6 + 11y_7 - 5y_5 - 5y_4 + 11y_3 - 5y_2 - 5y_1, 5y_9, 5y_8, 0, 0, 5y_6, 5y_7, 5y_5, 5y_4, 5y_3, 5y_2, 5y_1]$$

$$p = -s - s^2 - s^3 + s^8 + s^9 + s^{10}$$

695 . Coloring, {2, 4, 8, 9, 12}

R: [7, 8, 7, 7, A, A, B, B, C, C, 1, 9]

B: [6, 7, 8, 6, 3, 3, A, C, B, 2, 4, 5]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	9 vs 10

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 0, 3, 0, 4, 4] , [4, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 3] , [2, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 4, 0, 4, 0, 3, 3]] \$

$$[7 y_5, 0, 0, 0, 0, 0, 7 y_4, 7 y_3, 7 y_2, 14 y_3, -7 y_5 - 7 y_4 + 11 y_3 + 9 y_2 + 9 y_1, 7 y_1]$$

$$p = s^2 + s^3 - s^5 - s^6 \quad p = s^2 - s^4 - s^5 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {2, 7, 10}} order: 12

See Matrix

\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 2, 1, 1] , [0, 2, 4, 1, 1, 2, 2, 2, 0, 1, 0, 1] , [0, 1, 3, 0, 1, 1, 2, 4, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 1, 3, 0, 2, 0, 4] , [0, 2, 2, 0, 4, 0, 2, 2, 0, 1, 0, 3] , [0, 1, 4, 0, 3, 0, 2, 2, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 0, 1, 4, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 2, 3, 0, 1, 0, 4] , [0, 1, 2, 0, 4, 0, 2, 2, 0, 2, 0, 3] , [0, 2, 4, 0, 3, 0, 1, 2, 0, 2, 0, 2]] \$

$$[0, 5 y_1, 11 y_1 - 5 y_9 - 5 y_5 - 5 y_6 + 11 y_7 - 5 y_8 + 11 y_2 - 5 y_3 - 5 y_4, 5 y_9, 5 y_5, 5 y_6, 5 y_7, 5 y_8, 0, 5 y_2, 5 y_3, 5 y_4]$$

$$p = -s^4 - s^5 - s^6 + s^8 + s^9 + s^{10}$$

696 . Coloring, {2, 4, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, B, B, B, 2, 4, 5]

B: [6, 7, 8, 6, 3, 3, A, C, C, C, 1, 9]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	7 vs 7	6 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 4, 2, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 4, 2, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$$[0, y_1, 0, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, 0]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 2, 0, 4], [0, 0, 2, 0, 0, 2, 0, 2, 4, 1, 0, 5], [0, 0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7], [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$$[2 y_5, 0, y_6, 0, 0, -2 y_5 + 2 y_2, y_5, y_4, y_3, y_2, 0, y_1]$$

$$p' = s^5 - s^7 \quad p = s^5 - s^7$$

697 . Coloring, {2, 4, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, B, B, B, 2, 1, 9]

B: [6, 7, 8, 6, 3, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	6 vs 7	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
See Matrix

\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 2, 2, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 2, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[y_1, y_2, 0, 0, 0, 0, y_5, y_6, y_4, y_4, y_3, 0]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4
See Matrix

\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 2, 0, 2, 0, 1, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4]] \$

$$[0, 0, y_6, 2y_4, y_5, -2y_4 + 2y_2, y_4, y_3, 0, y_2, 0, y_1]$$

$$p' = -s^3 + s^7 \quad p = -s^3 + s^7$$

698 . Coloring, {2, 4, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, B, B, B, C, 4, 9]

B: [6, 7, 8, 6, 3, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 4, 0, 2, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[0, 0, 0, y_1, 0, 0, y_6, y_4, y_5, 2y_4, y_2, y_3]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {2, 7, 10}} order: 12

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 2, 0, 2], [0, 2, 4, 0, 2, 2, 2, 2, 0, 1, 0, 1], [0, 1, 4, 0, 1, 0, 2, 4, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 1, 4, 0, 2, 0, 4], [0, 2, 2, 0, 4, 0, 2, 1, 0, 1, 0, 4], [0, 1, 4, 0, 4, 0, 2, 2, 0, 2, 0, 1], [0, 2, 4, 0, 1, 0, 1, 4, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 2, 4, 0, 1, 0, 4], [0, 1, 2, 0, 4, 0, 2, 1, 0, 2, 0, 4]] \$$$

$$[5y_2, 5y_1, -5y_2 + 11y_1 - 5y_5 - 5y_6 + 11y_7 - 5y_8 + 11y_3 - 5y_4, 0, 5y_5, 5y_6, 5y_7, 5y_8, 0, 5y_3, 0, 5y_4]$$

$$p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9$$

699 . Coloring, {2, 4, 9, 10, 11}

$$\Omega p(\Delta)=0: p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, B, C, C, 2, 4, 5]

B: [6, 7, 8, 6, 3, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}, {4, 7, 11}}

See Matrix

$$\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 2, 2, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 2, 2, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 3, 2, 0, 1, 2, 2], [0, 1, 0, 2, 2, 0, 2, 2, 0, 2, 3, 2], [0, 2, 0, 3, 2, 0, 2, 1, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 3, 2, 0, 2, 2, 1], [0, 2, 0, 2, 1, 0, 2, 2, 0, 2, 3, 2]] \$$$

$$[0, 9y_1 - 7y_2 + 9y_3 - 7y_4 - 7y_5 + 9y_6 - 7y_7, 0, 7y_1, 7y_2, 0, 7y_3, 7y_4, 0, 7y_5, 7y_6, 7y_7]$$

$$p = s + s^2 + s^3 - s^6 - s^7 - s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 2, 2, 2], [2, 0, 2, 0, 0, 2, 0, 2, 2, 1, 3, 2], [3, 0, 2, 0, 0, 2, 0, 2, 2, 0, 4, 1], [4, 0, 2, 0, 0, 3, 0, 2, 1, 0, 4, 0], [4, 0, 3, 0, 0, 4, 0, 2, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 0, 3, 0, 0, 2, 0], [2, 0, 4, 0, 0, 3, 0, 4, 0, 0, 3, 0], [3, 0, 3, 0, 0, 2, 0, 4, 0, 0, 4, 0], [4, 0, 2, 0, 0, 3, 0, 3, 0, 0, 4, 0]] \$$

$$[y_1, 0, y_2, 0, 0, y_5, y_6, y_4, y_3, y_7, y_8, y_9]$$

700 . Coloring, $\{2, 4, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, B, C, C, 2, 1, 9]

B: [6, 7, 8, 6, 3, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 2, 2, 2], [2, 2, 0, 0, 0, 0, 2, 2, 2, 0, 3, 3], [3, 0, 0, 0, 0, 0, 2, 2, 3, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 3, 0, 5, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 5]] \$$

$$[7y_7, 7y_6, 0, 0, 0, 0, 7y_5, 7y_4, 7y_2, 7y_3, 7y_1, 9y_7 - 7y_6 + 9y_5 - 7y_4 - 7y_2 - 7y_3 + 9y_1]$$

$$p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 2, 2, 2], [0, 0, 4, 2, 2, 2, 0, 2, 0, 1, 1, 2], [0, 0, 4, 1, 2, 2, 0, 4, 0, 0, 2, 1], [0, 0, 4, 2, 1, 1, 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 2, 0, 0, 4, 0], [0, 0, 4, 4, 0, 4, 0, 2, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 0, 4, 0, 0, 4, 0]] \$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

701 . Coloring, {2, 4, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, B, C, C, C, 4, 9]

B: [6, 7, 8, 6, 3, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 2, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 3, 5], [0, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 2, 5], [0, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2, 4]] \$$$

$$[0, 0, 0, 7y_5, 0, 0, 7y_4, 7y_3, 7y_2, 14y_3, 7y_1, 9y_5 + 9y_4 - 21y_3 - 7y_2 + 9y_1]$$

$$p = s^2 - s^4 - s^5 + s^7 \quad p = -s^2 - s^3 + s^5 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {2, 7, 10}}

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 2, 2, 0], [2, 2, 4, 0, 0, 2, 2, 2, 0, 1, 1, 0], [1, 1, 2, 0, 0, 2, 2, 4, 0, 2, 2, 0], [2, 2, 2, 0, 0, 1, 1, 2, 0, 2, 4, 0], [4, 2, 1, 0, 0, 2, 2, 2, 0, 1, 2, 0], [2, 1, 2, 0, 0, 4, 2, 1, 0, 2, 2, 0], [2, 2, 4, 0, 0, 2, 1, 2, 0, 2, 1, 0], [1, 2, 2, 0, 0, 2, 2, 4, 0, 1, 2, 0], [2, 1, 2, 0, 0, 1, 2, 2, 0, 2, 4, 0]] \$$$

$$[5y_8, 5y_7, 5y_6, 0, 5y_5, 5y_4, 5y_3, 5y_2, 0, 5y_1, -5y_8 + 11y_7 - 5y_6 - 5y_5 - 5y_4 + 11y_3 - 5y_2 + 11y_1, 0]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

702 . Coloring, {2, 4, 10, 11, 12}

R: [7, 8, 7, 7, A, A, B, C, B, 2, 4, 9]

B: [6, 7, 8, 6, 3, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 0, 2, 2, 1, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 3, 2, 1, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0]] \$

[0, y₂, 0, y₁, 0, 0, y₈, y₇, y₆, y₅, y₄, y₃]

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 2, 1, 3] , [1, 0, 4, 0, 3, 2, 0, 2, 0, 1, 1, 2] , [1, 0, 5, 0, 2, 1, 0, 4, 0, 0, 2, 1] , [2, 0, 3, 0, 1, 1, 0, 5, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 3, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 5, 0, 2, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 3, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 2, 0, 5, 0, 0, 4, 0]] \$

[y₁, 0, y₂, 0, y₃, y₄, y₅, y₆, 0, y₇, y₈, y₉]

703 . Coloring, {2, 5, 6, 7, 8}

R: [7, 8, 7, 6, 3, 3, A, B, B, C, 1, 5]

B: [6, 7, 8, 7, A, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 2, 2] , [2, 0, 3, 0, 2, 0, 4, 0, 0, 2, 1, 2] , [1, 0, 2, 0, 2, 0, 5, 0, 0, 4, 0, 2] , [0, 0, 2, 0, 2, 0, 3, 0, 0, 5, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 0, 0, 3, 0, 5] , [0, 0, 4, 0, 5, 0, 2, 0, 0, 2, 0, 3] , [0, 0, 5, 0, 3, 0, 4, 0, 0, 2, 0, 2] , [0, 0, 3, 0, 2, 0, 5, 0, 0, 4, 0, 2] , [0, 0, 2, 0, 2, 0, 3, 0, 0, 5, 0, 4]] \$

$[y_3, 0, y_2, 0, y_1, y_8, y_7, y_8, 0, y_6, y_5, y_4]$

$$p = s^4 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 4, 0, 2, 1, 2, 3] , [0, 1, 0, 2, 0, 0, 4, 0, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 4, 0, 3, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4, 2]] \$

$[0, -5y_1 + 6y_6 - 5y_7 + 11y_5 - 5y_2 - 5y_3 + 11y_4, 0, 5y_1, 0, 5y_6, 5y_7, 5y_6, 5y_5, 5y_2, 5y_3, 5y_4]$

$$p = s^4 - s^6 - s^7 + s^9 \quad p = -s^4 - s^5 + s^7 + s^8$$

704 . Coloring, {2, 5, 6, 7, 9}

R: [7, 8, 7, 6, 3, 3, A, C, C, C, 1, 5]

B: [6, 7, 8, 7, A, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 2] , [0, 0, 3, 0, 2, 0, 4, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 4, 0, 3, 0, 2, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 2]] \$

$$[2 y_3, 0, y_4, 0, y_5, y_3, y_2, y_3, 0, y_1, 0, y_6]$$

$$p = s^2 - s^7 \quad p' = s^2 - s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 4, 0], [0, 2, 0, 4, 0, 0, 4, 0, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$$$

$$[0, y_6, 0, y_5, 0, y_4, y_3, y_4, 2 y_4, y_2, y_1, 0]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

705 . Coloring, {2, 5, 6, 7, 10}

$$\Omega p(\Delta)=0: \quad p = -s + s^2 + s^4 - 4s^5 + 8s^7 - 16s^8$$

R: [7, 8, 7, 6, 3, 3, A, C, B, 2, 1, 5]

B: [6, 7, 8, 7, A, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 10	5 vs 8

Omega Rank for R : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 1, 1], [1, 2, 3, 0, 1, 0, 4, 2, 0, 2, 0, 1], [0, 2, 1, 0, 1, 0, 4, 2, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 1, 2, 0, 4, 0, 2], [0, 4, 2, 0, 2, 0, 1, 4, 0, 1, 0, 2], [0, 1, 2, 0, 2, 0, 2, 4, 0, 1, 0, 4], [0, 1, 2, 0, 4, 0, 2, 1, 0, 2, 0, 4], [0, 2, 4, 0, 4, 0, 2, 1, 0, 2, 0, 1], [0, 2, 4, 0, 1, 0, 4, 2, 0, 2, 0, 1], [0, 2, 1, 0, 1, 0, 4, 2, 0, 4, 0, 2]] \$$$

$$[y_4, y_1, y_2, 0, y_3, y_8, y_5, y_6, 0, y_7, y_8, y_9]$$

$$p = -s^3 + s^{10}$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4]] \$

$$[0, 0, 0, y_1, 0, y_4, -y_1 - y_4 + 2y_5 + 2y_3 - y_2, y_4, y_5, y_3, y_2, -y_4 + y_5 + y_3]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6 \quad p' = -s^4 + s^7$$

706 . Coloring, {2, 5, 6, 7, 11}

R: [7, 8, 7, 6, 3, 3, A, C, B, C, 4, 5]

B: [6, 7, 8, 7, A, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 2, 2, 0, 0, 2, 0, 3] , [0, 0, 5, 0, 3, 1, 3, 0, 0, 2, 0, 2] , [0, 0, 4, 0, 2, 0, 5, 0, 0, 3, 0, 2] , [0, 0, 2, 0, 2, 0, 4, 0, 0, 5, 0, 3] , [0, 0, 2, 0, 3, 0, 2, 0, 0, 4, 0, 5] , [0, 0, 3, 0, 5, 0, 2, 0, 0, 2, 0, 4] , [0, 0, 5, 0, 4, 0, 3, 0, 0, 2, 0, 2] , [0, 0, 4, 0, 2, 0, 5, 0, 0, 3, 0, 2]] \$

$$[0, 0, y_1, y_3, y_2, y_4, y_5, y_7, 0, y_8, y_7, y_6]$$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 2, 0, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 3, 2, 0, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 3, 1, 0, 1, 3, 2, 2] , [2, 3, 0, 0, 0, 2, 2, 0, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 2, 3, 0, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 1, 3, 0, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 2, 0, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 3, 2, 0, 2, 2, 2, 1]] \$

$$[-3 y_2 - 3 y_3 + 8 y_4 - 3 y_5 + 5 y_7, -3 y_1 + 5 y_4 - 3 y_6 + 8 y_7, 0, 0, 0, 3 y_1, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7]$$

$$p = -s^2 + s^8 \quad p' = s^2 - s^8$$

707 . Coloring, {2, 5, 6, 7, 12}

R: [7, 8, 7, 6, 3, 3, A, C, B, C, 1, 9]

B: [6, 7, 8, 7, A, A, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 1, 3], [1, 0, 1, 0, 0, 0, 4, 0, 3, 2, 2, 3], [2, 0, 0, 0, 0, 0, 2, 0, 3, 4, 3, 2], [3, 0, 0, 0, 0, 0, 2, 0, 2, 2, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 2, 2, 2], [2, 0, 0, 0, 0, 0, 3, 0, 2, 3, 4, 2], [4, 0, 0, 0, 0, 0, 2, 0, 2, 3, 2, 3], [2, 0, 0, 0, 0, 0, 4, 0, 3, 2, 2, 3], [2, 0, 0, 0, 0, 0, 2, 0, 3, 4, 3, 2]] \$$$

$$[y_3, 0, y_4, 0, 0, y_6, y_5, y_6, y_7, y_8, y_1, y_2]$$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 4, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 0, 5, 0, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[0, y_6, 0, y_5, y_4, y_7, y_3, y_7, 0, y_2, y_1, y_7]$$

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

708 . Coloring, {2, 5, 6, 8, 9}

R: [7, 8, 7, 6, 3, 3, B, B, C, C, 1, 5]
B: [6, 7, 8, 7, A, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
 See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 3, 3] , [3, 0, 3, 0, 3, 0, 4, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

[y₃, 0, y₁, 0, y₂, y₅, y₄, y₅, 0, 0, y₆, 3 y₅]

$$p' = s^4 - s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6
 See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 4, 0, 1, 3, 2, 1] , [0, 3, 0, 2, 0, 0, 5, 0, 1, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 5, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

[0, y₆, 0, y₅, 0, y₃, y₄, y₃, y₁, y₂, y₈, y₇]

$$p = -s^6 + s^9$$

709 . Coloring, {2, 5, 6, 8, 10}

R: [7, 8, 7, 6, 3, 3, B, B, B, 2, 1, 5]
B: [6, 7, 8, 7, A, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 8	5 vs 7

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 3
See Matrix

$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 4, 0], [4, 0, 3, 0, 0, 0, 4, 2, 0, 0, 3, 0], [3, 0, 0, 0, 0, 0, 7, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 3, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 6, 0, 0, 0, 3, 0], [3, 0, 0, 0, 0, 0, 7, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 3, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 6, 0, 0, 0, 3, 0]] \$$

$$[y_5, 4y_4 - 6y_2, y_4, 0, 4y_4 - 6y_2, 2y_4 - 3y_2, y_3, y_2, 0, 0, y_1, 0]$$

$$p' = s^4 - s^7 \quad p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 4
See Matrix

$\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 0, 4], [0, 0, 0, 0, 0, 0, 2, 0, 4, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$$[0, 0, 0, 2y_2, 0, y_2, y_1, y_2, y_5, y_4, 0, y_3]$$

$$p' = s^4 - s^6 \quad p = s^4 - s^6$$

710 . Coloring, $\{2, 5, 6, 8, 11\}$

R: [7, 8, 7, 6, 3, 3, B, B, B, C, 4, 5]

B: [6, 7, 8, 7, A, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 4, 2] , [0, 0, 3, 4, 2, 2, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 3, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 3, 4, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 2, 4, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 3, 3, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 4, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 3, 0, 0, 0, 2, 0]] \$

[0, 0, y₅, y₄, y₁, y₂, y₃, y₆, 0, 0, y₇, 2 y₆]

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 2, 2, 0, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 4, 0, 3, 4, 0, 2] , [0, 4, 0, 0, 0, 3, 0, 2, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 4, 0, 3, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 3, 0, 3, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 3, 0, 3]] \$

[10 y₁ + 10 y₃ + 10 y₄ - 22 y₅ + 10 y₂ - 22 y₆, y₁, 0, 0, 0, y₃, y₄, 5 y₁ + 5 y₃ + 5 y₄ - 11 y₅ + 5 y₂ - 11 y₆, y₅, y₂, 0, y₆]

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

711 . Coloring, {2, 5, 6, 8, 12}

R: [7, 8, 7, 6, 3, 3, B, B, B, C, 1, 9]

B: [6, 7, 8, 7, A, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 4, 2] , [4, 0, 1, 0, 0, 0, 4, 0, 2, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_2, 0, y_1, 0, 0, y_4, y_3, y_4, 2y_1 - 2y_4, 0, y_5, 2y_4]$$

$$p = s^3 - s^6 \quad p' = s^3 - s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 4, 0, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0], [0, 6, \\ & 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, \\ & 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$ \end{aligned}$$

$$[0, y_6, 0, 2y_3, y_5, y_3, y_4, y_3, 0, y_2, 0, y_1]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

712 . Coloring, {2, 5, 6, 9, 10}

R: [7, 8, 7, 6, 3, 3, B, C, C, 2, 1, 5]

B: [6, 7, 8, 7, A, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 2, 2], [2, 0, 3, 0, 2, 0, 4, 2, 0, 0, 2, 1], [2, 0, 2, 0, 1, 0, 5, 0, 0, 0, 4, 2], [4, 0, \\ & 1, 0, 2, 0, 4, 0, 0, 0, 5, 0], [5, 0, 2, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, \\ & 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0]] \$ \end{aligned}$$

$$[y_1, 2y_5, y_7, 0, y_6, y_5, y_4, y_3, 0, 0, y_2, y_8]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 0, 2, 3, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 2, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 2, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 0, 2, 3, 3, 4]] \$

[0, 0, 0, y_2 , 0, y_5 , y_1 , y_5 , y_3 , y_4 , y_7 , y_6]

$$p = -s^2 + s^8$$

713 . Coloring, {2, 5, 6, 9, 11}

R: [7, 8, 7, 6, 3, 3, B, C, C, C, 4, 5]

B: [6, 7, 8, 7, A, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 2, 4] , [0, 0, 3, 2, 4, 2, 2, 0, 0, 0, 2, 1] , [0, 0, 6, 2, 1, 2, 3, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 2, 6, 0, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 2, 3, 0, 0, 0, 6, 0] , [0, 0, 2, 6, 0, 3, 2, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 6, 2, 0, 0, 0, 2, 0] , [0, 0, 6, 2, 0, 3, 3, 0, 0, 0, 2, 0]] \$

[0, 0, y_1 , y_2 , y_3 , y_4 , y_5 , y_6 , 0, 0, y_7 , y_8]

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 4, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 3, 3, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

[y_6 , y_5 , 0, 0, 0, y_4 , y_3 , y_2 , 2 y_2 , y_1 , y_7 , 0]

$$p = s^5 - s^8$$

714 . Coloring, {2, 5, 6, 9, 12}

R: [7, 8, 7, 6, 3, 3, B, C, C, C, 1, 9]

B: [6, 7, 8, 7, A, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 2, 4] , [2, 0, 1, 0, 0, 0, 4, 0, 4, 0, 2, 3] , [2, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 4] , [4, 0, 0, 0, 0, 2, 0, 4, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 2, 0, 3, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 4, 0, 4, 0, 2, 3]] \$

$$[2 y_2, 0, 2 y_1, 0, 0, 7 y_2 + 7 y_1 + 7 y_3 - 9 y_4 + 7 y_5 - 9 y_6, 2 y_3, 7 y_2 + 7 y_1 + 7 y_3 - 9 y_4 + 7 y_5 - 9 y_6, 2 y_4, 0, 2 y_5, 2 y_6]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 4, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

$$[0, y_1, 0, y_2, 2 y_4, y_4, y_3, y_4, 0, y_6, y_5, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

715 . Coloring, {2, 5, 6, 10, 11}

R: [7, 8, 7, 6, 3, 3, B, C, B, 2, 4, 5]

B: [6, 7, 8, 7, A, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 3, 1] , [0, 0, 3, 3, 1, 2, 2, 2, 0, 0, 2, 1] , [0, 0, 3, 2, 1, 3, 3, 0, 0, 0, 2, 2] , [0, 0, 4, 2, 2, 2, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 2, 4, 0, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 3, 4, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 3, 2, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 4, 3, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 3, 0, 0, 0, 3, 0]] \$

[0, y₉, y₈, y₇, y₆, y₅, y₄, y₃, 0, 0, y₂, y₁]

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 1, 6] , [1, 0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[y₇, 0, 0, 0, 0, y₆, 2 y₅, y₅, y₄, y₃, y₂, y₁]

$$p = s^6 - s^8$$

716 . Coloring, {2, 5, 6, 10, 12}

R: [7, 8, 7, 6, 3, 3, B, C, B, 2, 1, 9]

B: [6, 7, 8, 7, A, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
 See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 3, 1] , [3, 0, 1, 0, 0, 0, 4, 2, 1, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2] , [5, 0, 0, 0, 0, 4, 0, 2, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$$[y_1, 2y_3, y_2, 0, 0, y_3, y_4, 2y_2 - 3y_3, y_5, 0, y_7, y_6]$$

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6
 See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 5, 1, 4] , [0, 0, 0, 1, 4, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$

$$[0, 0, 0, y_2, y_1, y_3, y_4, y_3, 0, y_7, y_6, y_5]$$

$$p = -s^5 + s^8$$

717 . Coloring, $\{2, 5, 6, 11, 12\}$

R: [7, 8, 7, 6, 3, 3, B, C, B, C, 4, 9]
B: [6, 7, 8, 7, A, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5
 See Matrix

$\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 3, 3] , [0, 0, 1, 3, 0, 2, 2, 0, 3, 0, 4, 1] , [0, 0, 2, 4, 0, 3, 1, 0, 1, 0, 5, 0] , [0, 0, 3, 5, 0, 4, 2, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 5, 3, 0, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 2, 4, 0, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 2, 5, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 3, 2, 0, 0, 0, 5, 0]] \$$

$$[0, 0, y_4, y_5, 0, y_3, y_6, y_1, y_2, 0, y_7, y_8]$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 1, 1], [1, 4, 0, 0, 1, 2, 2, 0, 0, 5, 1, 0], [1, 5, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 1, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$$

$$[y_1, y_2, 0, 0, y_7 + y_6, y_3, y_4, y_7, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

718 . Coloring, {2, 5, 7, 8, 9}

R: [7, 8, 7, 6, 3, A, A, B, C, C, 1, 5]

B: [6, 7, 8, 7, A, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 0, 3, 0, 0, 3, 1, 3], [1, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3]] \$$$

$$[y_2, 0, y_1, 0, y_3, y_5, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1], [0, 1, 1, 3, 0, 0, 4, 1, 1, 0, 4, 1], [0, 0, 0, 4, 0, 0, 4, 1, 1, 0, 5, 1], [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 5, 1], [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0, 0, 0]] \$$$

5, 0]] \$

$$[0, y_6, y_5, y_4, 0, y_6 - y_5, y_3, y_2, y_1, y_6 - y_5, y_8, y_7]$$

$$p' = s^6 - s^9 \quad p = s^6 - s^9$$

719 . Coloring, {2, 5, 7, 8, 10}

R: [7, 8, 7, 6, 3, A, A, B, B, 2, 1, 5]

B: [6, 7, 8, 7, A, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	4 vs 9

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 2, 0], [2, 3, 2, 0, 0, 0, 3, 2, 0, 3, 1, 0], [1, 3, 0, 0, 0, 0, 4, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 1, 3, 0, 4, 3, 0], [3, 4, 0, 0, 0, 0, 2, 3, 0, 1, 3, 0], [3, 1, 0, 0, 0, 0, 3, 4, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 3, 1, 0, 3, 4, 0], [4, 3, 0, 0, 0, 0, 3, 2, 0, 3, 1, 0], [1, 3, 0, 0, 0, 0, 4, 3, 0, 3, 2, 0]] \$$$

$$[y_8, y_7, y_6, 0, 2y_5, y_5, y_4, y_3, 0, y_2, y_1, 0]$$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 2, 4], [0, 0, 1, 2, 0, 0, 2, 1, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 1, 4, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5]] \$$$

$$[0, 0, 5y_3 - 2y_4, 2y_3, 0, 2y_2, 2y_3, 5y_3 - 2y_1 - 4y_2, 2y_1, 2y_2, 2y_3, 2y_4]$$

$$p = -s^4 + s^7 \quad p = -s^4 + s^9 \quad p = -s^4 + s^8 \quad p = -s^4 + s^5 \quad p = -s^4 + s^6$$

720 . Coloring, {2, 5, 7, 8, 11}

R: [7, 8, 7, 6, 3, A, A, B, B, C, 4, 5]

B: [6, 7, 8, 7, A, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 2, 2] , [0, 0, 2, 2, 2, 2, 1, 0, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 2, 2, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 1, 2, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3]] \$

[0, 0, y_9 , y_8 , y_7 , y_6 , y_5 , y_4 , 0, y_3 , y_2 , y_1]

Omega Rank for B : cycles: {{9, 12}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 2, 2] , [2, 1, 1, 0, 0, 2, 2, 1, 2, 0, 2, 3] , [2, 0, 2, 0, 0, 2, 1, 1, 3, 0, 2, 3] , [2, 0, 2, 0, 0, 2, 0, 2, 3, 0, 1, 4] , [1, 0, 2, 0, 0, 2, 0, 2, 4, 0, 0, 5] , [0, 0, 2, 0, 0, 1, 0, 2, 5, 0, 0, 6] , [0, 0, 1, 0, 0, 0, 0, 2, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

[$y_2 - y_1 + y_3 - y_4 + y_5 + y_6 - y_7 + y_8 - y_9$, y_2 , y_1 , 0, 0, y_3 , y_4 , y_5 , y_6 , y_7 , y_8 , y_9]

$$p = -s^9 + s^{10}$$

721 . Coloring, {2, 5, 7, 8, 12}

R: [7, 8, 7, 6, 3, A, A, B, B, C, 1, 9]

B: [6, 7, 8, 7, A, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	10 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 2, 2], [2, 0, 0, 0, 0, 0, 3, 0, 2, 3, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 3], [2, 0, 0, 0, 0, 0, 3, 0, 3, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 3, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 2], [2, 0, 0, 0, 0, 0, 3, 0, 2, 3, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 3]] \$$

$[y_1, 0, y_3, 0, 0, y_3, y_2, y_3, y_4, y_5, y_7, y_6]$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 9

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 2, 2], [0, 1, 1, 2, 2, 0, 4, 1, 0, 2, 2, 1], [0, 2, 0, 2, 1, 0, 3, 1, 0, 2, 4, 1], [0, 2, 0, 4, 1, 0, 4, 0, 0, 1, 3, 1], [0, 1, 0, 3, 1, 0, 6, 0, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 4, 0, 0, 1, 6, 0], [0, 1, 0, 6, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$$

$[0, y_1, y_2, y_3, y_{10}, y_9, y_7, y_8, 0, y_6, y_5, y_4]$

722 . Coloring, $\{2, 5, 7, 9, 10\}$

R: [7, 8, 7, 6, 3, A, A, C, C, 2, 1, 5]

B: [6, 7, 8, 7, A, 3, B, B, B, C, 4, 9]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 9

Omega Rank for R : cycles: $\{\{2, 3, 5, 7, 8, 10, 12\}\}$ order: 7

See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 3, 2, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 2, 3, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 2, 3, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 1, 3, 0, 2, 0, 3], [0, 2, 3, 0, 3, 0, 2, 2, 0, 1, 0, 3], [0, 1, 3, 0, 3, 0, 3, 2, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 3, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 3, 2, 0, 3, 0, 1]] \$$

$$[2y_7, y_2, y_1, 0, y_8, y_7, y_6, y_5, 0, y_4, 0, y_3]$$

$$p = -s^2 + s^9$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 4, 2], [0, 0, 1, 4, 0, 0, 2, 1, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 4, 1, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$$[0, 0, y_6, y_4, 0, y_5, y_2, -y_6 + y_3, y_3, y_5, y_1, y_6 + y_5]$$

$$p' = -s^5 + s^8 \quad p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

723 . Coloring, $\{2, 5, 7, 9, 11\}$

R: [7, 8, 7, 6, 3, A, A, C, C, C, 4, 5]

B: [6, 7, 8, 7, A, 3, B, B, B, 2, 1, 9]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 0, 4], [0, 0, 2, 0, 4, 2, 1, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3]] \$$

$$[0, 0, y_3, 2y_5, y_1, y_2, y_6, y_5, 0, y_4, 0, y_7]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 4, 0], [4, 1, 1, 0, 0, 2, 2, 1, 0, 0, 5, 0], [5, 0, 2, 0, 0, 4, 1, 1, 0, 0, 3, 0], [3, 0, 4, 0, 0, 5, 0, 2, 0, 0, 2, 0], [2, 0, 5, 0, 0, 3, 0, 4, 0, 0, 2, 0], [2, 0, 3, 0, 0, 2, 0, 5, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 0, 3, 0, 0, 5, 0], [5, 0, 2, 0, 0, 4, 0, 2, 0, 0, 3, 0], [3, 0, 4, 0, 0, 5, 0, 2, 0, 0, 2, 0]] \$$$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, 2y_7, y_7, y_8, 0]$$

$$p = -s^4 + s^9$$

724 . Coloring, {2, 5, 7, 9, 12}

R: [7, 8, 7, 6, 3, A, A, C, C, C, 1, 9]

B: [6, 7, 8, 7, A, 3, B, B, B, 2, 4, 5]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	6 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 0, 4], [0, 0, 0, 0, 0, 0, 3, 0, 4, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[2y_4, 0, y_4, 0, 0, y_4, y_3, y_4, y_2, y_1, 0, y_5]$$

$$p = s^4 - s^8 \quad p' = s^5 - s^7 \quad p'' = s^4 - s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 4, 0] , [0, 1, 1, 4, 0, 0, 4, 1, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 5, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, y_1 - y_5 + 2y_4, y_1, y_2, 4y_1 - 2y_5, 2y_1 - y_5, y_3, y_4, 0, y_5, y_6, 0]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

725 . Coloring, {2, 5, 7, 10, 11}

R: [7, 8, 7, 6, 3, A, A, C, B, 2, 4, 5]

B: [6, 7, 8, 7, A, 3, B, B, C, C, 1, 9]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	6 vs 9

Omega Rank for R : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 2, 1, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 1, 2, 3, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 1, 3, 0, 3, 0, 3] , [0, 3, 2, 0, 3, 0, 1, 3, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 2, 3, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 3, 1, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 3, 1, 0, 3, 0, 1] , [0, 3, 3, 0, 1, 0, 3, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 3, 3, 0, 3, 0, 3, 0, 2]] \$

$$[0, y_1, y_2, y_3, y_4, y_6, y_7, y_5, 0, y_8, y_9, y_{10}]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3] , [3, 0, 1, 0, 0, 2, 0, 1, 3, 0, 3, 3] , [3, 0, 2, 0, 0, 3, 0, 1, 3, 0, 1, 3] , [1, 0, 3, 0, 0, 3, 0, 2, 3, 0, 1, 3] , [1, 0, 3, 0, 0, 1, 0, 3, 3, 0, 2, 3] , [2, 0, 1, 0, 0, 1, 0, 3, 3, 0, 3, 3] , [3, 0, 1, 0, 0, 2, 0, 1, 3, 0, 3, 3] , [3, 0, 2, 0, 0, 3, 0, 1, 3, 0, 1, 3] , [1, 0, 3, 0, 0, 3, 0, 2, 3, 0, 1, 3]] \$

$$[3y_2, 0, 3y_1, 0, 0, -3y_2 - 3y_1 - 3y_6 + 10y_5 - 3y_3 + 4y_4, 6y_4, 3y_6, 3y_5, 3y_4, 3y_3, 3y_5 + 3y_4]$$

$$p = -s^2 + s^7 \quad p' = s^3 - s^8 \quad p' = s^2 - s^7$$

726 . Coloring, {2, 5, 7, 10, 12}

R: [7, 8, 7, 6, 3, A, A, C, B, 2, 1, 9]

B: [6, 7, 8, 7, A, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	6 vs 9

Omega Rank for R : cycles: {{1, 2, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 0, 3, 2, 1, 3, 2, 1] , [2, 3, 0, 0, 0, 0, 1, 3, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 0, 2, 3, 2, 1, 1, 3] , [1, 1, 0, 0, 0, 0, 1, 3, 3, 2, 2, 3] , [2, 2, 0, 0, 0, 0, 1, 1, 3, 1, 3, 3] , [3, 1, 0, 0, 0, 0, 2, 2, 3, 1, 3, 1] , [3, 1, 0, 0, 0, 0, 3, 1, 1, 2, 3, 2] , [3, 2, 0, 0, 0, 0, 3, 1, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 0, 3, 2, 1, 3, 2, 1]] \$

$$[y_1, y_2, y_7, 0, 0, y_7, y_3, y_4, y_5, y_6, y_8, y_9]$$

$$p = -s^2 + s^{10}$$

Omega Rank for B : cycles: {{4, 7, 11}, {5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3] , [0, 0, 1, 3, 3, 0, 2, 1, 0, 2, 3, 1] , [0, 0, 0, 3, 1, 0, 3, 1, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 4, 3] , [0, 0, 0, 4, 3, 0, 3, 0, 0, 2, 3, 1] , [0, 0, 0, 3, 1, 0, 4, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 4, 3] , [0, 0, 0, 4, 3, 0, 3, 0, 0, 2, 3, 1] , [0, 0, 0, 3, 1, 0, 4, 0, 0, 3, 3, 2]] \$

$$[0, 0, y_6, y_5, -2y_6 - 2y_5 + 5y_4 + 5y_2 - 4y_1, y_4, y_3, 4y_6 + 4y_5 - 6y_4 - 6y_2 + 5y_1 - y_3, 0, 5y_6 + 5y_5 - 8y_4 - 8y_2 + 6y_1, y_2, y_1]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

727 . Coloring, {2, 5, 7, 11, 12}

R: [7, 8, 7, 6, 3, A, A, C, B, C, 4, 9]

B: [6, 7, 8, 7, A, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	10 vs 10

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 2, 1, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 1, 0, 0, 4, 3, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 4, 3] , [0, 0, 0, 4, 0, 3, 0, 0, 3, 2, 3, 1] , [0, 0, 0, 3, 0, 4, 0, 0, 1, 3, 3, 2] , [0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 1, 0, 0, 4, 3, 3, 3]] \$

[0, 0, y_4 , y_1 , 0, y_2 , y_3 , y_4 , y_7 , y_5 , y_6 , y_8]

$$p = s^3 - s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 2, 2, 1, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 3, 1, 1, 0, 1, 3, 0] , [3, 1, 3, 0, 0, 3, 2, 2, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 1, 3, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 0, 3, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0]] \$

[y_9 , y_{10} , y_8 , 0, y_7 , y_6 , y_4 , y_5 , 0, y_2 , y_3 , y_1]

728 . Coloring, {2, 5, 8, 9, 10}

R: [7, 8, 7, 6, 3, A, B, B, C, 2, 1, 5]

B: [6, 7, 8, 7, A, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 0, 3, 2, 0, 1, 3, 0] , [3, 1, 1, 0, 0, 0, 5, 1, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 0, 5, 0, 0, 0, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_7, y_6, y_5, 0, -y_6 + y_5 + 3y_4, y_4, y_3, y_2, 0, -y_6 + y_5 + 2y_4, y_1, y_4]$$

$$p' = s^5 - s^8 \quad p = s^5 - s^8 \quad p' = -s^6 + s^9$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3] , [0, 0, 1, 1, 0, 0, 2, 1, 3, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 1, 1, 4, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 2, 3, 1] , [0, 0, 0, 3, 0, 0, 4, 0, 1, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 0, 1, 0, 4, 3, 3, 3]] \$

$$[0, 0, y_9, y_8, 0, y_7, y_6, y_5, y_4, y_3, y_2, y_1]$$

729 . Coloring, {2, 5, 8, 9, 11}

R: [7, 8, 7, 6, 3, A, B, B, C, C, 4, 5]

B: [6, 7, 8, 7, A, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 10

Omega Rank for R : cycles: {{3, 4, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 2, 1, 0, 0, 1, 3, 1] , [0, 0, 3, 3, 1, 3, 2, 0, 0, 2, 1, 1] , [0, 0, 1, 1, 1, 3, 3, 0, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 1, 1, 0, 0, 3, 3, 3] , [0, 0, 2, 3, 3, 2, 1, 0, 0, 1, 1, 3] , [0, 0, 3, 1, 3, 3, 2, 0, 0, 2, 1, 1] , [0, 0, 3, 1, 1, 1, 3, 0, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 3, 3]] \$

$$[0, 0, y_1 + y_2 - y_3 + y_4 + y_5 + y_6 - y_7 - y_8, y_1, y_2, y_3, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}, {2, 7, 10}}

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1], [1, 3, 1, 0, 0, 2, 2, 1, 1, 2, 2, 1], [2, 2, 2, 0, 0, 1, 3, 1, 1, 2, 1, 1], [1, 2, 1, 0, 0, 2, 2, 2, 1, 3, 1, 1], [1, 3, 2, 0, 0, 1, 2, 1, 1, 2, 1, 2], [1, 2, 1, 0, 0, 1, 3, 2, 2, 2, 1, 1], [1, 2, 1, 0, 0, 1, 2, 1, 1, 3, 2, 2], [2, 3, 1, 0, 0, 1, 2, 1, 2, 2, 1, 1], [1, 2, 1, 0, 0, 2, 3, 1, 1, 2, 2, 1], [2, 2, 2, 0, 0, 1, 2, 1, 1, 3, 1, 1]] \$$$

$$[9y_1 - 7y_2 - 7y_3 + 9y_4 - 7y_5 - 7y_6 + 9y_7 - 7y_8 - 7y_9, 7y_1, 7y_2, 0, 0, 7y_3, 7y_4, 7y_5, 7y_6, 7y_7, 7y_8, 7y_9]$$

$$p = -s - s^2 - s^3 + s^8 + s^9 + s^{10}$$

730 . Coloring, {2, 5, 8, 9, 12}

R: [7, 8, 7, 6, 3, A, B, B, C, C, 1, 9]

B: [6, 7, 8, 7, A, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 9	8 vs 10

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4]] \$$$

$$[-3y_4 + 3y_1, 0, 3y_4, 0, 0, 3y_4, -3y_4 + 3y_1, 3y_4, 3y_2, 3y_3, 3y_1, -3y_4 + 7y_1 - 3y_2 - 3y_3]$$

$$p = s^3 - s^7 \quad p' = s^3 - s^5 \quad p' = s^4 - s^6 \quad p' = -s^5 + s^7 \quad p' = -s^6 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1] , [0, 3, 1, 1, 1, 0, 4, 1, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 4, 1, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 4, 0, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_5, y_6 - y_7, y_6, y_1, y_7, y_2, y_3, 0, y_4, y_7, y_8]$$

$$p = -s^6 + s^9 \quad p' = -s^6 + s^9$$

731 . Coloring, {2, 5, 8, 10, 11}

R: [7, 8, 7, 6, 3, A, B, B, B, 2, 4, 5]

B: [6, 7, 8, 7, A, 3, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 4, 0] , [0, 1, 2, 4, 0, 2, 1, 2, 0, 1, 3, 0] , [0, 1, 0, 3, 0, 4, 2, 1, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 0, 1, 0, 4, 3, 0] , [0, 4, 0, 3, 0, 3, 0, 2, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 3, 0, 4, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 1, 0, 3, 0, 3, 4, 0] , [0, 3, 0, 4, 0, 2, 0, 3, 0, 1, 3, 0] , [0, 1, 0, 3, 0, 4, 0, 3, 0, 2, 3, 0]] \$

$$[0, y_3, -y_3 + y_1 + y_2 - y_4 + y_5 + y_6 + y_7 - y_8, y_1, y_2, y_4, y_5, y_6, 0, y_7, y_8, 0]$$

$$p = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 0, 4] , [0, 0, 1, 0, 0, 2, 0, 1, 4, 2, 0, 6] , [0, 0, 2, 0, 0, 0, 0, 1, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[y_2, 0, y_1, 0, 0, -y_2 + y_5, y_2, y_3, y_4, y_5, 0, y_6]$$

$$p = s^5 - s^7 \quad p' = s^5 - s^7$$

732 . Coloring, {2, 5, 8, 10, 12}

R: [7, 8, 7, 6, 3, A, B, B, B, 2, 1, 9]

B: [6, 7, 8, 7, A, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 4, 0], [4, 1, 0, 0, 0, 0, 3, 2, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 4, 1, 0, 0, 5, 0], [5, 0, 0, 0, 0, 5, 1, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[y_6, y_7, y_5, 0, 0, y_5, y_3, y_4, 2y_5, y_1, y_2, 0]$$

$$p' = -s^5 + s^8 \quad p = s^5 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 0, 4], [0, 0, 1, 0, 4, 0, 2, 1, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 0, 1, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4]] \$$$

$$[0, 0, y_1, 2y_6, y_2, y_6, 2y_1, y_3, 0, y_4, 0, y_5]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

733 . Coloring, {2, 5, 8, 11, 12}

R: [7, 8, 7, 6, 3, A, B, B, B, C, 4, 9]

B: [6, 7, 8, 7, A, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 2, 1, 0, 2, 1, 5, 1] , [0, 0, 0, 5, 0, 4, 0, 0, 1, 2, 3, 1] , [0, 0, 0, 3, 0, 5, 0, 0, 1, 4, 1, 2] , [0, 0, 0, 1, 0, 3, 0, 0, 2, 5, 1, 4] , [0, 0, 0, 1, 0, 1, 0, 0, 4, 3, 2, 5] , [0, 0, 0, 2, 0, 1, 0, 0, 5, 1, 4, 3] , [0, 0, 0, 4, 0, 2, 0, 0, 3, 1, 5, 1] , [0, 0, 0, 5, 0, 4, 0, 0, 1, 2, 3, 1]] \$

$$[0, 0, y_3, y_1 - y_2 - y_4 - y_7 + y_5 + y_6, 0, y_1, y_2, y_3, y_4, y_7, y_5, y_6]$$

$$p' = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p = s^3 - s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 2, 2, 1, 0, 4, 0, 1] , [0, 4, 2, 0, 1, 0, 3, 1, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 4, 2, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 4, 0, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_8, 0, y_7, 0, y_9]$$

734 . Coloring, {2, 5, 9, 10, 11}

R: [7, 8, 7, 6, 3, A, B, C, C, 2, 4, 5]

B: [6, 7, 8, 7, A, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	9 vs 9

Omega Rank for R : cycles: $\{\{2, 3, 4, 5, 6, 7, 8, 10, 11, 12\}\}$ order: 10

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 2, 2], [0, 1, 2, 2, 2, 2, 1, 2, 0, 1, 2, 1], [0, 1, 2, 2, 1, 2, 2, 1, 0, 2, 1, 2], [0, 2, 1, 1, 2, 2, 2, 1, 0, 2, 2, 1], [0, 2, 2, 2, 1, 1, 1, 2, 0, 2, 2, 1], [0, 2, 1, 2, 1, 2, 2, 2, 0, 1, 1, 2], [0, 1, 1, 1, 2, 2, 1, 2, 0, 2, 2, 2], [0, 2, 2, 2, 2, 1, 1, 1, 0, 2, 1, 2], [0, 2, 2, 1, 2, 2, 2, 2, 0, 1, 1, 1], [0, 1, 2, 1, 1, 1, 2, 2, 0, 2, 2, 2]] \$$

$[0, -y_1 + y_2 + y_3 - y_4 + y_5 + y_6 + y_7 - y_8 - y_9, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 2, 2], [2, 0, 1, 0, 0, 2, 0, 1, 2, 2, 3, 3], [3, 0, 2, 0, 0, 2, 0, 1, 3, 0, 3, 2], [3, 0, 2, 0, 0, 3, 0, 2, 2, 0, 4, 0], [4, 0, 3, 0, 0, 3, 0, 2, 0, 0, 4, 0], [4, 0, 3, 0, 0, 4, 0, 3, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 0, 3, 0, 0, 3, 0], [3, 0, 4, 0, 0, 2, 0, 4, 0, 0, 3, 0], [3, 0, 2, 0, 0, 3, 0, 4, 0, 0, 4, 0]] \$$

$[y_1, 0, y_2, 0, 0, y_4, y_5, y_6, y_7, y_8, y_3, y_9]$

735 . Coloring, $\{2, 5, 9, 10, 12\}$

R: [7, 8, 7, 6, 3, A, B, C, C, 2, 1, 9]

B: [6, 7, 8, 7, A, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 2, 2], [2, 1, 0, 0, 0, 0, 3, 2, 2, 1, 2, 3], [2, 1, 0, 0, 0, 0, 2, 1, 3, 0, 3, 4], [3, 0, 0, 0, 0, 2, 1, 4, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 3, 4], [3, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]] \$$

$2, 0, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 3, 0, 5, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 5], [3, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 4]$] \$

$[2 y_4, 2 y_3, -9 y_4 + 7 y_3 - 9 y_2 + 7 y_1 + 7 y_8 + 7 y_7 - 9 y_6 + 7 y_5, 0, 0, -9 y_4 + 7 y_3 - 9 y_2 + 7 y_1 + 7 y_8 + 7 y_7 - 9 y_6 + 7 y_5, 2 y_2, 2 y_1, 2 y_8, 2 y_7, 2 y_6, 2 y_5]$

$$p = s^5 - s^7 - s^8 + s^{10} \quad p = -s^5 - s^6 + s^8 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 2, 2], [0, 0, 1, 2, 2, 0, 2, 1, 0, 4, 1, 3], [0, 0, 0, 1, 3, 0, 2, 1, 0, 4, 1, 4], [0, 0, 0, 1, 4, 0, 1, 0, 0, 5, 1, 4], [0, 0, 0, 1, 4, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$[0, 0, y_1, y_6, y_7, y_8, y_5, y_4, 0, y_2, y_3, y_9]$

736 . Coloring, {2, 5, 9, 11, 12}

R: [7, 8, 7, 6, 3, A, B, C, C, C, 4, 9]

B: [6, 7, 8, 7, A, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 2, 4], [0, 0, 0, 2, 0, 2, 1, 0, 4, 1, 2, 4], [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 1, 5], [0, 0, 0, 1, 0, 2, 0, 0, 5, 2, 0, 6], [0, 0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$[0, 0, y_7, y_6, 0, y_5, y_4, y_7, y_3, y_2, y_1, y_6 - y_5 + y_4 + y_3 + y_2 - y_1]$

$$p' = s^7 - s^8 \quad p = s^7 - s^9$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}, \{2, 7, 10\}\}$

See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 2, 0], [2, 3, 1, 0, 0, 2, 2, 1, 0, 4, 1, 0], [1, 4, 2, 0, 0, 2, 3, 1, 0, 2, 1, 0], [1, 2, 2, 0, 0, 1, 4, 2, 0, 3, 1, 0], [1, 3, 1, 0, 0, 1, 2, 2, 0, 4, 2, 0], [2, 4, 1, 0, 0, 1, 3, 1, 0, 2, 2, 0], [2, 2, 1, 0, 0, 2, 4, 1, 0, 3, 1, 0], [1, 3, 2, 0, 0, 2, 2, 1, 0, 4, 1, 0], [1, 4, 2, 0, 0, 1, 3, 2, 0, 2, 1, 0]] \$$

$[7y_8, 7y_6, 7y_7, 0, 7y_3, 7y_4, 7y_5, 7y_2, 0, 9y_8 - 7y_6 + 9y_7 - 7y_3 + 9y_4 - 7y_5 + 9y_2 + 9y_1, 7y_1, 0]$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

737 . Coloring, $\{2, 5, 10, 11, 12\}$

R: $[7, 8, 7, 6, 3, A, B, C, B, 2, 4, 9]$

B: $[6, 7, 8, 7, A, 3, A, B, C, C, 1, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	8 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 1, 2, 1, 1, 4, 1], [0, 1, 0, 4, 0, 3, 0, 1, 1, 2, 2, 2], [0, 2, 0, 2, 0, 4, 0, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 0, 2, 1, 4, 2, 1], [0, 4, 0, 2, 0, 1, 0, 3, 1, 2, 1, 2], [0, 2, 0, 1, 0, 2, 0, 4, 2, 1, 1, 3], [0, 1, 0, 1, 0, 1, 0, 2, 3, 2, 2, 4], [0, 2, 0, 2, 0, 1, 0, 1, 4, 1, 3, 2], [0, 1, 0, 3, 0, 2, 0, 2, 2, 1, 4, 1]] \$$

$[0, y_6, y_5, y_4, 0, y_3, y_2, y_1, y_6 + y_5 - y_4 + y_3 - y_2 - y_1 - y_9 + y_8 + y_7, y_9, y_8, y_7]$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}, \{1, 3, 6, 8, 11\}\}$

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3], [1, 0, 1, 0, 3, 2, 0, 1, 0, 4, 1, 3], [1, 0, 2, 0, 3, 1, 0, 1, 0, 3, 1, 4], [1, 0, 1, 0, 4, 1, 0, 2, 0, 3, 1, 3], [1, 0, 1, 0, 3, 1, 0, 1, 0, 4, 2, 3], [2, 0, 1, 0, 3, 1, 0, 1, 0, 3, 1, 4], [1, 0, 1, 0, 4, 2, 0, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 1, 0, 1, 0, 4, 1, 3], [1, 0, 1, 0, 3, 1, 0, 2, 0, 3, 1, 4]] \$$

$$[3y_1, 0, 3y_2, 0, 5y_1 + 5y_2 + 5y_3 - 3y_4 + 5y_5 - 3y_6 + 5y_7 - 3y_8, 3y_3, 3y_4, 3y_5, 0, 3y_6, 3y_7, 3y_8]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

738 . Coloring, {2, 6, 7, 8, 9}

R: [7, 8, 7, 6, A, 3, A, B, C, C, 1, 5]

B: [6, 7, 8, 7, 3, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6
See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3], [1, 0, 1, 0, 3, 0, 3, 0, 0, 4, 1, 3], [1, 0, 0, 0, 3, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$$

$$[y_1, 0, y_6, 0, y_4, y_3, y_2, y_3, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6
See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 4, 1, 1, 1, 4, 1], [0, 1, 0, 4, 0, 0, 4, 0, 1, 0, 5, 1], [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[0, y_2 + y_7, y_2, y_1, 0, y_2, y_3, y_5, y_4, y_5, y_6, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8 \quad p'' = -s^6 + s^9$$

739 . Coloring, {2, 6, 7, 8, 10}

R: [7, 8, 7, 6, A, 3, A, B, B, 2, 1, 5]

B: [6, 7, 8, 7, 3, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	4 vs 9

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 2, 0], [2, 3, 1, 0, 0, 0, 3, 2, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 3, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 1, 4, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 2, 3, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 3, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 4, 1, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 3, 2, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 3, 3, 0, 3, 2, 0]] \$

$$[y_1, y_2, y_8, 0, 2y_6, y_6, y_5, y_7, 0, y_3, y_4, 0]$$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 2, 4], [0, 0, 0, 2, 0, 0, 2, 1, 4, 1, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6], [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6], [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6], [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6]] \$

$$[0, 0, y_3, y_2, 0, y_3, y_2, y_1, -2y_3 + 5y_2 - 2y_1 - y_4, y_1, y_2, y_4]$$

$$p' = s^5 - s^7 \quad p' = s^4 - s^8 \quad p' = s^3 - s^7 \quad p' = s^3 - s^9 \quad p' = s^6 - s^8$$

740 . Coloring, {2, 6, 7, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s + s^2 - 2s^3 + 3s^4 + 8s^5 - 8s^7 - 16s^8$$

R: [7, 8, 7, 6, A, 3, A, B, B, C, 4, 5]

B: [6, 7, 8, 7, 3, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 9

See Matrix

$$[[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 2, 2], [0, 0, 1, 2, 2, 2, 1, 0, 0, 4, 1, 3], [0, 0, 2, 1, 3, 2, 1, 0, 0, 3, 0, 4], [0, 0, 2, 0, 4, 1, 2, 0, 0, 4, 0, 3], [0, 0, 1, 0, 3, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]]$$

$[0, 0, y_1, y_2, y_3, y_4, y_5, y_9, 0, y_6, y_7, y_8]$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}, {9, 12}} order: 6

See Matrix

$$[[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 2, 2], [2, 1, 0, 0, 0, 2, 2, 1, 2, 1, 2, 3], [2, 1, 0, 0, 0, 2, 1, 0, 3, 2, 2, 3], [2, 2, 0, 0, 0, 2, 1, 0, 3, 2, 1, 3], [1, 2, 0, 0, 0, 2, 2, 0, 3, 2, 1, 3], [1, 2, 0, 0, 0, 1, 2, 0, 3, 2, 2, 3], [2, 2, 0, 0, 0, 1, 2, 0, 3, 1, 2, 3], [2, 1, 0, 0, 0, 2, 2, 0, 3, 1, 2, 3], [2, 1, 0, 0, 0, 2, 1, 0, 3, 2, 2, 3], [2, 2, 0, 0, 0, 2, 1, 0, 3, 2, 1, 3]]$$

$[3y_7, 3y_6, 3y_5, 0, 0, 3y_4, 3y_3, 3y_2, 3y_1, -3y_7 - 3y_3 + 5y_2 + 5y_1, -3y_6 - 3y_4 + 5y_2 + 5y_1, -3y_5 + 3y_2 + 3y_1]$

$$p' = -s^3 + s^9 \quad p = -s^3 + s^9 \quad p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

741 . Coloring, {2, 6, 7, 8, 12}

R: [7, 8, 7, 6, A, 3, A, B, B, C, 1, 9]

B: [6, 7, 8, 7, 3, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 2, 2], [2, 0, 1, 0, 0, 0, 3, 0, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 2], [2, 0, 0, 0, 0, 3, 0, 2, 3, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 3], [2, 0, 0, 0, 0, 0, 3, 0, 3, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 3, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 2]] \$$

$[y_1, 0, y_7, 0, 0, y_8, y_6, y_8, y_3, y_2, y_4, y_5]$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}, \{3, 5, 8, 12\}\}$ order: 12

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 2, 2], [0, 1, 2, 2, 2, 0, 4, 1, 0, 1, 2, 1], [0, 1, 2, 2, 1, 0, 3, 2, 0, 0, 4, 1], [0, 0, 1, 4, 1, 0, 3, 2, 0, 0, 3, 2], [0, 0, 1, 3, 2, 0, 4, 1, 0, 0, 3, 2], [0, 0, 2, 3, 2, 0, 3, 1, 0, 0, 4, 1], [0, 0, 2, 4, 1, 0, 3, 2, 0, 0, 3, 1], [0, 0, 1, 3, 1, 0, 4, 2, 0, 0, 3, 2], [0, 0, 1, 3, 2, 0, 3, 1, 0, 0, 4, 2], [0, 0, 2, 4, 2, 0, 3, 1, 0, 0, 3, 1]] \$$

$[0, -3y_2 + 10y_1 - 3y_7 - 3y_3 + 10y_4 - 3y_5 - 3y_6, 3y_1 + 3y_4 - 3y_8, 3y_2, 3y_1, 3y_7, 3y_3, 3y_4, 0, 3y_5, 3y_6, 3y_8]$

$$p = s^4 + s^6 - s^7 - s^9 \quad p' = -s^4 - s^6 + s^7 + s^9$$

742 . Coloring, $\{2, 6, 7, 9, 10\}$

R: [7, 8, 7, 6, A, 3, A, C, C, 2, 1, 5]

B: [6, 7, 8, 7, 3, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 3, 2, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 1, 3, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 2, 0, 3, 0, 5] , [0, 3, 0, 0, 5, 0, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 4, 0, 2, 0, 3]] \$

[2 y₄, y₁, y₂, 0, y₃, y₄, y₅, y₆, 0, y₇, 0, y₈]

$$p = s^4 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 1, 2, 1, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

[0, 0, y₂, y₁, 0, y₂, y₃, y₅, y₄, y₅, y₆, y₇]

$$p = -s^5 + s^8 \quad p' = s^5 - s^8$$

743 . Coloring, {2, 6, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s + s^2 - 2s^3 - 3s^4 - 4s^5 + 8s^6 + 8s^7 + 16s^8$$

R: [7, 8, 7, 6, A, 3, A, C, C, C, 4, 5]

B: [6, 7, 8, 7, 3, A, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 2, 1, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 1, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[0, 0, y_7, 2y_3, y_6, y_4, y_5, y_3, 0, y_2, 0, y_1]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 4, 0], [4, 1, 0, 0, 0, 2, 2, 1, 0, 1, 5, 0], [5, 1, 0, 0, 0, 4, 1, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 5, 1, 0, 0, 4, 1, 0], [1, 4, 0, 0, 0, 3, 2, 0, 0, 5, 1, 0], [1, 5, 0, 0, 0, 1, 4, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 1, 5, 0, 0, 1, 4, 0], [4, 1, 0, 0, 0, 2, 3, 0, 0, 1, 5, 0], [5, 1, 0, 0, 0, 4, 1, 0, 0, 2, 3, 0]] \$$$

$$[y_1 - y_2 + y_3 - y_4 - y_5 - y_6 + y_7, y_1, y_2, 0, 0, y_3, y_4, y_5, 2y_2, y_6, y_7, 0]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

744 . Coloring, {2, 6, 7, 9, 12}

R: [7, 8, 7, 6, A, 3, A, C, C, C, 1, 9]

B: [6, 7, 8, 7, 3, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 0, 4], [0, 0, 1, 0, 0, 0, 3, 0, 4, 2, 0, 6], [0, 0, 0, 0, 0, 0, 1, 0, 6, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[2y_4, 0, y_2, 0, 0, y_4, y_3, y_4, y_5, y_6, 0, y_1]$$

$$p = -s^5 + s^7 \quad p' = -s^5 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 4, 0] , [0, 1, 2, 4, 0, 0, 4, 1, 0, 1, 3, 0] , [0, 1, 0, 3, 0, 0, 5, 2, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0]] \$

$$[0, y_1, -y_3 + 2y_5, y_2, 2y_3, y_3, y_4, 2y_1 - 2y_3 - y_5, 0, y_5, y_6, 0]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

745 . Coloring, {2, 6, 7, 10, 11}

R: [7, 8, 7, 6, A, 3, A, C, B, 2, 4, 5]

B: [6, 7, 8, 7, 3, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	7 vs 9

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1] , [0, 3, 1, 1, 1, 2, 1, 2, 0, 4, 0, 1] , [0, 4, 2, 0, 1, 1, 1, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 2, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 1, 2, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 2, 0, 4, 0, 4]] \$

$$[0, y_7, y_6, y_5, y_4, y_3, y_2, y_1, 0, y_{10}, y_9, y_8]$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 1, 3, 1, 3, 3] , [3, 0, 0, 0, 0, 3, 0, 0, 3, 2, 1, 4] , [1, 0, 0, 0, 0, 3, 0, 0, 4, 3, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[-y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, 0, 0, y_2, 2y_1, y_3, y_4, y_5, y_6, y_7]$$

$$p = s^7 - s^8 \quad p' = -s^7 + s^8$$

746 . Coloring, {2, 6, 7, 10, 12}

R: [7, 8, 7, 6, A, 3, A, C, B, 2, 1, 9]

B: [6, 7, 8, 7, 3, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	9 vs 9

Omega Rank for R : cycles: {{1, 2, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1] , [1, 3, 1, 0, 0, 0, 3, 2, 1, 2, 2, 1] , [2, 2, 0, 0, 0, 0, 2, 3, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 0, 2, 2, 2, 2, 1, 3] , [1, 2, 0, 0, 0, 0, 1, 3, 3, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 1, 2, 2, 1, 3, 3] , [3, 1, 0, 0, 0, 0, 2, 2, 3, 1, 2, 2] , [2, 1, 0, 0, 0, 0, 3, 1, 2, 2, 3, 2] , [3, 2, 0, 0, 0, 0, 2, 1, 2, 3, 2, 1] , [2, 3, 0, 0, 0, 0, 3, 2, 1, 2, 2, 1]] \$

[$y_7, y_6, y_5, 0, 0, y_4, y_3, y_2, y_1, y_{10}, y_9, y_8$]

Omega Rank for B : cycles: {{4, 7, 11}} order: 9

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 0, 2, 1, 0, 1, 3, 1] , [0, 0, 3, 3, 1, 0, 3, 2, 0, 0, 3, 1] , [0, 0, 1, 3, 1, 0, 3, 3, 0, 0, 5, 0] , [0, 0, 1, 5, 0, 0, 3, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 1, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$

[0, 0, $y_7, y_8, y_9, y_4, y_5, y_6, 0, y_2, y_3, y_1$]

747 . Coloring, {2, 6, 7, 11, 12}

R: [7, 8, 7, 6, A, 3, A, C, B, C, 4, 9]

B: [6, 7, 8, 7, 3, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 10

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 9, 10, 11, 12\}\}$ order: 8
See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3], [0, 0, 1, 1, 0, 2, 1, 0, 3, 2, 2, 4], [0, 0, 2, 2, 0, 1, 1, 0, 4, 1, 3, 2], [0, 0, 1, 3, 0, 2, 2, 0, 2, 1, 4, 1], [0, 0, 2, 4, 0, 3, 1, 0, 1, 2, 2, 1], [0, 0, 3, 2, 0, 4, 2, 0, 1, 1, 1, 2], [0, 0, 4, 1, 0, 2, 3, 0, 2, 2, 1, 1], [0, 0, 2, 1, 0, 1, 4, 0, 1, 3, 2, 2], [0, 0, 1, 2, 0, 1, 2, 0, 2, 4, 1, 3]] \$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 7, 10, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1], [3, 1, 2, 0, 1, 2, 2, 1, 0, 1, 3, 0], [3, 1, 1, 0, 0, 3, 1, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 1, 1, 0, 3, 3, 0], [3, 3, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 3, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 3, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 3, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 3, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 2, 0, 0, 3, 3, 0]] \$$

$$[y_6 + y_5 - y_7 + y_1 - y_2 - y_3 - y_4 + y_9 + y_8, y_6, y_5, 0, y_7, y_1, y_2, y_3, 0, y_4, y_9, y_8]$$

$$p = -s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

748 . Coloring, $\{2, 6, 8, 9, 10\}$

R: [7, 8, 7, 6, A, 3, B, B, C, 2, 1, 5]

B: [6, 7, 8, 7, 3, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 0, 3, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 4, 1, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 3, 2, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 1, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_1, y_2, y_3 - y_8, 0, y_3, y_8, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p' = -s^6 + s^9 \quad p = -s^6 + s^9$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 1, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 0, 1, 0, 4, 2, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 2, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 0, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 4, 2, 4] , [0, 0, 0, 2, 0, 0, 1, 0, 4, 2, 3, 4]] \$

$$[0, 0, y_1, 2y_1 + y_5 - y_6 - y_7 - y_4 + y_3 + y_2, 0, y_1, y_5, y_6, y_7, y_4, y_3, y_2]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p = -s^3 + s^9$$

749 . Coloring, {2, 6, 8, 9, 11}

R: [7, 8, 7, 6, A, 3, B, B, C, C, 4, 5]

B: [6, 7, 8, 7, 3, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	10 vs 10

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}, {5, 10, 12}}

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3] , [0, 0, 1, 3, 3, 2, 1, 0, 0, 2, 3, 1] , [0, 0, 2, 3, 1, 3, 1, 0, 0, 3, 1, 2] , [0, 0, 3, 1, 2, 3, 2, 0, 0, 1, 1, 3] , [0, 0, 3, 1, 3, 1, 3, 0, 0, 2, 2, 1] , [0, 0, 1, 2, 1, 1, 3, 0, 0, 3, 3, 2] , [0, 0, 1, 3, 2, 2, 1, 0, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 3, 1, 0, 0, 2, 1, 1] , [0, 0, 3, 1, 1, 3, 2, 0, 0, 3, 1, 2]] \$

$[0, 0, -3y_6 + 5y_5 - 3y_2 - 3y_3 - 3y_4 + 5y_1 - 3y_7 + 5y_8, 3y_6, 3y_5, 3y_2, 3y_3, 3y_4, 0, 3y_1, 3y_7, 3y_8]$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 9

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 2, 2, 1, 1, 3, 2, 1], [2, 3, 0, 0, 0, 1, 3, 0, 1, 4, 1, 1], [1, 4, 0, 0, 0, 2, 3, 0, 1, 4, 1, 0], [1, 4, 0, 0, 0, 1, 4, 0, 0, 5, 1, 0], [1, 5, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 1, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$[y_2, y_1, y_4, 0, 0, y_3, y_5, y_6, y_7, y_8, y_9, y_{10}]$

750 . Coloring, $\{2, 6, 8, 9, 12\}$

R: $[7, 8, 7, 6, A, 3, B, B, C, C, 1, 9]$

B: $[6, 7, 8, 7, 3, A, A, C, B, 2, 4, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	8 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3], [3, 0, 1, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3]] \$$

$[-3y_1 - 6y_3 - 3y_2 - 3y_4 + 10y_5, 0, 3y_1, 0, 0, 3y_3, 3y_2, 3y_3, -3y_3 + 3y_5, 3y_3, 3y_4, 3y_5]$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7 \quad p''' = -s^3 + s^9$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}, \{3, 5, 8, 12\}\}$ order: 12

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 0, 4, 1, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 4, 2, 0, 4, 0, 1] , [0, 4, 1, 0, 1, 0, 3, 1, 0, 4, 0, 2] , [0, 4, 1, 0, 2, 0, 4, 1, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 4, 1, 0, 4, 0, 1] , [0, 4, 1, 0, 1, 0, 3, 2, 0, 4, 0, 1] , [0, 4, 1, 0, 1, 0, 4, 1, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 4, 1, 0, 4, 0, 1] , [0, 4, 2, 0, 1, 0, 3, 1, 0, 4, 0, 1]] \$

[0, 11 y₁ - 5 y₂ + 11 y₃ - 10 y₅ - 5 y₇ + 11 y₈ - 5 y₄ + 11 y₆, 5 y₁, 5 y₂, 5 y₃, 5 y₅, 5 y₇, 5 y₈, 0, 5 y₄, 5 y₅, 5 y₆]

$$p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9 \quad p = s^3 - s^6 - s^7 + s^{10}$$

751 . Coloring, {2, 6, 8, 10, 11}

R: [7, 8, 7, 6, A, 3, B, B, B, 2, 4, 5]

B: [6, 7, 8, 7, 3, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	4 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 4, 0] , [0, 1, 1, 4, 0, 2, 1, 2, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 4, 1, 1, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 2, 2, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 4, 0, 0, 0, 2, 0]] \$

[0, y₉, y₈, y₇, y₆, y₅, y₄, y₃, 0, y₂, y₁, 0]

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 1, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

[-2 y₁ + 4 y₂ + 4 y₄ - 4 y₃, 0, -y₁ + 2 y₂ + 2 y₄ - 2 y₃, 0, 0, y₁, -2 y₁ + 4 y₂ + 4 y₄ - 4 y₃, y₂ + y₄ - y₃, y₂, y₄, 0, y₃]

$$p' = -s^4 + s^7 \quad p' = -s^4 + s^6 \quad p' = -s^4 + s^5 \quad p = s^4 - s^5$$

752 . Coloring, {2, 6, 8, 10, 12}

R: [7, 8, 7, 6, A, 3, B, B, B, 2, 1, 9]

B: [6, 7, 8, 7, 3, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	4 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 4, 0] , [4, 1, 1, 0, 0, 0, 3, 2, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 1, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_6, y_5, y_4, 0, 0, y_5 - y_4, y_3, y_2, 2y_5 - 2y_4, y_5 - y_4, y_1, 0]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 1, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 2, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 4]] \$

$$[0, 0, y_2, 2y_4, y_3, y_4, -y_2 + y_3 + y_4, y_3 + 2y_4 - y_1, 0, y_1, 0, y_3 + 2y_4]$$

$$p = -s^4 + s^7 \quad p = -s^4 + s^8 \quad p = -s^4 + s^5 \quad p = -s^4 + s^6$$

753 . Coloring, {2, 6, 8, 11, 12}

R: [7, 8, 7, 6, A, 3, B, B, B, C, 4, 9]

B: [6, 7, 8, 7, 3, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 4, 2], [0, 0, 1, 4, 0, 2, 1, 0, 2, 0, 5, 1], [0, 0, 2, 5, 0, 4, 1, 0, 1, 0, 3, 0], [0, 0, 4, 3, 0, 5, 2, 0, 0, 0, 2, 0], [0, 0, 5, 2, 0, 3, 4, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 2, 5, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 3, 0, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 2, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 5, 2, 0, 0, 0, 2, 0]] \$$

$[0, 0, y_1, y_2, 0, y_3, y_4, y_7, y_5, y_7, y_6, y_8]$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}, \{3, 5, 8, 12\}\}$ order: 12

See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 2, 2, 1, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 2, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 4, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 3, 1, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 3, 2, 0, 3, 0, 1], [0, 3, 1, 0, 1, 0, 4, 2, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 3, 1, 0, 4, 0, 2]] \$$

$[3y_7, 3y_6, 3y_5, 0, 3y_4, 3y_3, 3y_2, 3y_1, 0, -3y_7 - 3y_6 + 10y_4 - 3y_3 - 3y_2 + 10y_1, 0, -3y_5 + 3y_4 + 3y_1]$

$$p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9 \quad p = -s^3 - s^5 + s^6 + s^8$$

754 . Coloring, $\{2, 6, 9, 10, 11\}$

R: [7, 8, 7, 6, A, 3, B, C, C, 2, 4, 5]

B: [6, 7, 8, 7, 3, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}, \{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 2, 2], [0, 1, 1, 2, 2, 2, 1, 2, 0, 2, 2, 1], [0, 2, 2, 2, 1, 2, 1, 1, 0, 2, 1, 2], [0, 2, 2, 1, 2, 2, 2, 0, 1, 1, 1], [0, 1, 2, 1, 1, 1, 2, 2, 0, 2, 2, 2], [0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 2, 2], [0, 1, 1, 2, 2, 2, 1, 2, 0, 2, 2, 1], [0, 2, 2, 2, 1, 2, 1, 1, 0, 2, 1, 2], [0, 2, 2, 1, 2, 2, 2, 2, 0, 1, 1, 1], [0, 1, 2, 1, 1, 1, 2, 2, 0, 2, 2, 2]] \$$

$[0, y_2 - y_4 + y_3, -y_5 + y_1 + y_3, y_2 - y_1 + y_5, y_2 + y_5 - y_4, y_2, y_1 - y_4 + y_3, y_1, 0, y_4, y_5, y_3]$

$$p' = -s^2 + s^7 \quad p' = -s^4 + s^9 \quad p = -s + s^6 \quad p' = -s + s^6 \quad p' = -s^3 + s^8$$

Omega Rank for B : cycles: $\{\{1, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 2, 2], [2, 0, 0, 0, 0, 2, 0, 1, 2, 3, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 3, 3], [3, 0, 0, 0, 0, 3, 0, 0, 3, 2, 3, 2], [3, 0, 0, 0, 0, 3, 0, 0, 2, 3, 3, 2], [3, 0, 0, 0, 0, 3, 0, 0, 2, 3, 2, 3], [2, 0, 0, 0, 0, 3, 0, 0, 3, 3, 2, 3], [2, 0, 0, 0, 0, 2, 0, 0, 3, 3, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 3, 3]] \$$

$[3y_1 + y_7 - y_6 - y_5 - y_4 + y_3 + y_2, 0, y_1, 0, 0, y_7, 2y_1, y_6, y_5, y_4, y_3, y_2]$

$$p = -s^3 + s^9 \quad p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

755 . Coloring, $\{2, 6, 9, 10, 12\}$

R: [7, 8, 7, 6, A, 3, B, C, C, 2, 1, 9]

B: [6, 7, 8, 7, 3, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 10	6 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 2, 2] , [2, 1, 1, 0, 0, 0, 3, 2, 2, 0, 2, 3] , [2, 0, 0, 0, 0, 0, 3, 1, 3, 0, 3, 4] , [3, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4]] \$

$$[y_4 + y_2 + y_3 + y_6 - y_1 - y_5, y_4 + y_2 + y_3 - y_6, y_2 + y_3 - y_6, 0, 0, y_4, y_1, y_2, y_3, y_4, y_5, y_6]$$

$$p' = -s^4 + s^7 \quad p' = -s^5 + s^8 \quad p = -s^4 + s^{10} \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 4, 5, 7, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 0, 2, 2, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 0, 1, 2, 0, 2, 2, 2] , [0, 0, 3, 2, 2, 0, 1, 3, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 3, 0, 1, 3, 1] , [0, 0, 2, 3, 1, 0, 2, 2, 0, 2, 3, 1] , [0, 0, 1, 3, 1, 0, 3, 2, 0, 2, 2, 2] , [0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 2, 2]] \$

$$[0, 0, -y_2 - y_3 + y_5 + y_6, -y_1 + y_5 + y_6, y_1, y_2, y_3, -y_4 + y_5 + y_6, 0, y_4, y_5, y_6]$$

$$p = -s^2 + s^3 - s^6 + s^7 \quad p = -s^2 + s^4 - s^6 + s^8 \quad p = -s^2 + s^5 - s^6 + s^9$$

756 . Coloring, {2, 6, 9, 11, 12}

R: [7, 8, 7, 6, A, 3, B, C, C, C, 4, 9]

B: [6, 7, 8, 7, 3, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {3, 4, 6, 7, 11}} order: 10

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 2, 4] , [0, 0, 1, 2, 0, 2, 1, 0, 4, 0, 2, 4] , [0, 0, 2, 2, 0, 2, 1, 0, 4, 0, 1, 4] , [0, 0, 2, 1, 0, 2, 2, 0, 4, 0, 1, 4] , [0, 0, 2, 1, 0, 1, 2, 0, 4, 0, 2, 4] , [0, 0, 1, 2, 0, 1, 2, 0, 4, 0, 2, 4] , [0, 0, 1, 2, 0, 2, 1, 0, 4, 0, 2, 4] , [0, 0, 2, 2, 0, 2, 1, 0, 4, 0, 1, 4] , [0, 0, 2, 1, 0, 2, 2, 0, 4, 0, 1, 4]] \$

$$[0, 0, -y_1 - y_2 - y_3 + 2y_6 - y_5, y_1, 0, y_2, y_3, y_4, -2y_4 + y_6, y_4, y_5, y_6]$$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7 \quad p'' = -s^3 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 2, 0], [2, 3, 2, 0, 0, 2, 2, 1, 0, 3, 1, 0], [1, 3, 0, 0, 0, 2, 3, 2, 0, 4, 1, 0], [1, 4, \\ & 0, 0, 0, 1, 3, 0, 0, 5, 2, 0], [2, 5, 0, 0, 0, 1, 4, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 2, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, \\ & 4, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0]] \$ \end{aligned}$$

$$[y_3, y_1, y_2, 0, y_8, y_9, y_7, y_6, 0, y_5, y_4, 0]$$

757 . Coloring, {2, 6, 10, 11, 12}

R: [7, 8, 7, 6, A, 3, B, C, B, 2, 4, 9]

B: [6, 7, 8, 7, 3, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	6 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 10

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1], [0, 1, 1, 3, 0, 2, 1, 2, 1, 0, 4, 1], [0, 0, 2, 4, 0, 3, 1, 1, 1, 0, 2, 2], [0, 0, \\ & 3, 2, 0, 4, 2, 0, 2, 0, 2, 1], [0, 0, 4, 2, 0, 2, 3, 0, 1, 0, 4, 0], [0, 0, 2, 4, 0, 2, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, \\ & 2, 0, 0, 0, 4, 0], [0, 0, 4, 4, 0, 4, 2, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 4, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 4, 0, 0, 0, \\ & 4, 0]] \$ \end{aligned}$$

$$[0, y_3, y_1, y_2, 0, y_{10}, y_9, y_6, y_7, y_8, y_5, y_4]$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 2, 0, 1, 0, 3, 1, 3], [1, 0, 3, 0, 3, 1, 0, 2, 0, 2, 1, 3], [1, 0, \\ & 3, 0, 3, 1, 0, 3, 0, 1, 2, 2], [2, 0, 3, 0, 2, 1, 0, 3, 0, 1, 3, 1], [3, 0, 2, 0, 1, 2, 0, 3, 0, 1, 3, 1], [3, 0, 1, 0, 1, 3, \\ & 0, 2, 0, 2, 3, 1], [3, 0, 1, 0, 1, 3, 0, 1, 0, 3, 2, 2], [2, 0, 1, 0, 2, 3, 0, 1, 0, 3, 1, 3]] \$ \end{aligned}$$

$$[y_4, 0, y_5, 0, y_6, y_4 - y_5 + y_6 - y_1, y_1, y_4 + y_6 - y_2, 0, y_2, y_4 + y_6 - y_3, y_3]$$

$$p' = -s^2 + s^3 - s^6 + s^7 \quad p = s^2 - s^3 + s^6 - s^7 \quad p' = -s^2 + s^4 - s^6 + s^8$$

758 . Coloring, {2, 7, 8, 9, 10}

R: [7, 8, 7, 6, A, A, A, B, C, 2, 1, 5]

B: [6, 7, 8, 7, 3, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 1, 1], [1, 4, 0, 0, 1, 0, 2, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 1, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 1, 5, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 2, 3, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 4, 1, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 5, 1, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 3, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 1, 4, 0, 3, 2, 0]] \$$$

$$[y_6, y_7, 0, 0, y_5, y_4, y_2, y_3, 0, -y_6 + y_7 + y_5 + y_2 - y_3 + y_1, y_1, y_4]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 3, 3], [0, 0, 1, 3, 0, 0, 2, 2, 3, 0, 4, 1], [0, 0, 0, 4, 0, 0, 3, 1, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$$$

$$[0, 0, y_2, y_1, 0, y_5, y_6, y_4, y_3, 0, y_7, y_8]$$

759 . Coloring, {2, 7, 8, 9, 11}

R: [7, 8, 7, 6, A, A, A, B, C, C, 4, 5]

B: [6, 7, 8, 7, 3, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 1, 3], [0, 0, 0, 1, 3, 2, 0, 0, 0, 5, 1, 4], [0, 0, 0, 1, 4, 1, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$

$[0, 0, 0, y_1, y_3, y_4, 2y_5, y_5, 0, y_6, y_7, y_2]$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 3, 1], [3, 0, 1, 0, 0, 2, 2, 2, 1, 0, 4, 1], [4, 0, 2, 0, 0, 3, 0, 1, 1, 0, 3, 2], [3, 0, 3, 0, 0, 4, 0, 2, 2, 0, 1, 1], [1, 0, 4, 0, 0, 3, 0, 3, 1, 0, 2, 2], [2, 0, 3, 0, 0, 1, 0, 4, 2, 0, 1, 3], [1, 0, 1, 0, 0, 2, 0, 3, 3, 0, 2, 4], [2, 0, 2, 0, 0, 1, 0, 1, 4, 0, 3, 3], [3, 0, 1, 0, 0, 2, 0, 2, 3, 0, 4, 1]] \$$

$[y_3, y_2, y_1, 0, 0, y_8, y_9, y_7, y_6, 0, y_5, y_4]$

760 . Coloring, $\{2, 7, 8, 9, 12\}$

R: [7, 8, 7, 6, A, A, A, B, C, C, 1, 9]

B: [6, 7, 8, 7, 3, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 3, 1, 6] , [1, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[y₁, 0, 0, 0, 0, y₃, y₂, y₃, y₄, y₅, y₆, y₇]

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {4, 7, 11}} order: 12

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 3, 1] , [0, 0, 3, 3, 1, 0, 4, 2, 0, 0, 2, 1] , [0, 0, 1, 2, 1, 0, 3, 3, 0, 0, 4, 2] , [0, 0, 1, 4, 2, 0, 2, 1, 0, 0, 3, 3] , [0, 0, 2, 3, 3, 0, 4, 1, 0, 0, 2, 1] , [0, 0, 3, 2, 1, 0, 3, 2, 0, 0, 4, 1] , [0, 0, 1, 4, 1, 0, 2, 3, 0, 0, 3, 2] , [0, 0, 1, 3, 2, 0, 4, 1, 0, 0, 2, 3] , [0, 0, 2, 2, 3, 0, 3, 1, 0, 0, 4, 1]] \$

[0, 18 y₁ - 14 y₂ + 18 y₃ - 14 y₇ + 18 y₄ - 14 y₅ + 18 y₆, 5 y₁, 5 y₂, 5 y₃, 9 y₁ - 7 y₂ + 9 y₃ - 7 y₇ + 9 y₄ - 7 y₅ + 9 y₆, 5 y₇, 5 y₄, 0, 0, 5 y₅, 5 y₆]

$$p = s^2 + s^3 + s^4 - s^6 - s^7 - s^8 \quad p = -s^2 + s^5 + s^6 - s^9$$

761 . Coloring, {2, 7, 8, 10, 11}

R: [7, 8, 7, 6, A, A, A, B, B, 2, 4, 5]

B: [6, 7, 8, 7, 3, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 2, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 2, 0, 4, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 1, 0, 5, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 4, 0, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 5, 0, 1, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 2, 0, 5, 1, 0]] \$

$$[0, y_2, 0, y_1, y_4, y_5, y_4, y_3, 0, y_7, y_6, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 2, 4], [2, 0, 1, 0, 0, 2, 0, 2, 4, 0, 2, 3], [2, 0, 2, 0, 0, 2, 0, 1, 3, 0, 0, 6], [0, 0, 2, 0, 0, 2, 0, 2, 6, 0, 0, 4], [0, 0, 2, 0, 0, 0, 0, 2, 4, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$$$

$$[y_1, 0, y_7, 0, 0, y_6, y_2, y_3, y_4, 0, y_5, y_8]$$

762 . Coloring, {2, 7, 8, 10, 12}

R: [7, 8, 7, 6, A, A, A, B, B, 2, 1, 9]

B: [6, 7, 8, 7, 3, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	5 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 2, 0], [2, 4, 0, 0, 0, 0, 2, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 2, 4, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 3, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 4, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 3, 3, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 2, 2, 0, 3, 3, 0]] \$$$

$$[y_5, y_4, 0, 0, 0, y_3, y_2, y_1, 2y_3, y_7, y_6, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 2, 4], [0, 0, 3, 2, 4, 0, 2, 2, 0, 0, 2, 1], [0, 0, 4, 2, 1, 0, 2, 3, 0, 0, 2, 2], [0, 0, 1, 2, 2, 0, 2, 4, 0, 0, 2, 3], [0, 0, 2, 2, 3, 0, 2, 1, 0, 0, 2, 4], [0, 0, 3, 2, 4, 0, 2, 2, 0, 0, 2, 1], [0, 0, 4, 2, 1, 0, 2, 3, 0, 0, 2, 2], [0, 0, 1, 2, 2, 0, 2, 4, 0, 0, 2, 3]] \$$$

$$[0, 0, y_3, y_5, y_2, y_1, y_5, -y_3 - y_2 - y_1 + 5y_5 - y_4, 0, 0, y_5, y_4]$$

$$p' = -s^3 + s^7 \quad p' = -s^2 + s^6 \quad p = -s^2 + s^6$$

763 . Coloring, {2, 7, 8, 11, 12}

R: [7, 8, 7, 6, A, A, A, B, B, C, 4, 9]

B: [6, 7, 8, 7, 3, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 3, 3, 4] , [0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 2, 3] , [0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 4, 0, 0, 2, 2, 2, 3] , [0, 0, 0, 2, 0, 3, 0, 0, 3, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 3, 3, 4]] \$

$$[0, 0, 0, y_2, 0, y_1, 2y_3, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 2, 2, 2, 0, 0, 2, 1] , [2, 0, 4, 0, 1, 2, 0, 3, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 2, 0, 4, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 2, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4]] \$

$$[y_2, y_1, -y_2 + y_1 + y_8 + y_7 - y_6 + y_5 + y_4 - y_3, 0, y_8, y_7, y_6, y_5, 0, 0, y_4, y_3]$$

$$p = s^6 - s^7 + s^8 - s^9$$

764 . Coloring, {2, 7, 9, 10, 11}

R: [7, 8, 7, 6, A, A, A, C, C, 2, 4, 5]

B: [6, 7, 8, 7, 3, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 2, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 5, 0, 1, 0, 4] , [0, 1, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 1, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2]] \$

[0, y_1 , 0, y_5, y_6, y_4, y_5, y_3 , 0, y_2 , 0, y_7]

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 4, 2] , [4, 0, 1, 0, 0, 2, 0, 2, 2, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 1, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 5, 0, 2, 0, 0, 1, 0] , [1, 0, 5, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 1, 0, 5, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 0, 4, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 1, 0, 0, 4, 0]] \$

[y_1 , 0, y_2 , 0, 0, y_3, y_7, y_4, y_5 , 0, y_6, y_7]

$$p = -s^3 + s^8$$

765 . Coloring, {2, 7, 9, 10, 12}

R: [7, 8, 7, 6, A, A, A, C, C, 2, 1, 9]

B: [6, 7, 8, 7, 3, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 2, 2, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 0, 4, 3, 2, 0, 4], [0, 2, 0, 0, 0, 0, 0, 3, 4, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$[2 y_6, y_7, 0, 0, 0, y_6, y_4, y_5, y_3, y_2, 0, y_1]$

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 4, 2], [0, 0, 3, 4, 2, 0, 2, 2, 0, 0, 3, 0], [0, 0, 2, 3, 0, 0, 4, 3, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 3, 2, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0]] \$$

$[0, 0, y_1, y_3, y_4, y_2, y_5, y_7, 0, 0, y_6, 2 y_2]$

$$p = -s^5 + s^8$$

766 . Coloring, {2, 7, 9, 11, 12}

R: [7, 8, 7, 6, A, A, A, C, C, C, 4, 9]

B: [6, 7, 8, 7, 3, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4
See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 0, 4, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[0, 0, 0, 2 y₂, 0, y₁, 2 y₂, y₂, y₃, y₄, 0, y₅]

$$p = s^4 - s^6 \quad p' = s^4 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5
See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 2, 2, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 4, 0, 3, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 3, 0, 2, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 0, 3, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 0, 4, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 4, 0, 3, 0, 0, 4, 0]] \$

[y₇, y₅, y₆, 0, y₅, y₄, y₂, y₃, 0, 0, y₁, 0]

$$p = -s^3 + s^8$$

767 . Coloring, {2, 7, 10, 11, 12}

R: [7, 8, 7, 6, A, A, A, C, B, 2, 4, 9]
B: [6, 7, 8, 7, 3, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 8, 9, 10, 11, 12}} order: 8
See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 0, 2, 1, 3, 2, 1] , [0, 3, 0, 2, 0, 1, 0, 4, 1, 2, 1, 2] , [0, 2, 0, 1, 0, 2, 0, 3, 2, 1, 1, 4] , [0, 1, 0, 1, 0, 1, 0, 2, 4, 2, 2, 3] , [0, 2, 0, 2, 0, 1, 0, 1, 3, 1, 4, 2] , [0, 1, 0, 4, 0, 2, 0, 2, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 4, 0, 1, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 3, 0, 1, 2, 4, 1, 1]] \$

$$[0, y_1, 0, y_4, 0, y_3, y_2, y_8, y_9, y_6, y_7, y_5]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 3, 3], [3, 0, 3, 0, 3, 2, 0, 2, 0, 0, 3, 0], [3, 0, 5, 0, 0, 3, 0, 3, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 0, 5, 0, 0, 3, 0], [3, 0, 3, 0, 0, 2, 0, 3, 0, 0, 5, 0], [5, 0, 2, 0, 0, 3, 0, 3, 0, 0, 3, 0], [3, 0, 3, 0, 0, 5, 0, 2, 0, 0, 3, 0], [3, 0, 5, 0, 0, 3, 0, 3, 0, 0, 2, 0]] \$$$

$$[2 y_7, 0, 2 y_6, 0, 2 y_4, 2 y_5, 2 y_3, 2 y_2, 0, 0, 2 y_1, 3 y_3]$$

$$p = -s^3 + s^8$$

768 . Coloring, {2, 8, 9, 10, 11}

R: [7, 8, 7, 6, A, A, B, B, C, 2, 4, 5]

B: [6, 7, 8, 7, 3, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 3, 1], [0, 2, 0, 3, 1, 2, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 0, 2, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 3, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 0, 2, 0, 3, 2, 0]] \$$$

$$[0, y_1, 0, y_1 + y_7 + y_6 - y_5 - y_4 + y_3 - 3 y_2, y_7, y_6, 2 y_2, y_5, 0, y_4, y_3, y_2]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

$$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 1, 3], [1, 0, 1, 0, 0, 2, 0, 2, 3, 2, 2, 3], [2, 0, 2, 0, 0, 1, 0, 1, 3, 0, 3, 4], [3, 0, 1, 0, 0, 2, 0, 2, 4, 0, 3, 1], [3, 0, 2, 0, 0, 3, 0, 1, 1, 0, 4, 2], [4, 0, 3, 0, 0, 3, 0, 2, 2, 0, 1, 1], [1, 0, 3, 0, 0, 4, 0, 3, 1, 0, 2, 2], [2, 0, 4, 0, 0, 1, 0, 3, 2, 0, 1, 3], [1, 0, 1, 0, 0, 2, 0, 4, 3, 0, 2, 3]] \$$$

$$[y_1, 0, y_2, 0, 0, y_6, y_7, y_4, y_5, y_3, y_9, y_8]$$

769 . Coloring, {2, 8, 9, 10, 12}

R: [7, 8, 7, 6, A, A, B, B, C, 2, 1, 9]

B: [6, 7, 8, 7, 3, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 2, 2, 1, 1, 3, 2], [3, 1, 0, 0, 0, 0, 3, 2, 2, 0, 4, 1], [4, 0, 0, 0, 0, 3, 1, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1]] \$$$

$$[-3 y_1 - 3 y_2 - 3 y_3 - 3 y_4 + 13 y_5 - 3 y_6 - 3 y_7 + 13 y_8, 3 y_1, 0, 0, 0, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7, 3 y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 1, 3], [0, 0, 3, 1, 3, 0, 2, 2, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 1, 3, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 0, 3, 0, 1, 0, 5], [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4]] \$$$

$$[0, 0, y_1 + y_2 - y_3 + y_4 + y_5 - y_6, y_1, y_2, y_7, y_3, y_4, 0, y_5, y_7, y_6]$$

$$p = s^5 - s^6 + s^7 - s^8 \quad p = -s^5 + s^9$$

770 . Coloring, {2, 8, 9, 11, 12}

R: [7, 8, 7, 6, A, A, B, B, C, C, 4, 9]

B: [6, 7, 8, 7, 3, 3, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	6 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 3, 4] , [0, 0, 0, 3, 0, 3, 0, 0, 4, 2, 0, 4] , [0, 0, 0, 0, 3, 0, 0, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[0, 0, 0, y_3 , 0, y_2 , 2 y_1 , y_1 , y_7 , y_6 , y_5 , y_4]

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{2, 7, 10}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 1, 1] , [1, 2, 3, 0, 1, 2, 2, 2, 0, 2, 0, 1] , [0, 2, 3, 0, 1, 1, 2, 3, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 2, 2, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 2, 2, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 0, 2, 3, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 2, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 2, 2, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 2, 2, 0, 2, 0, 2, 0, 2]] \$

[-2 y_1 + 5 y_6 - 2 y_2 , 2 y_6 , 2 y_1 , 0, 2 y_4 , 2 y_5 , 2 y_6 , 2 y_3 , 0, 2 y_6 , -2 y_4 - 2 y_5 - 2 y_3 + 5 y_6 , 2 y_2]

$$p = s^4 - s^8 \quad p' = s^4 - s^8 \quad p'' = s^6 - s^7 + s^8 - s^9 \quad p''' = s^5 - s^9$$

771 . Coloring, {2, 8, 10, 11, 12}

R: [7, 8, 7, 6, A, A, B, B, B, 2, 4, 9]

B: [6, 7, 8, 7, 3, 3, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 4, 0], [0, 2, 0, 4, 0, 2, 0, 2, 0, 1, 5, 0], [0, 1, 0, 5, 0, 4, 0, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 5, 0, 1, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 0, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 2, 0, 4, 0, 2, 2, 0], [0, 2, 0, 2, 0, 1, 0, 5, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 0, 2, 0, 1, 5, 0]] \$$

$$[0, y_2, 0, y_1, 0, y_3, y_6, y_7, y_6, y_5, y_4, 0]$$

$$p = s^2 - s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 4

See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 0, 4], [0, 0, 3, 0, 4, 2, 0, 2, 0, 2, 0, 3], [0, 0, 6, 0, 3, 0, 0, 3, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 6, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 3, 0, 0, 0, 6], [0, 0, 3, 0, 6, 0, 0, 4, 0, 0, 0, 3], [0, 0, 6, 0, 3, 0, 0, 3, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 6, 0, 0, 0, 3]] \$$

$$[-2y_4 + 2y_2, 0, y_6, 0, y_5, y_4, -2y_4 + 2y_2, y_3, 0, y_2, 0, y_1]$$

$$p' = -s^3 + s^7 \quad p = -s^3 + s^7$$

772 . Coloring, $\{2, 9, 10, 11, 12\}$

R: [7, 8, 7, 6, A, A, B, C, C, 2, 4, 9]

B: [6, 7, 8, 7, 3, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	9 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 8

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 2, 2] , [0, 2, 0, 2, 0, 2, 0, 2, 2, 1, 2, 3] , [0, 1, 0, 2, 0, 2, 0, 2, 3, 2, 0, 4] , [0, 2, 0, 0, 0, 2, 0, 1, 4, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 0, 2, 5, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$[0, y_1, 0, y_4, 0, y_3, y_2, y_8, y_6, y_7, y_5, y_9]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}\}$ order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 2, 2] , [2, 0, 3, 0, 2, 2, 0, 2, 0, 2, 1, 2] , [1, 0, 4, 0, 2, 2, 0, 3, 0, 0, 2, 2] , [2, 0, 4, 0, 2, 1, 0, 4, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 0, 3, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 3, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 0, 4, 0, 0, 3, 0]] \$

$[y_2, 0, y_1, 0, y_9, y_8, y_7, y_6, 0, y_5, y_4, y_3]$

773 . Coloring, $\{3, 4, 5, 6, 7\}$

R: [7, 7, 8, 7, 3, 3, A, C, B, C, 1, 5]

B: [6, 8, 7, 6, A, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8

See Matrix

\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 2, 1, 3] , [1, 0, 2, 0, 3, 0, 2, 2, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 1, 2, 0, 2, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 3, 0, 1, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4]] \$

$[y_5, 0, y_4, 0, y_3, 0, y_2, y_1, 0, y_8, y_7, y_6]$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}, {9, 12}} order: 6
See Matrix

\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 0, 2, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 3, 0, 2, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 2, 0, 2, 1, 3, 2, 2] , [0, 3, 0, 2, 0, 2, 0, 2, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 2, 0, 3, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 2, 0, 2, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 0, 2, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 3, 0, 2, 2, 2, 2, 1]] \$

[0, 3 y₇, 0, 3 y₆, 0, 3 y₅, 3 y₃, 3 y₄, 3 y₂, -3 y₆ - 3 y₃ - 3 y₄ + 5 y₂ + 8 y₁, -3 y₇ - 3 y₅ + 8 y₂ + 5 y₁, 3 y₁]

$$p' = s^2 - s^8 \quad p = s^2 - s^8$$

774 . Coloring, {3, 4, 5, 6, 8}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, B, B, C, 1, 5]

B: [6, 8, 7, 6, A, A, A, C, C, 2, 4, 9]

' See graph

' ' See pair graph

'

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	8 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
See Matrix

\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 0, 4, 2] , [4, 0, 2, 0, 2, 0, 2, 2, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 0, 4, 2, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 4, 2, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

[y₇, 0, y₆, 0, y₅, 0, y₄, y₃, 0, 0, y₂, y₁]

Omega Rank for B : cycles: {{9, 12}} order: 6
See Matrix

\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 2, 0, 2, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 0, 4, 3, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 3, 4, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, y_5, 0, 2y_3, 0, y_4, y_3, y_2, y_7, y_1, 0, y_6]$$

$$p = s^6 - s^8$$

775 . Coloring, {3, 4, 5, 6, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, C, C, C, 1, 5]

B: [6, 8, 7, 6, A, A, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}, {1, 7, 11}} order: 12

See Matrix

$$\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 0, 2, 4], [2, 0, 2, 0, 4, 0, 2, 2, 0, 0, 3, 1], [3, 0, 4, 0, 1, 0, 2, 2, 0, 0, 2, 2], [2, 0, 1, 0, 2, 0, 3, 4, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 2, 1, 0, 0, 3, 4], [3, 0, 2, 0, 4, 0, 2, 2, 0, 0, 2, 1], [2, 0, 4, 0, 1, 0, 3, 2, 0, 0, 2, 2]] \$$$

$$[7y_6, 0, 7y_5, 0, 7y_4, 0, 7y_2, 7y_3, 0, 0, 7y_1, 9y_6 - 7y_5 - 7y_4 + 9y_2 - 7y_3 + 9y_1]$$

$$p = s + s^2 + s^3 - s^5 - s^6 - s^7$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 4, 2, 0], [0, 4, 0, 2, 0, 2, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 0, 4, 0, 2, 2, 0], [0, 2, 0, 2, 0, 3, 0, 3, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 4, 0, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 3, 0, 3, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 0, 2, 0, 3, 3, 0]] \$$$

$$[0, y_1, 0, y_2, 0, y_3, y_4, y_5, 2y_4, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

776 . Coloring, {3, 4, 5, 6, 10}

R: [7, 7, 8, 7, 3, 3, B, C, B, 2, 1, 5]

B: [6, 8, 7, 6, A, A, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}, {1, 7, 11}} order: 12

See Matrix

\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 0, 3, 1] , [3, 0, 2, 0, 1, 0, 4, 2, 0, 0, 3, 1] , [3, 0, 1, 0, 1, 0, 3, 2, 0, 0, 4, 2] , [4, 0, 1, 0, 2, 0, 3, 1, 0, 0, 3, 2] , [3, 0, 2, 0, 2, 0, 4, 1, 0, 0, 3, 1] , [3, 0, 2, 0, 1, 0, 3, 2, 0, 0, 4, 1] , [4, 0, 1, 0, 1, 0, 3, 2, 0, 0, 3, 2] , [3, 0, 1, 0, 2, 0, 4, 1, 0, 0, 3, 2]] \$

[3 y₆, 3 y₅, 3 y₄, 0, 3 y₃, 0, 3 y₂, 3 y₁, 0, 0, -3 y₆ - 3 y₅ - 3 y₂ + 10 y₃ + 10 y₁, -3 y₄ + 3 y₃ + 3 y₁]

$p' = s^2 + s^4 - s^5 - s^7$ $p = s^2 + s^3 + s^4 - s^6 - s^7 - s^8$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 1, 6] , [0, 0, 0, 1, 0, 1, 0, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[0, 0, 0, y₁, 0, y₇, y₆, y₆, y₅, y₄, y₃, y₂]

$p = s^6 - s^8$

777 . Coloring, {3, 4, 5, 6, 11}

R: [7, 7, 8, 7, 3, 3, B, C, B, C, 4, 5]

B: [6, 8, 7, 6, A, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{4, 7, 11\}\}$ order: 12

See Matrix

$\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 0, 3, 3], [0, 0, 2, 3, 3, 0, 2, 2, 0, 0, 3, 1], [0, 0, 3, 3, 1, 0, 3, 2, 0, 0, 2, 2], [0, 0, 1, 2, 2, 0, 3, 3, 0, 0, 3, 2], [0, 0, 2, 3, 2, 0, 2, 1, 0, 0, 3, 3], [0, 0, 2, 3, 3, 0, 3, 2, 0, 0, 2, 1], [0, 0, 3, 2, 1, 0, 3, 2, 0, 0, 3, 2]] \$$

$$[0, 0, y_1 - y_2 + y_4 - y_3 + y_6 - y_5, y_1, y_2, 0, y_4, y_3, 0, 0, y_6, y_5]$$

$$p = s + s^2 + s^3 - s^5 - s^6 - s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{1, 2, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 4, 1, 1], [1, 4, 0, 0, 0, 2, 0, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 1, 0, 4, 2, 2, 2, 1], [2, 2, 0, 0, 0, 1, 0, 3, 1, 1, 4, 2], [4, 1, 0, 0, 0, 2, 0, 2, 2, 1, 3, 1], [3, 1, 0, 0, 0, 4, 0, 1, 1, 2, 2, 2], [2, 2, 0, 0, 0, 3, 0, 1, 2, 4, 1, 1], [1, 4, 0, 0, 0, 2, 0, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 1, 0, 4, 2, 2, 2, 1]] \$$

$$[3y_7, 3y_6, 0, 0, 0, 3y_5, 3y_4, 3y_3, 3y_2, -3y_7 - 3y_3 + 8y_2 + 5y_1, -3y_6 - 3y_5 - 3y_4 + 5y_2 + 8y_1, 3y_1]$$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

778 . Coloring, $\{3, 4, 5, 6, 12\}$

R: [7, 7, 8, 7, 3, 3, B, C, B, C, 1, 9]

B: [6, 8, 7, 6, A, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 0, 3, 3], [3, 0, 0, 0, 0, 0, 2, 2, 3, 0, 5, 1], [5, 0, 0, 0, 0, 0, 3, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 0], [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0]] \$$

$$[y_2, 0, y_1, 0, 0, 0, y_7, y_6, y_5, 0, y_4, y_3]$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 4, 1, 1], [0, 4, 0, 1, 1, 2, 0, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 1, 0, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 1, 0, 5, 0, 1, 4, 0], [0, 1, 0, 4, 0, 2, 0, 3, 0, 1, 5, 0], [0, 1, 0, 5, 0, 4, 0, 1, 0, 2, 3, 0], [0, 2, 0, 3, 0, 5, 0, 1, 0, 4, 1, 0], [0, 4, 0, 1, 0, 3, 0, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 1, 0, 4, 0, 3, 2, 0]] \$$

$$[0, y_3, 0, y_2, y_1, -y_3 + y_2 - y_1 + y_6 + y_5 - y_4, y_7, y_6, 0, y_5, y_4, y_7]$$

$$p' = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = s^3 - s^9$$

779 . Coloring, $\{3, 4, 5, 7, 8\}$

R: [7, 7, 8, 7, 3, A, A, B, B, C, 1, 5]

B: [6, 8, 7, 6, A, 3, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 10

Omega Rank for R : cycles: $\{\{1, 3, 5, 7, 8, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 2, 2], [2, 0, 2, 0, 2, 0, 2, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 0, 2, 2, 0, 2, 1, 3], [1, 0, 3, 0, 3, 0, 1, 2, 0, 2, 2, 2], [2, 0, 3, 0, 2, 0, 1, 3, 0, 1, 2, 2], [2, 0, 2, 0, 2, 0, 2, 3, 0, 1, 3, 1], [3, 0, 2, 0, 1, 0, 2, 2, 0, 2, 3, 1], [3, 0, 1, 0, 1, 0, 3, 2, 0, 2, 2, 2]] \$$

$$[y_1, 0, y_2, 0, -y_1 + y_4 + y_5, 0, -y_2 + y_4 + y_5, -y_3 + y_4 + y_5, 0, y_3, y_4, y_5]$$

$$p = s - s^2 + s^5 - s^6 \quad p' = -s + s^3 - s^5 + s^7 \quad p'' = -s + s^2 - s^5 + s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}}, {9, 12}} order: 10

See Matrix

$$\begin{aligned} & \$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 2, 2], [0, 1, 2, 2, 0, 2, 1, 2, 2, 0, 1, 3], [0, 0, 2, 1, 0, 2, 2, 1, 3, 0, 1, 4], [0, 0, \\ & 2, 1, 0, 1, 2, 0, 4, 0, 2, 4], [0, 0, 1, 2, 0, 1, 2, 0, 4, 0, 2, 4], [0, 0, 1, 2, 0, 2, 1, 0, 4, 0, 2, 4], [0, 0, 2, 2, 0, 2, \\ & 1, 0, 4, 0, 1, 4], [0, 0, 2, 1, 0, 2, 2, 0, 4, 0, 1, 4], [0, 0, 2, 1, 0, 1, 2, 0, 4, 0, 2, 4], [0, 0, 1, 2, 0, 1, 2, 0, 4, 0, \\ & 2, 4]] \$ \end{aligned}$$

$$[0, y_8, y_7, y_6, 0, y_5, y_4, y_2, y_3, y_1, -y_7 - y_6 - y_5 - y_4 + 2y_2 + 2y_3 + 2y_1, -y_8 + y_2 + y_3 + y_1]$$

$$p = -s^4 + s^9 \quad p' = -s^4 + s^9$$

780 . Coloring, {3, 4, 5, 7, 9}

R: [7, 7, 8, 7, 3, A, A, C, C, C, 1, 5]

B: [6, 8, 7, 6, A, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	8 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\begin{aligned} & \$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 2, 1, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 0, 2, 0, 2, 0, 4], [0, 0, \\ & 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, \\ & 0, 4, 0, 0, 0, 4]] \$ \end{aligned}$$

$$[y_4, 0, y_3, 0, y_2, 0, -y_3 + y_4 + y_2, y_1, 0, y_4 + y_2 - y_1, 0, y_4 + y_2]$$

$$p' = -s^5 + s^6 \quad p'' = s^4 - s^5 \quad p = s^4 - s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 4, 0] , [0, 1, 2, 4, 0, 2, 1, 2, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 2, 1, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 4, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0]] \$

$$[0, y_1, y_2, y_3, 0, y_4, y_5, y_6, 2 y_7, y_7, y_8, 0]$$

$$p = -s^4 + s^9$$

781 . Coloring, {3, 4, 5, 7, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, A, C, B, 2, 1, 5]

B: [6, 8, 7, 6, A, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}, {2, 7, 10}} order: 12

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 0, 4, 1, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 4, 2, 0, 4, 0, 1] , [0, 4, 1, 0, 1, 0, 3, 1, 0, 4, 0, 2] , [0, 4, 1, 0, 2, 0, 4, 1, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 4, 1, 0, 4, 0, 1] , [0, 4, 1, 0, 1, 0, 3, 2, 0, 4, 0, 1] , [0, 4, 1, 0, 1, 0, 4, 1, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 4, 1, 0, 4, 0, 1]] \$

$$[-5 y_1 + 11 y_2 + 11 y_3 - 5 y_4 + 11 y_5 - 5 y_6 - 5 y_7 + 11 y_8, 5 y_1, 5 y_2, 0, 5 y_3, 0, 5 y_4, 5 y_5, 0, 5 y_6, 5 y_7, 5 y_8]$$

$$p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 3, 3] , [0, 0, 2, 3, 0, 2, 1, 0, 3, 0, 2, 3] , [0, 0, 2, 2, 0, 3, 2, 0, 3, 0, 1, 3] , [0, 0, 3, 1, 0, 2, 2, 0, 3, 0, 2, 3] , [0, 0, 2, 2, 0, 1, 3, 0, 3, 0, 2, 3] , [0, 0, 1, 2, 0, 2, 2, 0, 3, 0, 3, 3] , [0, 0, 2, 3, 0, 2, 3, 0, 2, 3, 0, 2]] \$

1, 0, 3, 0, 2, 3], [0, 0, 2, 2, 0, 3, 2, 0, 3, 0, 1, 3], [0, 0, 3, 1, 0, 2, 2, 0, 3, 0, 2, 3]] \$

[0, 0, 3 y₆, 3 y₅, 0, 3 y₄, 3 y₃, 3 y₂, 3 y₁, 3 y₂, -3 y₆ - 3 y₅ - 3 y₄ - 3 y₃ + 7 y₂ + 10 y₁, 3 y₂ + 3 y₁]

$$p' = s^3 - s^8 \quad p' = s^2 - s^7 \quad p = s^2 - s^7$$

782 . Coloring, {3, 4, 5, 7, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, A, C, B, C, 4, 5]

B: [6, 8, 7, 6, A, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 v _s 8	10 v _s 10	10 v _s 10	5 v _s 8	9 v _s 10

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 0, 2, 1, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 1, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 1, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$

[0, 0, -y₄ + y₃ + y₂, y₃ + y₂ - y₅, y₅, 0, y₄, y₃, 0, y₂, y₁, y₃ + y₂ - y₁]

$$p' = s^6 - s^7 \quad p' = s^5 - s^7 \quad p = s^5 - s^8$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 7, 11}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 3, 1], [3, 1, 2, 0, 0, 2, 1, 2, 1, 0, 2, 2], [2, 0, 2, 0, 0, 3, 2, 1, 2, 0, 3, 1], [3, 0, 3, 0, 0, 2, 2, 0, 1, 0, 3, 2], [3, 0, 2, 0, 0, 3, 3, 0, 2, 0, 2, 1], [2, 0, 3, 0, 0, 3, 2, 0, 1, 0, 3, 2], [3, 0, 3, 0, 0, 2, 3, 0, 2, 0, 2, 1], [2, 0, 2, 0, 0, 3, 3, 0, 1, 0, 3, 2], [3, 0, 3, 0, 0, 2, 2, 0, 2, 0, 3, 1], [3, 0, 2, 0, 0, 3, 3, 0, 1, 0, 2, 2]] \$

$$[3 y_9, 3 y_7, 3 y_8, 0, 0, 3 y_5, 3 y_6, 3 y_3, 3 y_4, -3 y_9 - 3 y_7 - 3 y_8 - 3 y_5 - 3 y_6 - 3 y_3 + 13 y_4 - 3 y_1 + 13 y_2, 3 y_1, 3 y_2]$$

$$p = -s^4 - s^5 + s^9 + s^{10}$$

783 . Coloring, {3, 4, 5, 7, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, A, C, B, C, 1, 9]

B: [6, 8, 7, 6, A, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6
See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 1, 3], [1, 0, 0, 0, 0, 0, 2, 1, 3, 3, 2, 4], [2, 0, 0, 0, 0, 0, 1, 0, 4, 2, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 1, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 2, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 3, 2, 2], [2, 0, 0, 0, 0, 0, 4, 0, 2, 4, 1, 3], [1, 0, 0, 0, 0, 0, 2, 0, 3, 4, 2, 4]] \$$$

$$[y_1, 0, y_1 - y_7 + y_6 + y_5 + y_4 - y_3 - y_2, 0, 0, 0, y_7, y_6, y_5, y_4, y_3, y_2]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 10
See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 3, 1], [0, 1, 2, 3, 1, 2, 1, 2, 0, 2, 2, 0], [0, 2, 2, 2, 0, 3, 2, 1, 0, 1, 3, 0], [0, 1, 3, 3, 0, 2, 2, 0, 0, 3, 0], [0, 0, 2, 3, 0, 3, 3, 1, 0, 0, 4, 0], [0, 0, 3, 4, 0, 3, 2, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 4, 3, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 3, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 2, 4, 0, 0, 0, 3, 0], [0, 0, 2, 3, 0, 3, 4, 0, 0, 0, 4, 0]] \$$$

$$[0, y_9, y_{10}, y_8, y_6, y_7, y_5, y_4, 0, y_3, y_1, y_2]$$

784 . Coloring, {3, 4, 5, 8, 9}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, B, B, C, C, 1, 5]

B: [6, 8, 7, 6, A, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 8	10 vs 10

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 0, 2, 1, 0, 0, 4, 1] , [4, 0, 3, 0, 1, 0, 3, 2, 0, 0, 3, 0] , [3, 0, 1, 0, 0, 0, 4, 3, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 3, 1, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0]] \$

[y₂, 0, y₁, 0, y₃, 0, y₆, y₇, 0, y₄, y₅, y₈]

Omega Rank for B : cycles: {{2, 3, 4, 6, 7, 8, 9, 10, 11, 12}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 1, 1] , [0, 3, 2, 1, 0, 2, 1, 2, 1, 1, 2, 1] , [0, 1, 2, 2, 0, 1, 2, 3, 1, 1, 1, 2] , [0, 1, 1, 1, 0, 2, 2, 1, 2, 2, 1, 3] , [0, 2, 2, 1, 0, 1, 1, 1, 3, 2, 2, 1] , [0, 2, 1, 2, 0, 1, 2, 2, 1, 1, 3, 1] , [0, 1, 1, 3, 0, 2, 1, 2, 1, 2, 1, 2] , [0, 2, 2, 1, 0, 3, 1, 1, 2, 1, 1, 2] , [0, 1, 3, 1, 0, 1, 2, 2, 2, 1, 2, 1] , [0, 1, 1, 2, 0, 1, 3, 1, 1, 2, 2, 2]] \$

[0, y₁₀, y₉, y₈, 0, y₇, y₆, y₅, y₄, y₃, y₂, y₁]

785 . Coloring, {3, 4, 5, 8, 10}

R: [7, 7, 8, 7, 3, A, B, B, B, 2, 1, 5]

B: [6, 8, 7, 6, A, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 4, 0], [4, 1, 2, 0, 0, 0, 4, 1, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 5, 2, 0, 0, 5, 0], [5, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$$

$$[y_2, y_1, 2y_1 - 3y_4, 0, 2y_4, 0, y_6, y_5, 0, y_4, y_3, 0]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 0, 4], [0, 0, 2, 0, 0, 2, 1, 0, 4, 1, 0, 6], [0, 0, 2, 0, 0, 0, 2, 0, 6, 1, 0, 5], [0, 0, 0, 0, 0, 2, 0, 5, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$$[0, 0, y_1, 2y_4, 0, y_2, y_3, y_4, y_5, y_6, 0, y_7]$$

$$p = -s^6 + s^8$$

786 . Coloring, $\{3, 4, 5, 8, 11\}$

R: [7, 7, 8, 7, 3, A, B, B, B, C, 4, 5]

B: [6, 8, 7, 6, A, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 0, 2, 1, 0, 0, 4, 1] , [0, 0, 2, 4, 1, 0, 4, 2, 0, 0, 3, 0] , [0, 0, 1, 3, 0, 0, 4, 2, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_2, y_1, y_8, 0, y_7, y_6, 0, y_5, y_4, y_3]$$

Omega Rank for B : cycles: {{9, 12}} order: 8
See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 0, 2] , [0, 3, 2, 0, 0, 2, 1, 2, 2, 1, 0, 3] , [0, 1, 2, 0, 0, 0, 2, 3, 3, 1, 0, 4] , [0, 1, 0, 0, 0, 0, 2, 1, 4, 2, 0, 6] , [0, 2, 0, 0, 0, 0, 0, 1, 6, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, y_7, y_8, 0, y_9]$$

787 . Coloring, {3, 4, 5, 8, 12}

R: [7, 7, 8, 7, 3, A, B, B, B, C, 1, 9]
B: [6, 8, 7, 6, A, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 1, 2, 0, 6, 1] , [6, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_1, 0, y_3, 0, 0, 0, y_6, y_5, y_4, y_3, y_2, y_3 + y_5]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 2, 1, 2, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 2, 3, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 2, 3, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3]] \$

[0, y₁, y₂, y₃, y₄, y₅, y₇, y₆, 0, y₈, 0, y₉]

788 . Coloring, {3, 4, 5, 9, 10}

R: [7, 7, 8, 7, 3, A, B, C, C, 2, 1, 5]

B: [6, 8, 7, 6, A, 3, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 0, 4, 1, 0, 0, 3, 1] , [3, 0, 2, 0, 1, 0, 3, 2, 0, 0, 4, 1] , [4, 0, 1, 0, 1, 0, 3, 2, 0, 0, 3, 2] , [3, 0, 1, 0, 2, 0, 4, 1, 0, 0, 3, 2] , [3, 0, 2, 0, 2, 0, 3, 1, 0, 0, 4, 1] , [4, 0, 2, 0, 1, 0, 3, 2, 0, 0, 3, 1] , [3, 0, 1, 0, 1, 0, 4, 2, 0, 0, 3, 2] , [3, 0, 1, 0, 2, 0, 3, 1, 0, 0, 4, 2]] \$

[3 y₃, 3 y₂, 3 y₁, 0, 3 y₁ - 3 y₇ + 3 y₄, 0, -3 y₃ - 3 y₂ + 10 y₁ - 3 y₆ - 3 y₅ + 10 y₄, 3 y₇, 0, 3 y₆, 3 y₅, 3 y₄]

$$p' = -s^3 - s^5 + s^6 + s^8 \quad p = s^3 + s^5 - s^6 - s^8$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 2, 2] , [0, 0, 2, 2, 0, 2, 1, 0, 2, 1, 3, 3] , [0, 0, 2, 3, 0, 2, 2, 0, 3, 1, 2, 1] , [0, 0, 2, 2, 0, 3, 2, 0, 1, 2, 3, 1] , [0, 0, 3, 3, 0, 2, 2, 0, 1, 2, 1, 2] , [0, 0, 2, 1, 0, 3, 3, 0, 2, 2, 1, 2] , [0, 0, 3, 1, 0, 1, 2, 0, 2, 3, 2, 2] , [0, 0, 1, 2, 0, 1, 3, 0, 2, 2, 2, 3] , [0, 0, 1, 2, 0, 2, 1, 0, 3, 3, 2, 2]] \$

$$[0, 0, y_9, y_8, 0, y_7, y_5, y_6, y_3, y_2, y_4, y_1]$$

789 . Coloring, {3, 4, 5, 9, 11}

R: [7, 7, 8, 7, 3, A, B, C, C, C, 4, 5]

B: [6, 8, 7, 6, A, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 2, 4] , [0, 0, 2, 2, 4, 0, 2, 1, 0, 0, 3, 2] , [0, 0, 4, 3, 2, 0, 2, 2, 0, 0, 2, 1] , [0, 0, 2, 2, 1, 0, 3, 4, 0, 0, 2, 2] , [0, 0, 1, 2, 2, 0, 2, 2, 0, 0, 3, 4] , [0, 0, 2, 3, 4, 0, 2, 1, 0, 0, 2, 2] , [0, 0, 4, 2, 2, 0, 3, 2, 0, 0, 2, 1] , [0, 0, 2, 2, 1, 0, 2, 4, 0, 0, 3, 2]] \$

$$[0, 0, 9y_1 - 7y_4 + 9y_2 - 7y_3 - 7y_5 + 9y_6 - 7y_7, 7y_1, 7y_4, 0, 7y_2, 7y_3, 0, 7y_5, 7y_6, 7y_7]$$

$$p = -s^2 - s^3 - s^4 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: {{1, 2, 3, 6, 7, 8, 10, 11}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 2, 0] , [2, 3, 2, 0, 0, 2, 1, 2, 0, 1, 3, 0] , [3, 1, 2, 0, 0, 2, 2, 3, 0, 1, 2, 0] , [2, 1, 2, 0, 0, 3, 2, 1, 0, 2, 3, 0] , [3, 2, 3, 0, 0, 2, 2, 1, 0, 2, 1, 0] , [1, 2, 2, 0, 0, 3, 3, 2, 0, 2, 1, 0] , [1, 2, 3, 0, 0, 1, 2, 2, 0, 3, 2, 0] , [2, 3, 1, 0, 0, 1, 3, 2, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 2, 1, 3, 0, 3, 2, 0]] \$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, y_7, y_8, y_9, 0]$$

790 . Coloring, {3, 4, 5, 9, 12}

R: [7, 7, 8, 7, 3, A, B, C, C, C, 1, 9]

B: [6, 8, 7, 6, A, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 2, 4], [2, 0, 0, 0, 0, 0, 2, 1, 4, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 3, 0, 5, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 5], [3, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 3, 4]] \$$

$[7y_1, 0, 7y_4, 0, 0, 0, 7y_2, 7y_6, 7y_5, 7y_4, 7y_3, 9y_1 - 14y_4 + 9y_2 - 7y_6 - 7y_5 + 9y_3]$

$$p = s^3 - s^5 - s^6 + s^8 \quad p = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: $\{\{2, 3, 4, 6, 7, 8, 10, 11\}\}$ order: 8

See Matrix

$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 2, 0], [0, 3, 2, 2, 0, 2, 1, 2, 0, 3, 1, 0], [0, 3, 2, 1, 0, 2, 2, 3, 0, 1, 2, 0], [0, 1, 2, 2, 0, 1, 2, 3, 0, 2, 3, 0], [0, 2, 1, 3, 0, 2, 2, 1, 0, 2, 3, 0], [0, 2, 2, 3, 0, 3, 1, 2, 0, 2, 1, 0], [0, 2, 3, 1, 0, 3, 2, 2, 0, 1, 2, 0], [0, 1, 3, 2, 0, 1, 3, 2, 0, 2, 2, 0], [0, 2, 1, 2, 0, 2, 3, 1, 0, 3, 2, 0]] \$$

$[0, y_4, y_5, y_3, y_1, y_2, y_6, y_9, 0, y_8, y_7, 0]$

791 . Coloring, $\{3, 4, 5, 10, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, B, C, B, 2, 4, 5]

B: [6, 8, 7, 6, A, 3, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 0, 4, 1, 0, 0, 3, 1] , [0, 0, 1, 3, 1, 0, 4, 2, 0, 0, 4, 1] , [0, 0, 1, 4, 1, 0, 3, 1, 0, 0, 4, 2] , [0, 0, 1, 4, 2, 0, 4, 1, 0, 0, 3, 1] , [0, 0, 2, 3, 1, 0, 4, 1, 0, 0, 4, 1] , [0, 0, 1, 4, 1, 0, 3, 2, 0, 0, 4, 1] , [0, 0, 1, 4, 1, 0, 4, 1, 0, 0, 3, 2] , [0, 0, 1, 3, 2, 0, 4, 1, 0, 0, 4, 1]] \$

[0, 11 y₁ - 5 y₂ + 11 y₃ - 5 y₈ + 11 y₄ - 5 y₅ - 5 y₆ + 11 y₇, 5 y₁, 5 y₂, 5 y₃, 0, 5 y₈, 5 y₄, 0, 5 y₅, 5 y₆, 5 y₇]

$$p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 1, 3] , [1, 0, 2, 0, 0, 2, 1, 0, 3, 1, 1, 5] , [1, 0, 2, 0, 0, 1, 2, 0, 5, 1, 0, 4] , [0, 0, 1, 0, 0, 1, 2, 0, 4, 2, 0, 6] , [0, 0, 1, 0, 0, 0, 1, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[y₂, 0, y₁, 0, 0, y₃, y₄, y₅, y₈, y₆, y₇, y₉]

792 . Coloring, {3, 4, 5, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, B, C, B, 2, 1, 9]

B: [6, 8, 7, 6, A, 3, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 0, 4, 1, 1, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_1, y_5 + y_3, y_5, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 1, 0, 0, 3, 1, 3], [0, 0, 2, 1, 3, 1, 2, 0, 0, 4, 0, 3], [0, 0, \\ & 1, 0, 3, 1, 2, 0, 0, 5, 0, 4], [0, 0, 1, 0, 4, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, \\ & 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$ \end{aligned}$$

$$[0, 0, y_1, y_2, y_6, y_3, y_4, y_5, 0, y_7, y_8, y_9]$$

793 . Coloring, {3, 4, 5, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, B, C, B, C, 4, 9]

B: [6, 8, 7, 6, A, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 3, 3], [0, 0, 0, 3, 0, 0, 2, 1, 3, 0, 5, 2], [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 5, 1], [0, 0, \\ & 0, 5, 0, 0, 5, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, \\ & 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$ \end{aligned}$$

$$[0, 0, y_4, y_1, 0, 0, y_7, y_2, y_3, y_4, y_5, y_6]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 2, 3, 6, 7, 8, 10, 11}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 1, 2, 0, 3, 1, 0] , [1, 3, 2, 0, 0, 1, 2, 3, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 1, 2, 3, 0, 2, 3, 0] , [3, 2, 1, 0, 0, 2, 1, 2, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 3, 1, 2, 0, 1, 2, 0] , [2, 1, 3, 0, 0, 3, 2, 2, 0, 1, 2, 0] , [2, 1, 3, 0, 0, 2, 3, 1, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 2, 3, 1, 0, 3, 1, 0] , [1, 3, 2, 0, 0, 2, 2, 2, 0, 3, 1, 0]] \$

$$[y_9, y_8, y_7, 0, y_6, y_4, y_5, y_3, 0, y_2, y_1, -y_9 + y_8 - y_7 + y_6 + y_4 + y_5 - y_3 - y_2 + y_1]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9 - s^{10}$$

794 . Coloring, {3, 4, 6, 7, 8}

R: [7, 7, 8, 7, A, 3, A, B, B, C, 1, 5]

B: [6, 8, 7, 6, 3, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	10 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 2, 2] , [2, 0, 0, 0, 2, 0, 2, 1, 0, 5, 1, 3] , [1, 0, 0, 0, 3, 0, 2, 0, 0, 4, 1, 5] , [1, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[y_1, 0, y_2, 0, y_7, 0, y_3, y_4, 0, y_5, y_6, y_8]$$

Omega Rank for B : cycles: {{9, 12}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 2, 2] , [0, 1, 0, 2, 0, 2, 1, 2, 2, 2, 1, 3] , [0, 2, 0, 1, 0, 2, 0, 1, 3, 2, 1, 4] , [0, 2, 0, 1, 0, 1, 0, 2, 4, 2, 0, 4] , [0, 2, 0, 0, 0, 1, 0, 2, 4, 1, 0, 6] , [0, 1, 0, 0, 0, 0, 0, 2, 6, 1, 0, 6] , [0, 1, 0, 0, 0, 0, 0, 1, 6, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 1, 8, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, y_9, y_{10}, y_8, 0, y_7, y_6, y_5, y_4, y_3, y_1, y_2]$$

795 . Coloring, {3, 4, 6, 7, 9}

R: [7, 7, 8, 7, A, 3, A, C, C, C, 1, 5]

B: [6, 8, 7, 6, 3, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 1, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$

$$[2 y_3, 0, y_3, 0, y_2, 0, y_3 + 2 y_1, y_1, 0, y_5, 0, y_4]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 4, 0] , [0, 1, 0, 4, 0, 2, 1, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 4, 0, 1, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 4, 0, 2, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 3, 0, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 1, 0, 4, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 0, 4, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 2, 0, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 4, 0, 1, 0, 2, 3, 0]] \$

$$[0, y_1, y_2, y_3, 0, y_4, y_7, y_5, 2 y_2, y_6, y_8, 0]$$

$$p = -s^3 + s^9$$

796 . Coloring, {3, 4, 6, 7, 10}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, A, C, B, 2, 1, 5]

B: [6, 8, 7, 6, 3, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 1, 1] , [1, 3, 0, 0, 1, 0, 4, 1, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 4, 0, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[y_6 + y_4, y_1, y_6, 0, y_2, 0, y_3, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 2, 1, 0, 3, 2, 2, 3] , [0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 1, 5] , [0, 0, 0, 1, 0, 2, 0, 0, 5, 3, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, 0, y_4, y_1, 0, y_2, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p = -s^7 + s^9$$

797 . Coloring, {3, 4, 6, 7, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, A, C, B, C, 4, 5]

B: [6, 8, 7, 6, 3, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 10

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 6
See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 1, 3], [0, 0, 0, 1, 3, 0, 2, 1, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$

$$[0, 0, y_5, y_5 + y_3, y_1, 0, y_2, y_3, 0, y_4, y_5, y_6]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{1, 2, 6, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 3, 1], [3, 1, 0, 0, 0, 2, 1, 2, 1, 2, 2, 2], [2, 2, 0, 0, 0, 3, 0, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 0, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 3, 0, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 1, 0, 3, 1, 3, 2, 2], [2, 3, 0, 0, 0, 2, 0, 2, 2, 1, 3, 1], [3, 1, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2], [2, 2, 0, 0, 0, 3, 0, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 0, 2, 1, 3, 1, 2]] \$$

$$[2y_2, 11y_2 - 2y_1 - 2y_4 + 11y_5 + 11y_6 + 11y_3 - 2y_7 - 39y_8, 2y_1, 0, 0, 2y_4, 2y_5, 2y_6, 3y_2 + 3y_5 + 3y_6 + 3y_3 - 11y_8, 2y_3, 2y_7, 2y_8]$$

$$p = -s^3 + s^9 \quad p' = -s^3 + s^9$$

798 . Coloring, $\{3, 4, 6, 7, 12\}$

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, A, C, B, C, 1, 9]

B: [6, 8, 7, 6, 3, A, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 1, 3], [1, 0, 0, 0, 0, 0, 2, 1, 3, 3, 2, 4], [2, 0, 0, 0, 0, 0, 1, 0, 4, 2, 3, 4], [3, 0, 0, 0, 0, 2, 0, 4, 1, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 2, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 3, 2, 2], [2, 0, 0, 0, 0, 0, 4, 0, 2, 4, 1, 3], [1, 0, 0, 0, 0, 0, 2, 0, 3, 4, 2, 4]] \$$

$$[y_1 + y_2 - y_4 - y_3 - y_6 + y_5 + y_7, 0, y_1, 0, 0, 0, y_2, y_4, y_3, y_6, y_5, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 3, 1], [0, 1, 2, 3, 1, 2, 1, 2, 0, 2, 2, 0], [0, 2, 1, 2, 0, 3, 2, 1, 0, 2, 3, 0], [0, 2, 0, 3, 0, 2, 1, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 0, 2, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 0, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 2, 0, 3, 0, 3, 3, 3, 0]] \$$

$$[0, y_8, y_7, y_6, y_5, y_4, y_3, y_2, 0, y_1, y_{10}, y_9]$$

799 . Coloring, $\{3, 4, 6, 8, 9\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, B, B, C, C, 1, 5]

B: [6, 8, 7, 6, 3, A, A, C, B, 2, 4, 9]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{1, 7, 11\}\}$ order: 3

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 1, 3, 3] , [3, 0, 0, 0, 3, 0, 2, 1, 0, 2, 4, 1] , [4, 0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 3, 3] , [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1] , [4, 0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 3, 3] , [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1]] \$

$$[y_1, 0, y_2, 0, y_3, 0, 5y_3 - y_4 + 4y_1 + 4y_2 - 6y_5, y_4, 0, -2y_1 - 2y_2 - 4y_3 + 5y_5, y_5, 6y_3 + 5y_1 + 5y_2 - 8y_5]$$

$$p' = -s^4 + s^7 \quad p = s^3 - s^6 \quad p' = s^3 - s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 2, 1, 2, 1, 3, 2, 1] , [0, 3, 0, 2, 0, 1, 0, 3, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 2, 0, 3, 2, 1, 1, 3] , [0, 1, 0, 1, 0, 1, 0, 3, 3, 2, 2, 3] , [0, 2, 0, 2, 0, 1, 0, 1, 3, 1, 3, 3] , [0, 1, 0, 3, 0, 2, 0, 2, 3, 1, 3, 1] , [0, 1, 0, 3, 0, 3, 0, 1, 1, 2, 3, 2] , [0, 2, 0, 3, 0, 3, 0, 1, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 3, 0, 2, 1, 3, 2, 1]] \$

$$[0, y_1, y_2, y_3, 0, y_4, y_{10}, y_6, y_7, y_8, y_9, y_5]$$

800 . Coloring, {3, 4, 6, 8, 10}

R: [7, 7, 8, 7, A, 3, B, B, B, 2, 1, 5]

B: [6, 8, 7, 6, 3, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 4, 1, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_1, y_2, 2y_4 - y_5, 0, 4y_4 - 2y_5, 0, y_3, y_4, 0, y_5, y_6, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 4
See Matrix

$$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 0, 4], [0, 0, 0, 0, 0, 2, 1, 0, 4, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[0, 0, y_5, 2y_5, 0, 2y_4, y_4, y_5, y_3, y_2, 0, y_1]$$

$$p' = s^4 - s^6 \quad p' = s^5 - s^7 \quad p = s^4 - s^8$$

801 . Coloring, {3, 4, 6, 8, 11}

R: [7, 7, 8, 7, A, 3, B, B, B, C, 4, 5]

B: [6, 8, 7, 6, 3, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3
See Matrix

$$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 4, 2], [0, 0, 0, 4, 2, 0, 2, 1, 0, 2, 4, 1], [0, 0, 0, 4, 1, 0, 4, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 2, 4, 1], [0, 0, 0, 4, 1, 0, 4, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 2, 4, 1]] \$$$

$$[0, 0, -2y_1 + 9y_2 + 9y_3 - 11y_5 - 2y_4, 2y_1, -2y_2 - 2y_3 + 2y_5 + 2y_4, 0, 2y_2, 2y_3, 0, 7y_2 + 7y_3 - 9y_5 - 2y_4, 2y_4, 2y_5]$$

$$p' = s^3 - s^6 \quad p' = s^4 - s^7 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 6
See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 0, 2], [0, 3, 0, 0, 0, 2, 1, 2, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 0, 3, 3, 3, 0, 4], [0, 3, 0, 0, 0, 0, 3, 4, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 3, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]] \$$$

0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[2y_2, y_1, y_2, 0, 0, 2y_3, y_3, y_7, y_4, y_5, 0, y_6]$$

$$p = -s^6 + s^8 \quad p' = -s^6 + s^8$$

802 . Coloring, {3, 4, 6, 8, 12}

R: [7, 7, 8, 7, A, 3, B, B, B, C, 1, 9]

B: [6, 8, 7, 6, 3, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 4, 2], [4, 0, 0, 0, 0, 0, 2, 1, 2, 0, 6, 1], [6, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_1, 0, y_4, 0, 0, 0, y_2, -y_4 + y_6, y_3, y_4, y_5, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 2, 1, 2, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 2, 3, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 2, 3, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 1, 3, 0, 2, 0, 3], [0, 2, 3, 0, 3, 0, 2, 2, 0, 1, 0, 3], [0, 1, 3, 0, 3, 0, 3, 2, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 3, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 3, 2, 0, 3, 0, 1]] \$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_7, 0, y_8, 0, y_9]$$

803 . Coloring, {3, 4, 6, 9, 10}

R: [7, 7, 8, 7, A, 3, B, C, C, 2, 1, 5]
B: [6, 8, 7, 6, 3, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 9
 See Matrix

\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 2, 2] , [2, 1, 0, 0, 2, 0, 4, 1, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 3, 0, 0, 2, 4, 1] , [4, 2, 0, 0, 1, 0, 5, 0, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 0, 6, 0, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$

[y₃, y₂, y₁, 0, y₉, 0, y₈, y₇, 0, y₆, y₅, y₄]

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6
 See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 2, 1, 0, 2, 3, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2, 3] , [0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 3, 2] , [0, 0, 0, 3, 0, 3, 0, 0, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 3, 0, 0, 3, 3, 2, 2] , [0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2, 3]] \$

[0, 0, y₄, y₁, 0, y₂, y₃, y₄, y₅, y₆, y₇, y₈]

$$p = -s^3 + s^9$$

804 . Coloring, {3, 4, 6, 9, 11}

R: [7, 7, 8, 7, A, 3, B, C, C, C, 4, 5]
B: [6, 8, 7, 6, 3, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 2, 4], [0, 0, 0, 2, 4, 0, 2, 1, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 2, 0, 0, 4, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 2, 0, 0, 4, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 3, 2]] \$$

$[0, 0, 2y_1, 4y_1 + 4y_5 + 3y_2 + 3y_3 - 7y_4, 2y_5, 0, 10y_1 + 10y_5 + 4y_2 + 4y_3 - 16y_4, 2y_2, 0, 2y_3, 2y_4, 16y_1 + 16y_5 + 7y_2 + 7y_3 - 27y_4]$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 2, 0], [2, 3, 0, 0, 0, 2, 1, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 0, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 0, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 2, 0, 3, 0, 3, 3, 0], [3, 3, 0, 0, 0, 3, 0, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 0, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 0, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 0, 3, 0, 3, 2, 0]] \$$

$[y_8, y_7, y_6, 0, 0, y_4, y_5, y_3, 2y_6, y_2, y_1, 0]$

$$p = -s^3 + s^9$$

805 . Coloring, {3, 4, 6, 9, 12}

R: [7, 7, 8, 7, A, 3, B, C, C, C, 1, 9]

B: [6, 8, 7, 6, 3, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 1, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 5] , [2, 0, 0, 0, 0, 0, 3, 0, 5, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 5] , [3, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 5] , [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 3, 4]] \$

$$[7y_1, 0, 7y_3, 0, 0, 0, 7y_6, 7y_5, 7y_4, 7y_3, 7y_2, 9y_1 - 14y_3 + 9y_6 - 7y_5 - 7y_4 + 9y_2]$$

$$p' = s^3 + s^4 - s^6 - s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 2, 1, 2, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 2, 2, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 1, 0, 3, 0, 4, 3, 0] , [0, 4, 0, 3, 0, 2, 0, 3, 0, 1, 3, 0] , [0, 1, 0, 3, 0, 3, 0, 4, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 0, 1, 0, 3, 4, 0] , [0, 3, 0, 4, 0, 3, 0, 2, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 4, 0, 3, 0, 3, 2, 0]] \$

$$[0, y_2, y_1, y_8, y_7, y_6, y_5, y_4, 0, y_3, y_9, 0]$$

806 . Coloring, {3, 4, 6, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, B, C, B, 2, 4, 5]

B: [6, 8, 7, 6, 3, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 9

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 3, 1] , [0, 1, 0, 3, 1, 0, 4, 1, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 4, 0, 0, 1, 4, 1] , [0, 1, 0, 4, 1, 0, 5, 0, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 5, 0, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, y_8, y_9, y_7, y_6, 0, y_5, y_4, 0, y_3, y_1, y_2]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 2, 1, 0, 3, 3, 1, 5] , [1, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0] , [0, 0, 9, 0, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$[y_1, 0, y_3, 0, 0, y_5, y_7, y_3, y_2, y_4, y_7, y_6]$

$$p = s^6 - s^8 \quad p' = s^6 - s^8$$

807 . Coloring, {3, 4, 6, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, B, C, B, 2, 1, 9]

B: [6, 8, 7, 6, 3, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 0, 4, 1, 1, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$[y_1, y_4 + y_7, y_4, 0, 0, 0, y_2, y_7, y_3, y_4, y_5, y_6]$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 2, 1, 0, 0, 3, 1, 3] , [0, 0, 3, 1, 3, 1, 2, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 1, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3]] \$

$$[0, 0, y_5, y_4, y_2, y_3, y_1, y_9, 0, y_8, y_6, y_7]$$

808 . Coloring, {3, 4, 6, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, B, C, B, C, 4, 9]

B: [6, 8, 7, 6, 3, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 3, 3], [0, 0, 0, 3, 0, 0, 2, 1, 3, 0, 5, 2], [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[0, 0, y_6, y_2, 0, 0, y_1, y_3, y_7, y_6, y_5, y_4]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 1, 1], [1, 3, 2, 0, 1, 2, 1, 2, 0, 3, 1, 0], [1, 3, 1, 0, 0, 1, 2, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 1, 1, 3, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 0, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 0, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 0, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 3, 0, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 0, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 0, 3, 0, 3, 3, 0], [3, 3, 0, 0, 0, 3, 0, 3, 0, 3, 2, 0]] \$$$

$$[y_2, y_2 + y_1 - y_3 - y_4 - y_5 + y_6 + y_9 - y_7 + y_8, y_1, 0, y_3, y_4, y_5, y_6, 0, y_9, y_7, y_8]$$

$$p = -s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

809 . Coloring, {3, 4, 7, 8, 9}

R: [7, 7, 8, 7, A, A, A, B, C, C, 1, 5]

B: [6, 8, 7, 6, 3, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 0, 3, 1, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 0, 2, 0, 0, 5, 1, 4] , [1, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

[$y_1, 0, 0, 0, y_2, 0, y_3, y_4, 0, y_6, y_5, y_7$]

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 1, 1, 2, 0, 3, 1] , [0, 0, 2, 3, 0, 2, 2, 2, 1, 0, 3, 1] , [0, 0, 2, 3, 0, 3, 2, 0, 1, 0, 3, 2] , [0, 0, 3, 3, 0, 3, 2, 0, 2, 0, 3, 0] , [0, 0, 3, 3, 0, 3, 3, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 3, 3, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 4, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 3, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 3, 4, 0, 0, 0, 3, 0]] \$

[0, $y_1, y_3, y_2, 0, y_6, y_7, y_5, y_4, 0, y_8, y_9$]

810 . Coloring, {3, 4, 7, 8, 10}

$\Omega p(\Delta)=0: p = s^3 - 2s^4 - 8s^6 + 32s^8$

R: [7, 7, 8, 7, A, A, A, B, B, 2, 1, 5]

B: [6, 8, 7, 6, 3, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 4, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[y_2, y_1, 0, 0, 2y_5, 0, y_6, y_5, 0, y_4, y_3, 0]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 0, 2, 4] , [0, 0, 2, 2, 0, 2, 2, 0, 4, 0, 1, 3] , [0, 0, 2, 1, 0, 2, 2, 0, 3, 0, 2, 4] , [0, 0, 2, 2, 0, 1, 2, 0, 4, 0, 2, 3] , [0, 0, 1, 2, 0, 2, 2, 0, 3, 0, 2, 4] , [0, 0, 2, 2, 0, 2, 1, 0, 4, 0, 2, 3] , [0, 0, 2, 2, 0, 2, 2, 0, 3, 0, 1, 4] , [0, 0, 2, 1, 0, 2, 2, 0, 4, 0, 2, 3]] \$

$$[0, 0, 7y_4, 7y_3, 0, 7y_2, -7y_4 - 7y_3 - 7y_2 + 9y_1 + 9y_7 - 7y_6 + 9y_5, 7y_1, 7y_7, 0, 7y_6, 7y_5]$$

$$p = s^2 + s^3 - s^7 - s^8$$

811 . Coloring, {3, 4, 7, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, A, B, B, C, 4, 5]

B: [6, 8, 7, 6, 3, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 0, 2, 0, 0, 5, 1, 4] , [0, 0, 0, 1, 4, 0, 2, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

[0, 0, 0, y₁, y₂, 0, y₃, y₄, 0, y₅, y₆, y₇]

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 0, 2, 2] , [2, 0, 2, 0, 0, 2, 2, 2, 2, 0, 1, 3] , [1, 0, 2, 0, 0, 2, 2, 0, 3, 0, 2, 4] , [2, 0, 2, 0, 0, 1, 2, 0, 4, 0, 2, 3] , [2, 0, 1, 0, 0, 2, 2, 0, 3, 0, 2, 4] , [2, 0, 2, 0, 0, 2, 1, 0, 4, 0, 2, 3] , [2, 0, 2, 0, 0, 2, 2, 0, 3, 0, 1, 4] , [1, 0, 2, 0, 0, 2, 2, 0, 4, 0, 2, 3] , [2, 0, 2, 0, 0, 1, 2, 0, 3, 0, 2, 4]] \$

[9 y₁ - 7 y₂ - 7 y₆ - 7 y₇ + 9 y₈ + 9 y₅ - 7 y₄ + 9 y₃, 7 y₁, 7 y₂, 0, 0, 7 y₆, 7 y₇, 7 y₈, 7 y₅, 0, 7 y₄, 7 y₃]

$$p = -s^3 - s^4 + s^8 + s^9$$

812 . Coloring, {3, 4, 7, 8, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, A, B, B, C, 1, 9]

B: [6, 8, 7, 6, 3, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 0, 2, 3, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 2, 2, 3] , [2, 0, 0, 0, 0, 3, 0, 3, 2, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 0, 2, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 2, 2, 3] , [2, 0, 0, 0, 0, 0, 3, 0, 3, 4, 2, 2]] \$

$$[y_2, 0, 0, 0, 0, 0, y_1, y_7, y_6, y_5, y_4, y_3]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 0, 2, 2], [0, 0, 4, 2, 2, 2, 2, 2, 0, 0, 1, 1], [0, 0, 4, 1, 1, 2, 4, 0, 0, 0, 2, 2], [0, 0, 3, 2, 2, 1, 4, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 3, 4, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0]] \$$$

$$[0, y_5, y_4, y_3, y_2, y_1, y_9, y_8, 0, 0, y_7, y_6]$$

813 . Coloring, {3, 4, 7, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, A, C, C, 2, 1, 5]

B: [6, 8, 7, 6, 3, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 4, 0, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$$

$$[2y_2, y_1, 0, 0, y_5, 0, y_6, y_2, 0, y_3, 0, y_4]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 0, 4, 2], [0, 0, 2, 4, 0, 2, 2, 0, 2, 0, 4, 0], [0, 0, 2, 4, 0, 4, 2, 0, 0, 0, 4, 0], [0, 0, 4, 4, 0, 4, 2, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 4, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 2, 0, 0, 0, 4, 0]] \$$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, 2y_5]$$

$$p = -s^3 + s^8$$

814 . Coloring, {3, 4, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, A, C, C, C, 4, 5]

B: [6, 8, 7, 6, 3, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$$

$$[0, 0, 0, 2y_4, y_5, 0, y_3, y_4, 0, y_2, 0, y_1]$$

$$p = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 0, 4, 0], [4, 0, 2, 0, 0, 2, 2, 2, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 2, 0, 0, 0, 4, 0], [4, 0, 4, 0, 0, 4, 2, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 4, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 2, 4, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 4, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 2, 0, 0, 0, 4, 0]] \$$$

$$[y_1, y_3, y_2, 0, 0, y_5, y_6, y_7, y_3, 0, y_4, 0]$$

$$p = -s^3 + s^8$$

815 . Coloring, {3, 4, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, A, C, C, C, 1, 9]

B: [6, 8, 7, 6, 3, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 4, 0, 4], [0, 0, 0, 0, 0, 0, 2, 0, 4, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[2 y_3, 0, 0, 0, 0, 0, y_4, y_3, y_2, y_1, 0, y_5]$$

$$p = s^4 - s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 0, 4, 0], [0, 0, 4, 4, 0, 2, 2, 2, 0, 0, 2, 0], [0, 0, 2, 2, 0, 4, 4, 0, 0, 0, 4, 0], [0, 0, 4, 4, 0, 2, 2, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 4, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 2, 0, 0, 0, 4, 0], [0, 0, 4, 4, 0, 2, 4, 0, 0, 0, 2, 0], [0, 0, 2, 2, 0, 4, 4, 0, 0, 0, 4, 0]] \$$$

$$[0, y_5, y_1, y_2, y_5, y_3, y_4, y_6, 0, 0, y_7, 0]$$

$$p = -s^3 + s^8$$

816 . Coloring, {3, 4, 7, 10, 11}

R: [7, 7, 8, 7, A, A, A, C, B, 2, 4, 5]

B: [6, 8, 7, 6, 3, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 4, 1, 1], [0, 4, 0, 1, 1, 0, 4, 0, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$

$$[0, y_5, 0, y_6, y_1, 0, y_2, y_3, 0, y_4, y_3, y_6 - y_3]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 0, 3, 3], [3, 0, 2, 0, 0, 2, 2, 0, 3, 0, 2, 2], [2, 0, 2, 0, 0, 3, 2, 0, 2, 0, 2, 3], [2, 0, 3, 0, 0, 2, 2, 0, 3, 0, 2, 2], [2, 0, 2, 0, 0, 2, 3, 0, 2, 0, 2, 3], [2, 0, 2, 0, 0, 2, 2, 0, 3, 0, 3, 2], [3, 0, 2, 0, 0, 2, 2, 0, 2, 0, 2, 3], [2, 0, 2, 0, 0, 3, 2, 0, 3, 0, 2, 2]] \$$

$$[5y_5, 0, 5y_4, 0, 0, 5y_3, 5y_2, -5y_5 - 5y_4 - 5y_3 - 5y_2 + 11y_1 - 5y_7 + 11y_6, 5y_1, 0, 5y_7, 5y_6]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

817 . Coloring, $\{3, 4, 7, 10, 12\}$

R: [7, 7, 8, 7, A, A, A, C, B, 2, 1, 9]

B: [6, 8, 7, 6, 3, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 4, 0, 1, 3, 2, 1], [2, 3, 0, 0, 0, 0, 5, 0, 1, 4, 1, 0], [1, 4, 0, 0, 0, 0, 5, 0, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$

$[y_1, y_2, 0, 0, 0, 0, y_3, y_4, y_5, y_8, y_6, y_7]$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 0, 3, 3], [0, 0, 4, 3, 3, 2, 2, 0, 0, 0, 2, 0], [0, 0, 5, 2, 0, 3, 4, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 2, 5, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 3, 0, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 2, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 5, 2, 0, 0, 0, 2, 0], [0, 0, 5, 2, 0, 3, 4, 0, 0, 0, 2, 0]] \$$

$[0, 0, y_5, y_6, y_1, y_2, y_3, y_4, 0, 0, y_7, 3 y_4]$

$$p = -s^3 + s^8$$

818 . Coloring, $\{3, 4, 7, 11, 12\}$

R: $[7, 7, 8, 7, A, A, A, C, B, C, 4, 9]$

B: $[6, 8, 7, 6, 3, 3, B, B, C, 2, 1, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 4, 1, 3], [0, 0, 0, 1, 0, 0, 2, 0, 3, 3, 2, 5], [0, 0, 0, 2, 0, 0, 1, 0, 5, 2, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 5, 2], [0, 0, 0, 5, 0, 0, 3, 0, 2, 2, 3, 1], [0, 0, 0, 3, 0, 0, 5, 0, 1, 3, 2, 2], [0, 0, 0, 2, 0, 0, 3, 0, 2, 5, 1, 3]] \$$

$$[0, 0, 0, y_1, 0, 0, y_2, y_3, y_4, y_6, y_5, y_7]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 0, 3, 1], [3, 0, 4, 0, 1, 2, 2, 2, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0]] \$$$

$$[y_1, 2y_7, y_2, 0, y_3, y_4, y_5, 2y_3 - 3y_7, 0, 0, y_6, y_7]$$

$$p' = s^3 - s^8 \quad p = s^3 - s^8$$

819 . Coloring, {3, 4, 8, 9, 10}

R: [7, 7, 8, 7, A, A, B, B, C, 2, 1, 5]

B: [6, 8, 7, 6, 3, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 2, 3, 1], [3, 2, 0, 0, 1, 0, 4, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 5, 0, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[y_4, y_3, 0, 0, y_2, 0, y_1, y_7, 0, y_6, y_5, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 2, 1, 3], [0, 0, 2, 1, 0, 2, 2, 0, 3, 1, 2, 3], [0, 0, 2, 2, 0, 1, 2, 0, 3, 2, 3, 1], [0, 0, 1, 3, 0, 2, 2, 0, 1, 2, 3, 2], [0, 0, 2, 3, 0, 3, 1, 0, 2, 2, 1, 2], [0, 0, 3, 1, 0, 3, 2, 0, 2, 1, 2, 2], [0, 0, 3, 2, 0, 1, 3, 0, 2, 2, 2, 1], [0, 0, 1, 2, 0, 2, 3, 0, 1, 3, 2, 2], [0, 0, 2, 2, 0, 2, 1, 0, 2, 3, 1, 3]] \$$$

$$[0, 0, y_3, y_2, 0, y_1, y_8, y_9, y_7, y_5, y_6, y_4]$$

820 . Coloring, {3, 4, 8, 9, 11}

R: [7, 7, 8, 7, A, A, B, B, C, C, 4, 5]

B: [6, 8, 7, 6, 3, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	10 vs 10

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 3, 2, 2], [0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 3, 2, 2], [0, 0, 0, 2, 2, 0, 4, 0, 0, 2, 3, 3]] \$$$

$$[0, 0, 0, 16y_1 + 16y_2 - 27y_3 + 7y_4, 4y_1 + 4y_2 + 3y_4 - 7y_3, 0, 2y_1, 2y_2, 0, 10y_1 + 10y_2 - 16y_3 + 4y_4, 2y_4, 2y_3]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 2, 3, 6, 7, 8, 9, 10, 11, 12}} order: 10

See Matrix

$$\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 2, 1, 1], [1, 2, 2, 0, 0, 2, 2, 2, 1, 1, 2, 1], [2, 1, 2, 0, 0, 1, 2, 2, 1, 2, 1, 2], [1, 2, 1, 0, 0, 2, 2, 1, 2, 2, 1, 2], [1, 2, 2, 0, 0, 1, 1, 2, 2, 2, 2, 1], [2, 2, 1, 0, 0, 1, 2, 2, 1, 1, 2, 2], [2, 1, 1, 0, 0, 2, 1, 2, 2, 1, 2], [1, 2, 2, 0, 0, 2, 1, 1, 2, 1, 2, 2], [2, 1, 2, 0, 0, 1, 2, 2, 2, 1, 2, 1], [2, 1, 1, 0, 0, 2, 2, 1, 1, 2, 2, 2]] \$$$

$$[y_4, y_5, y_6, 0, 0, y_1, y_2, y_3, y_7, y_8, y_9, y_{10}]$$

821 . Coloring, {3, 4, 8, 9, 12}

R: [7, 7, 8, 7, A, A, B, B, C, C, 1, 9]

B: [6, 8, 7, 6, 3, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	10 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 0, 4, 4], [4, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 3], [2, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 2, 4], [2, 0, 0, 0, 0, 0, 4, 0, 4, 0, 3, 3]] \$$

$[-7 y_1 + 11 y_4 + 9 y_3 - 7 y_2 + 9 y_5, 0, 0, 0, 0, 0, 7 y_1, 7 y_4, 7 y_3, 14 y_4, 7 y_2, 7 y_5]$

$$p' = -s^2 - s^3 + s^5 + s^6 \quad p = -s^2 + s^4 + s^5 - s^7$$

Omega Rank for B : cycles: $\{\{2, 3, 5, 7, 8, 10, 12\}\}$ order: 7

See Matrix

$\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 2, 1, 1], [0, 2, 4, 1, 1, 2, 2, 2, 0, 1, 0, 1], [0, 1, 3, 0, 1, 1, 4, 2, 0, 2, 0, 2], [0, 2, 2, 0, 2, 3, 1, 0, 4, 0, 2], [0, 4, 2, 0, 2, 0, 2, 2, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 2, 4, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 2, 3, 0, 2, 0, 4], [0, 2, 2, 0, 4, 0, 1, 2, 0, 2, 0, 3], [0, 2, 4, 0, 3, 0, 2, 2, 0, 1, 0, 2], [0, 1, 3, 0, 2, 0, 4, 2, 0, 2, 0, 2]] \$$

$[0, y_2, y_1, y_6, y_7, y_5, y_3, y_4, 0, y_9, y_{10}, y_8]$

822 . Coloring, $\{3, 4, 8, 10, 11\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, B, B, B, 2, 4, 5]

B: [6, 8, 7, 6, 3, 3, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 4, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[0, y_1, 0, y_2, 2y_4, 0, y_3, y_4, 0, y_5, y_6, 0]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 2, 0, 4] , [0, 0, 2, 0, 0, 2, 2, 0, 4, 1, 0, 5] , [0, 0, 2, 0, 0, 0, 2, 0, 5, 2, 0, 5] , [0, 0, 0, 0, 0, 2, 0, 5, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[2y_2, 0, y_5, 0, 0, y_4, y_3, y_2, y_1, y_7, 0, y_6]$$

$$p = s^6 - s^8$$

823 . Coloring, {3, 4, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, B, B, B, 2, 1, 9]

B: [6, 8, 7, 6, 3, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 3

See Matrix

$\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$$[y_3, y_4, 0, 0, 0, 0, y_1, y_2, 2y_2, 2y_2, y_5, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 2, 2, 0, 0, 1, 0, 3] , [0, 0, 6, 0, 3, 0, 4, 0, 0, 2, 0, 1] , [0, 0, 3, 0, 1, 0, 6, 0, 0, 4, 0, 2] , [0, 0, 1, 0, 2, 0, 3, 0, 0, 6, 0, 4] , [0, 0, 2, 0, 4, 0, 1, 0, 0, 3, 0, 6] , [0, 0, 4, 0, 6, 0, 2, 0, 0, 1, 0, 3] , [0, 0, 6, 0, 3, 0, 4, 0, 0, 2, 0, 1]] \$$

$$[0, 0, y_7, 2y_3, y_6, y_5, y_4, y_3, 0, y_2, 0, y_1]$$

$$p = s^3 - s^8$$

824 . Coloring, $\{3, 4, 8, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, B, B, B, C, 4, 9]

B: [6, 8, 7, 6, 3, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 4, 0, 2, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$$[0, 0, 0, y_6, 0, 0, y_5, y_4, y_3, 2y_4, y_2, y_1]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

$$\begin{aligned} \$ [& [2, 2, 2, 0, 2, 2, 1, 1, 0, 2, 0, 2], [0, 2, 4, 0, 2, 2, 2, 2, 0, 1, 0, 1], [0, 1, 4, 0, 1, 0, 4, 2, 0, 2, 0, 2], [0, 2, \\ & 1, 0, 2, 0, 4, 1, 0, 4, 0, 2], [0, 4, 2, 0, 2, 0, 1, 2, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 2, 4, 0, 1, 0, 2], [0, 1, 1, 0, 2, 0, \\ & 2, 4, 0, 2, 0, 4], [0, 2, 2, 0, 4, 0, 1, 1, 0, 2, 0, 4], [0, 2, 4, 0, 4, 0, 2, 2, 0, 1, 0, 1]] \$ \end{aligned}$$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, 0, y_9]$$

825 . Coloring, {3, 4, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, B, C, C, 2, 4, 5]

B: [6, 8, 7, 6, 3, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 2, 0, 2, 2, 0, 3, 1, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 4, 0, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 4, 0, 0, 2, 4, 0], [0, 2, \\ & 0, 4, 0, 0, 5, 0, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, \\ & 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$ \end{aligned}$$

$$[0, y_3, 0, y_1, y_2, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [2, 0, 2, 0, 0, 2, 1, 1, 2, 2, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 1, 3, 2], [3, 0, 2, 0, 0, 2, 2, 0, 2, 2, 2, 1], [2, 0, \\ & 2, 0, 0, 3, 2, 0, 1, 2, 2, 2], [2, 0, 3, 0, 0, 2, 2, 0, 2, 2, 1, 2], [1, 0, 2, 0, 0, 2, 3, 0, 2, 2, 2, 2], [2, 0, 2, 0, 0, 1, \\ & 2, 0, 2, 3, 2, 2], [2, 0, 1, 0, 0, 2, 2, 0, 2, 2, 2, 3], [2, 0, 2, 0, 0, 2, 1, 0, 3, 2, 2, 2]] \$ \end{aligned}$$

$$[y_5, 0, y_4, 0, 0, y_2, y_3, y_1, y_8, y_9, y_7, y_6]$$

826 . Coloring, {3, 4, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, B, C, C, 2, 1, 9]

B: [6, 8, 7, 6, 3, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 2, 2, 2], [2, 2, 0, 0, 0, 0, 4, 0, 2, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 3], [4, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 3]] \$$$

$$[y_1, y_2, 0, 0, 0, 0, y_3, 5y_1 + 5y_2 + 5y_3 - 11y_4 + 5y_5 - 11y_6, y_4, 10y_1 + 10y_2 + 10y_3 - 22y_4 + 10y_5 - 22y_6, y_5, y_6]$$

$$p = s^3 - s^5 - s^6 + s^8 \quad p = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 2, 2, 2], [0, 0, 4, 2, 2, 2, 2, 0, 0, 1, 1, 2], [0, 0, 4, 1, 2, 2, 4, 0, 0, 2, 0, 1], [0, 0, 4, 0, 1, 1, 4, 0, 0, 4, 0, 2], [0, 0, 2, 0, 2, 0, 4, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0, 2, 0, 0, 4, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 4, 0, 0, 2, 0, 2], [0, 0, 4, 0, 2, 0, 4, 0, 0, 4, 0, 2]] \$$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

827 . Coloring, {3, 4, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, B, C, C, C, 4, 9]

B: [6, 8, 7, 6, 3, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 3, 5] , [0, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2, 4]] \$

$$[0, 0, 0, 7y_1, 0, 0, 7y_3, 7y_4, 7y_5, 14y_4, 7y_2, 9y_1 + 9y_3 - 21y_4 - 7y_5 + 9y_2]$$

$$p = -s^2 - s^3 + s^5 + s^6 \quad p = s^2 - s^4 - s^5 + s^7$$

Omega Rank for B : cycles: {{1, 2, 3, 6, 7, 8, 10, 11}} order: 8

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 2, 2, 0] , [2, 2, 4, 0, 0, 2, 2, 2, 0, 1, 1, 0] , [1, 1, 2, 0, 0, 2, 4, 2, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 1, 2, 1, 0, 4, 2, 0] , [2, 4, 1, 0, 0, 2, 2, 2, 0, 2, 1, 0] , [1, 2, 2, 0, 0, 2, 1, 4, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 1, 2, 2, 0, 1, 4, 0] , [4, 1, 1, 0, 0, 2, 2, 2, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 4, 1, 1, 0, 2, 2, 0]] \$

$$[y_1, y_2, y_6, 0, y_7, y_8, y_9, y_5, 0, y_3, y_4, 0]$$

828 . Coloring, {3, 4, 10, 11, 12}

R: [7, 7, 8, 7, A, A, B, C, B, 2, 4, 9]

B: [6, 8, 7, 6, 3, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6
See Matrix

$\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 2, 3, 1], [0, 2, 0, 3, 0, 0, 4, 0, 1, 0, 5, 1], [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$$[0, 2 y_2, 0, y_1, 0, 0, y_6, y_5, y_4, 2 y_5, y_3, y_2]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
See Matrix

$\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 2, 1, 3], [1, 0, 4, 0, 3, 2, 2, 0, 0, 1, 1, 2], [1, 0, 5, 0, 2, 1, 4, 0, 0, 2, 0, 1], [0, 0, 3, 0, 1, 1, 5, 0, 0, 4, 0, 2], [0, 0, 2, 0, 2, 0, 3, 0, 0, 5, 0, 4], [0, 0, 2, 0, 4, 0, 2, 0, 0, 3, 0, 5], [0, 0, 4, 0, 5, 0, 2, 0, 0, 2, 0, 3], [0, 0, 5, 0, 3, 0, 4, 0, 0, 2, 0, 2], [0, 0, 3, 0, 2, 0, 5, 0, 0, 4, 0, 2]] \$$

$$[y_9, 0, y_8, 0, y_6, y_7, y_5, y_4, 0, y_3, y_1, y_2]$$

829 . Coloring, $\{3, 5, 6, 7, 8\}$

R: [7, 7, 8, 6, 3, 3, A, B, B, C, 1, 5]

B: [6, 8, 7, 7, A, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	5 vs 9

Omega Rank for R : cycles: $\{\{1, 3, 5, 7, 8, 10, 11, 12\}\}$ order: 8
See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 2, 2] , [2, 0, 3, 0, 2, 0, 2, 2, 0, 2, 1, 2] , [1, 0, 2, 0, 2, 0, 2, 3, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 0, 1, 2, 0, 2, 3, 2] , [3, 0, 2, 0, 2, 0, 2, 2, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 0, 3, 2, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 0, 2, 2, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 0, 2, 2, 0, 2, 2, 3] , [2, 0, 2, 0, 3, 0, 2, 1, 0, 2, 2, 2]] \$

$$[y_8, 0, y_7, 0, y_6, y_4, y_5, y_3, 0, y_2, y_1, y_8 - y_7 + y_6 + y_4 - y_5 + y_3 + y_2 - y_1]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 2, 2, 2, 1, 2, 3] , [0, 1, 0, 2, 0, 0, 2, 2, 3, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 1, 4, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5]] \$

$$[0, 2y_3, 0, 2y_5, 0, -2y_3 + 5y_5 - 2y_4, 2y_5, 2y_2, 5y_5 - 2y_2 - 2y_1, 2y_1, 2y_5, 2y_4]$$

$$p' = s^7 - s^8 \quad p = s^5 - s^9 \quad p' = s^6 - s^8 \quad p' = s^5 - s^8$$

830 . Coloring, {3, 5, 6, 7, 9}

R: [7, 7, 8, 6, 3, 3, A, C, C, C, 1, 5]

B: [6, 8, 7, 7, A, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 2, 2, 0, 2, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 3, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5]] \$

$$[2y_3, 0, y_6, 0, y_5, y_3, y_4, y_2, 0, y_1, 0, -y_6 + y_5 + 3y_3 - y_4 + y_2 + y_1]$$

$$p = -s^4 + s^8 \quad p = -s^4 + s^5 - s^6 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6
See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 4, 2, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 5, 1, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$$$

$$[0, y_1, 0, y_2, 0, y_3, y_4, y_5, 2y_3, y_7, y_6, 0]$$

$$p = s^5 - s^8$$

831 . Coloring, {3, 5, 6, 7, 10}

R: [7, 7, 8, 6, 3, 3, A, C, B, 2, 1, 5]
B: [6, 8, 7, 7, A, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	5 vs 8

Omega Rank for R : cycles: {{2, 7, 10}, {3, 5, 8, 12}} order: 12
See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 1, 1], [1, 2, 3, 0, 1, 0, 4, 2, 0, 2, 0, 1], [0, 2, 1, 0, 1, 0, 3, 3, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 2, 1, 0, 3, 0, 3], [0, 3, 2, 0, 3, 0, 4, 1, 0, 2, 0, 1], [0, 2, 3, 0, 1, 0, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 2, 3, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 4, 1, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 3, 1, 0, 4, 0, 1], [0, 4, 3, 0, 1, 0, 2, 2, 0, 3, 0, 1]] \$$$

$$[2y_8, 2y_6, 2y_7, 0, 2y_5, 7y_8 + 7y_6 - 9y_7 - 9y_5 + 7y_4 - 9y_3 + 7y_2 - 9y_1, 2y_4, 2y_3, 0, 2y_2, 7y_8 + 7y_6 - 9y_7 - 9y_5 + 7y_4 - 9y_3 + 7y_2 - 9y_1, 2y_1]$$

$$p = s^3 + s^4 + s^5 - s^7 - s^8 - s^9 \quad p = s^3 - s^6 - s^7 + s^{10}$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6
See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4]] \$

$$[0, 0, 0, -y_1 + y_2 - y_4 + 2y_5, 0, y_2, y_1, y_2, y_2 - y_3 + y_5, y_3, y_4, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p'' = -s^3 + s^6$$

832 . Coloring, {3, 5, 6, 7, 11}

R: [7, 7, 8, 6, 3, 3, A, C, B, C, 4, 5]

B: [6, 8, 7, 7, A, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 2, 0, 2, 0, 2, 0, 3] , [0, 0, 5, 0, 3, 1, 0, 3, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5]] \$

$$[0, 0, y_1, y_2, y_3, y_4, 2y_6, y_5, 0, 2y_2 - 2y_6, y_6, y_7]$$

$$p' = s^4 - s^8 \quad p = s^4 - s^8$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 0, 2, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 3, 0, 2, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 3, 0, 1, 1, 3, 2, 2] , [2, 3, 0, 0, 0, 2, 0, 2, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 1, 0, 3, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 0, 2, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 3, 0, 2, 2, 2, 2, 1]] \$

$$[-3y_5 - 3y_4 + 8y_3 - 3y_2 + 5y_1, 3y_7, 0, 0, 0, 3y_6, 3y_5, 3y_4, 3y_3, 3y_2, -3y_7 - 3y_6 + 5y_3 + 8y_1, 3y_1]$$

$$p' = s^2 - s^8 \quad p = s^2 - s^8$$

833 . Coloring, {3, 5, 6, 7, 12}

R: [7, 7, 8, 6, 3, 3, A, C, B, C, 1, 9]

B: [6, 8, 7, 7, A, A, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 1, 3] , [1, 0, 1, 0, 0, 0, 2, 2, 3, 2, 2, 3] , [2, 0, 0, 0, 0, 0, 1, 1, 3, 2, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 1, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 2, 4, 1] , [4, 0, 0, 0, 0, 0, 3, 0, 1, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 4, 2, 3] , [2, 0, 0, 0, 0, 0, 1, 0, 3, 3, 3, 4]] \$

$$[y_8 - y_7 + y_6 - y_5 - y_4 - y_3 + y_2 + y_1, 0, y_8, 0, 0, y_7, y_6, y_5, y_4, y_3, y_2, y_1]$$

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 2, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 3, 2, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 3, 3, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, y_1, 0, y_2, y_3, y_8, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^6 + s^9$$

834 . Coloring, {3, 5, 6, 8, 9}

R: [7, 7, 8, 6, 3, 3, B, B, C, C, 1, 5]

B: [6, 8, 7, 7, A, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 3, 3], [3, 0, 3, 0, 3, 0, 2, 2, 0, 0, 3, 0], [3, 0, 3, 0, 0, 0, 3, 3, 0, 0, 4, 0], [4, 0, 0, 0, 0, 3, 3, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$$

$[y_2, 0, y_1, 0, y_5, y_3, y_4, y_7, 0, 0, y_6, 3 y_3]$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{2, 4, 7, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 2, 2, 1, 3, 2, 1], [0, 3, 0, 2, 0, 0, 1, 4, 1, 2, 1, 2], [0, 2, 0, 1, 0, 0, 2, 3, 2, 1, 1, 4], [0, 1, 0, 1, 0, 0, 1, 2, 4, 2, 2, 3], [0, 2, 0, 2, 0, 0, 1, 1, 3, 1, 4, 2], [0, 1, 0, 4, 0, 0, 2, 2, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 4, 1, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 3, 1, 2, 4, 1, 1]] \$$

$[0, y_9, 0, y_8, 0, y_7, y_5, y_6, y_4, y_2, y_3, y_1]$

835 . Coloring, $\{3, 5, 6, 8, 10\}$

R: [7, 7, 8, 6, 3, 3, B, B, B, 2, 1, 5]

B: [6, 8, 7, 7, A, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 0, 4, 2, 0, 0, 3, 0] , [3, 0, 0, 0, 0, 0, 4, 3, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 3, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 6, 0, 0, 0, 3, 0] , [3, 0, 0, 0, 0, 0, 7, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 3, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 6, 0, 0, 0, 3, 0]] \$

$$[y_3, 2y_1, y_2, 0, 2y_1, y_1, y_6, y_5, 0, 0, y_4, 0]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 0, 4, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, 0, 2y_2, 0, y_2, y_1, y_2, y_3, y_4, 0, y_5]$$

$$p = s^4 - s^6 \quad p' = -s^4 + s^6$$

836 . Coloring, {3, 5, 6, 8, 11}

R: [7, 7, 8, 6, 3, 3, B, B, B, C, 4, 5]

B: [6, 8, 7, 7, A, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 4, 2] , [0, 0, 3, 4, 2, 2, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 0, 3, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 3, 0, 4, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 2, 0, 4, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 3, 0, 3, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 0, 3, 0, 0, 2, 0]] \$

$$[0, 0, y_7, y_6, y_5, y_4, y_3, y_2, 0, 0, y_1, y_3]$$

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 0, 2], [0, 4, 0, 0, 0, 2, 0, 2, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 0, 4, 3, 2, 0, 4], [0, 2, 0, 0, 0, 0, 0, 3, 4, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[y_3, y_1, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, 0, y_7]$$

$$p = -s^6 + s^8$$

837 . Coloring, {3, 5, 6, 8, 12}

R: [7, 7, 8, 6, 3, 3, B, B, B, C, 1, 9]

B: [6, 8, 7, 7, A, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 4, 2], [4, 0, 1, 0, 0, 0, 2, 2, 2, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[y_5, 0, y_4, 0, 0, y_3, y_2, y_1, 2y_4 - 2y_3, 0, y_6, 2y_3]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 2, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 5, 0, 1, 0, 4] , [0, 1, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 1, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2]] \$

$$[0, y_1, 0, 2y_5, y_2, y_5, y_3, y_4, 0, y_6, 0, y_7]$$

$$p = -s^3 + s^8$$

838 . Coloring, {3, 5, 6, 9, 10}

R: [7, 7, 8, 6, 3, 3, B, C, C, 2, 1, 5]

B: [6, 8, 7, 7, A, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 0, 4, 2, 0, 0, 2, 1] , [2, 0, 2, 0, 1, 0, 2, 3, 0, 0, 4, 2] , [4, 0, 1, 0, 2, 0, 2, 2, 0, 0, 2, 3] , [2, 0, 2, 0, 3, 0, 4, 1, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 0, 2, 2, 0, 0, 4, 1] , [4, 0, 2, 0, 1, 0, 2, 3, 0, 0, 2, 2] , [2, 0, 1, 0, 2, 0, 4, 2, 0, 0, 2, 3] , [2, 0, 2, 0, 3, 0, 2, 1, 0, 0, 4, 2]] \$

$$[y_4, 2y_1, y_3, 0, y_2, y_1, -y_4 + 2y_3 - 2y_1 - y_6 + 2y_5, y_3 - y_2 - y_1 + y_5, 0, 0, y_6, y_5]$$

$$p = -s^2 - s^3 + 2s^6 + s^8 - s^9 \quad p' = -s^3 - s^5 + s^6 + s^8 \quad p = -s^2 + s^5 + s^6 - s^9$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 0, 2, 3, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 2, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 2, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 0, 2, 3, 3, 4]] \$

$$[0, 0, 0, y_1, 0, y_3, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^2 + s^8$$

839 . Coloring, {3, 5, 6, 9, 11}

R: [7, 7, 8, 6, 3, 3, B, C, C, C, 4, 5]

B: [6, 8, 7, 7, A, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 2, 4] , [0, 0, 3, 2, 4, 2, 0, 2, 0, 0, 2, 1] , [0, 0, 6, 2, 1, 2, 0, 3, 0, 0, 0, 2] , [0, 0, 3, 0, 2, 2, 0, 6, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 3, 0, 0, 0, 6] , [0, 0, 3, 0, 6, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 6, 0, 0, 0, 3]] \$

[0, 0, y_1 , y_3 , y_4 , y_2 , y_5 , y_6 , 0, 0, y_7 , y_8]

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 0, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 0, 3, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 2, 0, 3, 3, 0]] \$

[y_1 , y_2 , 0, 0, 0, y_3 , y_5 , y_4 , y_5 , y_6 , y_7 , 0]

$$p = -s^2 + s^8$$

840 . Coloring, {3, 5, 6, 9, 12}

R: [7, 7, 8, 6, 3, 3, B, C, C, C, 1, 9]

B: [6, 8, 7, 7, A, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 2, 4], [2, 0, 1, 0, 0, 0, 2, 2, 4, 0, 2, 3], [2, 0, 0, 0, 0, 0, 2, 1, 3, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4]] \$$

$$[y_5, 0, y_1, 0, 0, 5y_5 - y_1 - y_4 - y_3 - y_2, y_5, y_4, y_3, 0, y_5, y_2]$$

$$p' = -s^5 + s^7 \quad p' = s^4 - s^6 \quad p = s^4 - s^6$$

Omega Rank for B : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 2, 4, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 1, 5, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 4, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 5, 1, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 2, 0, 5, 1, 0]] \$$

$$[0, y_1, 0, y_2, 2y_3, y_3, y_6, y_4, 0, y_5, y_7, 0]$$

$$p = -s^2 + s^8$$

841 . Coloring, $\{3, 5, 6, 10, 11\}$

R: [7, 7, 8, 6, 3, 3, B, C, B, 2, 4, 5]

B: [6, 8, 7, 7, A, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 3, 1] , [0, 0, 3, 3, 1, 2, 2, 2, 0, 0, 2, 1] , [0, 0, 3, 2, 1, 3, 0, 3, 0, 0, 2, 2] , [0, 0, 4, 2, 2, 2, 0, 3, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 2, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3]] \$

[0, y₃, y₁, y₂, y₄, y₅, y₆, y₇, 0, 0, y₈, y₉]

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 1, 6] , [1, 0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[y₁, 0, 0, 0, 0, y₂, 2 y₃, y₃, y₄, y₆, y₅, y₇]

$$p = -s^6 + s^8$$

842 . Coloring, {3, 5, 6, 10, 12}

R: [7, 7, 8, 6, 3, 3, B, C, B, 2, 1, 9]

B: [6, 8, 7, 7, A, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 3, 1] , [3, 0, 1, 0, 0, 0, 4, 2, 1, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 3, 1, 1, 0, 5, 2] , [5, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[y_1, 2y_5, y_6, 0, 0, y_5, y_4, y_2, y_3, 0, y_7, y_8]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 1, 3], [0, 0, 0, 1, 3, 0, 2, 0, 0, 5, 1, 4], [0, 0, 0, 1, 4, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$$

$$[0, 0, 0, y_1, y_2, y_3, y_6, y_3, 0, y_4, y_5, y_7]$$

$$p = -s^5 + s^8$$

843 . Coloring, {3, 5, 6, 11, 12}

R: [7, 7, 8, 6, 3, 3, B, C, B, C, 4, 9]

B: [6, 8, 7, 7, A, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

$$\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 3, 3], [0, 0, 1, 3, 0, 2, 0, 2, 3, 0, 4, 1], [0, 0, 2, 4, 0, 3, 0, 1, 1, 0, 3, 2], [0, 0, 3, 3, 0, 4, 0, 2, 2, 0, 1, 1], [0, 0, 4, 1, 0, 3, 0, 3, 1, 0, 2, 2], [0, 0, 3, 2, 0, 1, 0, 4, 2, 0, 1, 3], [0, 0, 1, 1, 0, 2, 0, 3, 3, 0, 2, 4], [0, 0, 2, 2, 0, 1, 0, 1, 4, 0, 3, 3]] \$$$

$$[0, 0, y_8, y_4, 0, y_1, y_2, y_3, y_5, 0, y_6, y_7]$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 1, 1], [1, 4, 0, 0, 1, 2, 0, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 1, 0, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 1, 0, 5, 0, 1, 4, 0], [4, 1, 0, 0, 0, 2, 0, 3, 0, 1, 5, 0], [5, 1, 0, 0, 0, 4, 0, 1, 0, 2, 3, 0], [3, 2, 0, 0, 0, 5, 0, 1, 0, 4, 1, 0], [1, 4, 0, 0, 0, 3, 0, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 1, 0, 4, 0, 3, 2, 0]] \$$$

$$[y_1 + y_2 + y_3 - y_4 - y_5 + y_6 + y_7, y_1, 0, 0, y_2, y_3, 2y_7, y_4, 0, y_5, y_6, y_7]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p = -s^3 + s^9$$

844 . Coloring, {3, 5, 7, 8, 9}

R: [7, 7, 8, 6, 3, A, A, B, C, C, 1, 5]

B: [6, 8, 7, 7, A, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 10

Omega Rank for R : cycles: {{1, 3, 5, 7, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 0, 2, 1, 0, 3, 1, 3], [1, 0, 3, 0, 3, 0, 1, 2, 0, 2, 1, 3], [1, 0, 3, 0, 3, 0, 1, 3, 0, 1, 2, 2], [2, 0, 3, 0, 2, 0, 1, 3, 0, 1, 3, 1], [3, 0, 2, 0, 1, 0, 2, 3, 0, 1, 3, 1], [3, 0, 1, 0, 1, 0, 3, 2, 0, 2, 3, 1], [3, 0, 1, 0, 1, 0, 3, 1, 0, 3, 2, 2], [2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 1, 3]] \$

$$[-y_1 + y_5 + y_6, 0, y_5 + y_6 - y_2 - y_4, 0, y_1, y_2, y_4, -y_3 + y_5 + y_6, 0, y_3, y_5, y_6]$$

$$p' = -s^2 + s^4 - s^6 + s^8 \quad p' = -s^2 + s^3 - s^6 + s^7 \quad p = s^2 - s^3 + s^6 - s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1], [0, 1, 1, 3, 0, 0, 3, 2, 1, 0, 4, 1], [0, 0, 0, 4, 0, 0, 4, 1, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, y_1 + y_6, y_1, y_2, 0, y_6, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p = -s^6 + s^9 \quad p' = -s^6 + s^9$$

845 . Coloring, {3, 5, 7, 8, 10}

R: [7, 7, 8, 6, 3, A, A, B, B, 2, 1, 5]

B: [6, 8, 7, 7, A, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	5 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 2, 0] , [2, 3, 2, 0, 0, 0, 4, 1, 0, 3, 1, 0] , [1, 3, 0, 0, 0, 0, 5, 2, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 4, 0, 0, 5, 2, 0] , [2, 5, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0]] \$

$$[y_1, y_5, y_6, 0, 2y_2, y_2, y_3, y_4, 0, y_7, y_8, 0]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 2, 4] , [0, 0, 1, 2, 0, 0, 3, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4]] \$

$$[0, 0, y_1, -y_1 - y_5 + 3y_4 - y_2 + 2y_3, 0, y_4, y_5, y_4, y_3, y_4, y_2, 2y_4 + y_3]$$

$$p' = -s^5 + s^8 \quad p' = -s^4 + s^7 \quad p' = -s^3 + s^6 \quad p = s^3 - s^6$$

846 . Coloring, {3, 5, 7, 8, 11}

R: [7, 7, 8, 6, 3, A, A, B, B, C, 4, 5]

B: [6, 8, 7, 7, A, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 10

Omega Rank for R : cycles: $\{\{3, 4, 5, 6, 8, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 2, 2], [0, 0, 2, 2, 2, 2, 0, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 0, 2, 0, 2, 1, 3], [0, 0, 3, 1, 3, 1, 0, 2, 0, 2, 2, 2], [0, 0, 3, 2, 2, 1, 0, 3, 0, 1, 2, 2], [0, 0, 2, 2, 2, 2, 0, 3, 0, 1, 3, 1], [0, 0, 2, 3, 1, 2, 0, 2, 0, 2, 3, 1], [0, 0, 1, 3, 1, 3, 0, 2, 0, 2, 2, 2], [0, 0, 1, 2, 2, 3, 0, 1, 0, 3, 2, 2]] \$$

$[0, 0, y_3 + y_2 - y_5 - y_4, -y_6 + y_3 + y_2, y_6, y_5, y_4, y_3, 0, y_2, y_1, y_3 + y_2 - y_1]$

$$p' = s^2 - s^3 + s^6 - s^7 \quad p' = -s^3 + s^4 - s^7 + s^8 \quad p = s^2 - s^4 + s^6 - s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 2, 2], [2, 1, 1, 0, 0, 2, 1, 2, 2, 0, 2, 3], [2, 0, 2, 0, 0, 2, 1, 1, 3, 0, 1, 4], [1, 0, 2, 0, 0, 2, 2, 0, 4, 0, 1, 4], [1, 0, 2, 0, 0, 1, 2, 0, 4, 0, 2, 4], [2, 0, 1, 0, 0, 1, 2, 0, 4, 0, 2, 4], [2, 0, 1, 0, 0, 2, 1, 0, 4, 0, 2, 4], [2, 0, 2, 0, 0, 2, 1, 0, 4, 0, 1, 4], [1, 0, 2, 0, 0, 2, 2, 0, 4, 0, 1, 4], [1, 0, 2, 0, 0, 1, 2, 0, 4, 0, 2, 4]] \$$

$[y_3, y_4, y_5, 0, 0, y_6, y_7, y_8, y_4 - y_8 - y_1 + y_2, y_1, -y_3 - y_5 - y_6 - y_7 + 2y_4 + 2y_2, y_2]$

$$p' = -s^4 + s^9 \quad p = -s^4 + s^9$$

847 . Coloring, $\{3, 5, 7, 8, 12\}$

R: [7, 7, 8, 6, 3, A, A, B, B, C, 1, 9]

B: [6, 8, 7, 7, A, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 2, 2], [2, 0, 0, 0, 0, 0, 2, 1, 2, 3, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 2, 3, 3], [3, 0, 0, 0, 0, 3, 0, 3, 2, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 3, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 3, 2, 3], [2, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 3], [2, 0, 0, 0, 0, 0, 2, 0, 3, 3, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 2, 3, 3]] \$$

$$[2y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, 0, 0, y_1, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}, \{2, 5, 8, 10, 12\}\}$

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 2, 2], [0, 1, 1, 2, 2, 0, 3, 2, 0, 2, 2, 1], [0, 2, 0, 2, 1, 0, 3, 1, 0, 2, 3, 2], [0, 2, 0, 3, 2, 0, 2, 2, 0, 1, 3, 1], [0, 1, 0, 3, 1, 0, 3, 2, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 3, 1, 0, 1, 3, 2], [0, 1, 0, 3, 2, 0, 2, 2, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 3, 1, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 3, 2, 0, 1, 3, 1], [0, 1, 0, 3, 1, 0, 2, 2, 0, 2, 3, 2]] \$$

$$[0, y_1 + y_2 - y_3 + y_4 + y_5 - y_6 - y_7 + y_9 - y_8, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_9, y_8]$$

$$p = s^3 + s^4 + s^5 - s^8 - s^9 - s^{10}$$

848 . Coloring, $\{3, 5, 7, 9, 10\}$

R: [7, 7, 8, 6, 3, A, A, C, C, 2, 1, 5]

B: [6, 8, 7, 7, A, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{3, 5, 8, 12\}\}$ order: 12

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 4, 1, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 3, 2, 0, 4, 0, 1] , [0, 4, 1, 0, 1, 0, 3, 2, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 4, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 3, 1, 0, 4, 0, 1] , [0, 4, 2, 0, 1, 0, 3, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 4, 2, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 3, 1, 0, 4, 0, 2]] \$

[6 y₂, 10 y₁ - 9 y₂ - 3 y₄ + 10 y₃ - 3 y₅, 3 y₁ + 3 y₃ - 3 y₆, 0, 3 y₁, 3 y₂, 3 y₄, 3 y₃, 0, 3 y₅, 0, 3 y₆]

$$p = -s^2 - s^4 + s^5 + s^7 \quad p' = -s^2 - s^4 + s^5 + s^7 \quad p = s^2 - s^5 - s^6 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 4, 2] , [0, 0, 1, 4, 0, 0, 3, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

[0, 0, -y₄ + y₆, y₁, 0, y₄, y₂, y₄, y₃, y₄, y₅, y₆]

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7 \quad p' = -s^5 + s^8$$

849 . Coloring, {3, 5, 7, 9, 11}

R: [7, 7, 8, 6, 3, A, A, C, C, C, 4, 5]

B: [6, 8, 7, 7, A, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	8 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 2, 0, 1, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 2, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 4]] \$

[0, 0, -y₂ + y₃ + y₄ - y₁, y₂, -y₂ + y₃ + y₄, y₁, y₂, y₃, 0, y₄, 0, y₃ + y₄]

$$p = -s^4 + s^7 \quad p = -s^4 + s^8 \quad p = -s^4 + s^5 \quad p = -s^4 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 4, 0], [4, 1, 1, 0, 0, 2, 1, 2, 0, 0, 5, 0], [5, 0, 2, 0, 0, 4, 1, 1, 0, 0, 3, 0], [3, 0, 4, 0, 0, 5, 2, 0, 0, 0, 2, 0], [2, 0, 5, 0, 0, 3, 4, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 2, 5, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 3, 0, 0, 0, 5, 0], [5, 0, 2, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 5, 2, 0, 0, 0, 2, 0]] \$$$

$$[y_1, y_2, y_3, 0, 0, y_7, y_4, y_5, 2y_6, y_6, y_8, 0]$$

$$p = -s^4 + s^9$$

850 . Coloring, {3, 5, 7, 9, 12}

R: [7, 7, 8, 6, 3, A, A, C, C, C, 1, 9]

B: [6, 8, 7, 7, A, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	7 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 0, 4], [0, 0, 0, 0, 0, 0, 2, 1, 4, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[2y_1, 0, y_1, 0, 0, y_1, 2y_2 + 2y_3 - 2y_4, y_2 + y_3 - y_4, y_2, y_3, 0, y_4]$$

$$p' = s^6 - s^7 \quad p' = s^4 - s^7 \quad p' = s^5 - s^7 \quad p = s^4 - s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 4, 0], [0, 1, 1, 4, 0, 0, 3, 2, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 5, 1, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 3, 2, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[0, y_7, y_6, y_5, 2y_4, y_4, y_3, y_2, 0, 2y_6 - y_4, y_1, 0]$$

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

851 . Coloring, {3, 5, 7, 10, 11}

R: [7, 7, 8, 6, 3, A, A, C, B, 2, 4, 5]

B: [6, 8, 7, 7, A, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	6 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}, {2, 7, 10}} order: 12

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 2, 1, 0, 3, 0, 1], [0, 3, 1, 0, 1, 1, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 1, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 4, 1, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 4, 1, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 4, 1, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 4, 1, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 3, 1, 0, 4, 0, 1]] \$$$

$$[0, 11y_6 - 5y_7 + 11y_8 - 5y_9 - 5y_5 + 11y_3 - 5y_4 - 5y_1 + 11y_2, 5y_6, 5y_7, 5y_8, 5y_9, 5y_5, 5y_3, 0, 5y_4, 5y_1, 5y_2]$$

$$p = -s^4 - s^5 - s^6 + s^8 + s^9 + s^{10}$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {9, 12}} order: 10

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3], [3, 0, 1, 0, 0, 2, 1, 0, 3, 0, 3, 3], [3, 0, 2, 0, 0, 3, 1, 0, 3, 0, 1, 3], [1, 0, 3, 0, 0, 3, 2, 0, 3, 0, 1, 3], [1, 0, 3, 0, 0, 1, 3, 0, 3, 0, 2, 3], [2, 0, 1, 0, 0, 1, 3, 0, 3, 0, 3, 3], [3, 0, 1, 0, 0, 2, 1, 0, 3, 0, 3, 3], [3, 0, 2, 0, 0, 3, 1, 0, 3, 0, 1, 3], [1, 0, 3, 0, 0, 3, 2, 0, 3, 0, 1, 3]] \$$$

$$[3y_4, 0, 3y_3, 0, 0, 3y_2, 3y_1, -3y_4 - 3y_3 - 3y_2 - 3y_1 + 10y_5 - 3y_6, 3y_4 + 3y_3 + 3y_2 + 3y_1 - 7y_5 + 3y_6, -3y_4 - 3y_3 - 3y_2 - 3y_1 + 10y_5 - 3y_6, 3y_6, 3y_5]$$

$$p' = s^3 - s^8 \quad p' = s^2 - s^7 \quad p = s^2 - s^7$$

852 . Coloring, {3, 5, 7, 10, 12}

R: [7, 7, 8, 6, 3, A, A, C, B, 2, 1, 9]

B: [6, 8, 7, 7, A, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	5 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 0, 4, 1, 1, 3, 2, 1] , [2, 3, 0, 0, 0, 0, 4, 0, 1, 4, 1, 1] , [1, 4, 0, 0, 0, 0, 5, 0, 1, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 5, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, y_3, 0, 0, y_3, y_4, y_5, y_7, y_8, y_9, y_6]$$

$$p = -s^7 + s^{10}$$

Omega Rank for B : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3] , [0, 0, 1, 3, 3, 0, 3, 0, 0, 2, 3, 1] , [0, 0, 0, 3, 1, 0, 4, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 4, 3] , [0, 0, 0, 4, 3, 0, 3, 0, 0, 2, 3, 1] , [0, 0, 0, 3, 1, 0, 4, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 4, 3] , [0, 0, 0, 4, 3, 0, 3, 0, 0, 2, 3, 1] , [0, 0, 0, 3, 1, 0, 4, 0, 0, 3, 3, 2]] \$

$$[0, 0, y_3, y_4, -2y_3 - 2y_4 + 5y_2 + 5y_1 - 4y_5, y_2, 4y_3 + 4y_4 - 7y_2 - 6y_1 + 5y_5, y_2, 0, 5y_3 + 5y_4 - 8y_2 - 8y_1 + 6y_5, y_1, y_5]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^9 \quad p' = -s^4 + s^7 \quad p = -s^3 + s^6$$

853 . Coloring, {3, 5, 7, 11, 12}

R: [7, 7, 8, 6, 3, A, A, C, B, C, 4, 9]

B: [6, 8, 7, 7, A, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	10 vs 10

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 1, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 1, 0, 0, 4, 2, 3, 4] , [0, 0, 0, 3, 0, 2, 0, 0, 4, 1, 4, 2] , [0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 4, 1] , [0, 0, 0, 4, 0, 4, 0, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 4, 2, 4] , [0, 0, 0, 2, 0, 1, 0, 0, 4, 2, 3, 4]] \$

$$[0, 0, y_7, y_6, 0, y_5, 2y_7, y_4, y_3, y_2, y_1, -3y_7 + y_6 - y_5 + y_4 + y_3 + y_2 - y_1]$$

$$p' = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p = s^3 - s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 2, 1, 2, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 3, 1, 1, 0, 1, 3, 0] , [3, 1, 3, 0, 0, 3, 2, 2, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 3, 1, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0]] \$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_{10}, y_8, y_9]$$

854 . Coloring, {3, 5, 8, 9, 10}

R: [7, 7, 8, 6, 3, A, B, B, C, 2, 1, 5]

B: [6, 8, 7, 7, A, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 0, 4, 1, 0, 1, 3, 0] , [3, 1, 1, 0, 0, 0, 4, 2, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0] , [5, 0, 0, 0, 0, 0, 0, 0, 0, 0, 5, 0, 0] , [5, 0, 0, 0, 0, 0, 0, 0, 0, 0, 5, 0, 0] , [5, 0, 0, 0, 0, 0, 0, 0, 0, 0, 5, 0, 0] , [5, 0, 0, 0, 0, 0, 0, 0, 0, 0, 5, 0, 0]] \$

$$[y_7, y_5, y_6, 0, -y_5 + y_6 + 3y_4, y_4, y_3, y_2, 0, -y_5 + y_6 + 2y_4, y_1, y_4]$$

$$p' = s^5 - s^8 \quad p' = s^6 - s^9 \quad p = s^5 - s^8$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3] , [0, 0, 1, 1, 0, 0, 3, 0, 3, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 2, 0, 2, 2, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 2, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 2, 0, 2, 4, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 3, 3, 2]] \$

$$[0, 0, y_6, y_5, 0, y_8, y_7, y_8, y_4, y_3, y_1, y_2]$$

$$p = s^3 - s^9$$

855 . Coloring, {3, 5, 8, 9, 11}

R: [7, 7, 8, 6, 3, A, B, B, C, C, 4, 5]

B: [6, 8, 7, 7, A, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	10 vs 10

Omega Rank for R : cycles: {{3, 4, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 2, 0, 1, 0, 1, 3, 1] , [0, 0, 3, 3, 1, 3, 0, 2, 0, 2, 1, 1] , [0, 0, 1, 1, 1, 3, 0, 3, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 1, 0, 1, 0, 3, 3, 3] , [0, 0, 2, 3, 3, 2, 0, 1, 0, 1, 1, 3] , [0, 0, 3, 1, 3, 3, 0, 2, 0, 2, 1, 1] , [0, 0, 3, 1, 1, 1, 0, 3, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 1, 0, 3, 0, 1, 3, 3]] \$

$$[0, 0, y_5, y_6, y_5 - y_6 + y_1 - y_2 - y_3 - y_4 + y_8 + y_7, y_1, y_2, y_3, 0, y_4, y_8, y_7]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: {{1, 2, 3, 6, 7, 8, 9, 10, 11, 12}} order: 10

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1], [1, 3, 1, 0, 0, 2, 1, 2, 1, 2, 2, 1], [2, 2, 2, 0, 0, 1, 1, 3, 1, 1, 1, 2], [1, 1, 1, 0, 0, 2, 2, 2, 1, 1, 3], [1, 1, 2, 0, 0, 1, 1, 1, 3, 2, 2, 2], [2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1], [3, 1, 1, 0, 0, 2, 1, 2, 1, 2, 2, 1], [2, 2, 2, 0, 0, 3, 1, 1, 1, 1, 1, 2], [1, 1, 3, 0, 0, 2, 2, 2, 2, 1, 1, 1], [1, 1, 2, 0, 0, 1, 3, 1, 1, 2, 2, 2]] \$$$

$$[y_{10}, y_8, y_9, 0, 0, y_7, y_6, y_4, y_5, y_3, y_1, y_2]$$

856 . Coloring, {3, 5, 8, 9, 12}

R: [7, 7, 8, 6, 3, A, B, B, C, C, 1, 9]

B: [6, 8, 7, 7, A, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 9	8 vs 10

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 2, 1, 3, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 0, 0, 0, 0], [3, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4]] \$$$

$$[-3y_1 + 3y_3, 0, 3y_1, 0, 0, 3y_1, 3y_3 - 3y_2, 3y_2, -3y_1 + 7y_3 - 3y_2 - 3y_4, 3y_2, 3y_3, 3y_4]$$

$$p' = -s^3 + s^7 \quad p = -s^3 + s^9 \quad p = -s^3 + s^5 \quad p' = -s^3 + s^5 \quad p = -s^3 + s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1], [0, 3, 1, 1, 1, 0, 3, 2, 0, 4, 0, 1], [0, 4, 0, 0, 1, 0, 2, 3, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0,$$

$0, 2, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4]$] \$

$$[0, y_1, y_2 - y_7, y_2, y_3, y_7, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = s^4 - s^9 \quad p' = -s^4 + s^9$$

857 . Coloring, {3, 5, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s - s^2 - s^4 + 4s^5 - 8s^7 + 16s^8$$

R: [7, 7, 8, 6, 3, A, B, B, B, 2, 4, 5]

B: [6, 8, 7, 7, A, 3, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 4, 0], [0, 1, 2, 4, 0, 2, 2, 1, 0, 1, 3, 0], [0, 1, 0, 3, 0, 4, 1, 2, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 1, 0, 0, 4, 3, 0], [0, 4, 0, 3, 0, 3, 2, 0, 0, 3, 1, 0], [0, 3, 0, 1, 0, 3, 4, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 1, 3, 0, 0, 3, 4, 0], [0, 3, 0, 4, 0, 2, 3, 0, 0, 1, 3, 0], [0, 1, 0, 3, 0, 4, 3, 0, 0, 2, 3, 0]] \$

$$[0, -y_1 + y_2 + y_3 - y_4 + y_6 + y_5 + y_7 - y_8, y_1, y_2, y_3, y_4, y_6, y_5, 0, y_7, y_8, 0]$$

$$p = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 0, 4], [0, 0, 1, 0, 0, 2, 1, 0, 4, 2, 0, 6], [0, 0, 2, 0, 0, 0, 1, 0, 6, 1, 0, 6], [0, 0, 0, 0, 0, 2, 0, 6, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[2 y_5, 0, y_1, 0, 0, y_7, y_6, y_5, y_4, y_3, 0, y_2]$$

$$p = -s^6 + s^8$$

858 . Coloring, {3, 5, 8, 10, 12}

R: [7, 7, 8, 6, 3, A, B, B, B, 2, 1, 9]

B: [6, 8, 7, 7, A, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 4, 1, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_2, y_1, y_3, 0, 0, y_3, y_4, y_6, 2 y_3, y_6, y_5, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 0, 3, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5]] \$

$$[0, 0, y_1, 2 y_4, y_2, y_4, y_3, y_4, 0, y_5, 0, y_6]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

859 . Coloring, {3, 5, 8, 11, 12}

R: [7, 7, 8, 6, 3, A, B, B, B, C, 4, 9]

B: [6, 8, 7, 7, A, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 1, 2, 1, 5, 1] , [0, 0, 0, 5, 0, 4, 0, 0, 1, 2, 3, 1] , [0, 0, 0, 3, 0, 5, 0, 0, 1, 4, 1, 2] , [0, 0, 0, 1, 0, 3, 0, 0, 2, 5, 1, 4] , [0, 0, 0, 1, 0, 1, 0, 0, 4, 3, 2, 5] , [0, 0, 0, 2, 0, 1, 0, 0, 5, 1, 4, 3] , [0, 0, 0, 4, 0, 2, 0, 0, 3, 1, 5, 1] , [0, 0, 0, 5, 0, 4, 0, 0, 1, 2, 3, 1]] \$

[0, 0, $-y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7$, y_1 , 0, y_2 , $-2y_1 + 2y_2 - 2y_3 - 2y_4 - 2y_5 + 2y_6 + 2y_7$, y_3 , y_4, y_5, y_6, y_7]

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 2, 1, 2, 0, 4, 0, 1] , [0, 4, 2, 0, 1, 0, 1, 3, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 2, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 3, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 4, 0, 2, 0, 3]] \$

[$y_1, y_2, y_3, 0, y_4, y_6, y_7, y_5, 0, y_8, 0, y_9$]

860 . Coloring, {3, 5, 9, 10, 11}

R: [7, 7, 8, 6, 3, A, B, C, C, 2, 4, 5]

B: [6, 8, 7, 7, A, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	9 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 6, 7, 10, 11\}, \{3, 5, 8, 12\}\}$ order: 12
See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 2, 2], [0, 1, 2, 2, 2, 2, 2, 1, 0, 1, 2, 1], [0, 1, 2, 2, 1, 2, 1, 2, 0, 2, 2, 1], [0, 2, 1, 2, 1, 2, 1, 2, 0, 2, 1, 2], [0, 2, 1, 1, 2, 2, 2, 1, 0, 2, 1, 2], [0, 2, 2, 1, 2, 1, 2, 1, 0, 2, 2, 1], [0, 2, 2, 2, 1, 1, 2, 2, 0, 1, 2, 1], [0, 1, 1, 2, 1, 2, 2, 2, 0, 1, 2, 2], [0, 1, 1, 2, 2, 2, 1, 1, 0, 2, 2, 2], [0, 2, 2, 2, 2, 2, 1, 1, 0, 2, 1, 1]] \$$

$[0, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_1, 3y_4 - 3y_6 + 3y_2, 0, -3y_5 - 3y_1 + 5y_4 + 5y_2, -3y_3 - 3y_7 + 5y_4 + 5y_2, 3y_2]$

$p' = s + s^3 - s^7 - s^9 \quad p = -2s - s^2 - 3s^3 - 2s^5 + 2s^6 + 3s^8 + s^9 + 2s^{10} \quad p = s + s^2 + 2s^3 + 2s^5 - 2s^6 + s^7 - 3s^8 - 2s^{10}$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 9, 10, 11, 12\}\}$ order: 8
See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 2, 2], [2, 0, 1, 0, 0, 2, 1, 0, 2, 2, 3, 3], [3, 0, 2, 0, 0, 2, 1, 0, 3, 1, 2, 2], [2, 0, 2, 0, 0, 3, 2, 0, 2, 1, 3, 1], [3, 0, 3, 0, 0, 2, 2, 0, 1, 2, 2, 1], [2, 0, 2, 0, 0, 3, 3, 0, 1, 2, 1, 2], [1, 0, 3, 0, 0, 2, 2, 0, 2, 3, 1, 2], [1, 0, 2, 0, 0, 1, 3, 0, 2, 2, 2, 3], [2, 0, 1, 0, 0, 1, 2, 0, 3, 3, 2, 2]] \$$

$[y_1, 0, y_9, 0, 0, y_8, y_7, y_4, y_5, y_6, y_3, y_2]$

861 . Coloring, $\{3, 5, 9, 10, 12\}$

R: [7, 7, 8, 6, 3, A, B, C, C, 2, 1, 9]

B: [6, 8, 7, 7, A, 3, A, B, B, C, 4, 5]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6
 See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 2, 2] , [2, 1, 0, 0, 0, 0, 4, 1, 2, 1, 2, 3] , [2, 1, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3] , [4, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 0, 3, 3]] \$$

$[-3 y_1 + 7 y_3 + 4 y_4 + 3 y_6 - 3 y_2 - 3 y_5, 3 y_1, 3 y_3 + 3 y_4 - 3 y_6, 0, 0, 3 y_3 + 3 y_4 - 3 y_6, 3 y_2, 3 y_4, 3 y_3, 3 y_4, 3 y_5, 3 y_6]$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8 \quad p''' = -s^4 + s^{10}$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6
 See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 0, 3, 0, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 0, 3, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$

$[0, 0, -y_6 + y_4, y_2, y_1, y_6, y_7, y_6, 0, y_5, y_4, y_3]$

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

862 . Coloring, $\{3, 5, 9, 11, 12\}$

R: [7, 7, 8, 6, 3, A, B, C, C, C, 4, 9]

B: [6, 8, 7, 7, A, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 6
 See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 1, 4, 1, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 0, 6] , [0, 0, 0, 0, 2, 0, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[0, 0, -y_6 + y_5 + y_4 - y_3 - y_2 + y_1, y_6, 0, y_5, -2y_6 + 2y_5 + 2y_4 - 2y_3 - 2y_2 + 2y_1, y_4, y_3, y_2, 2y_4, y_1]$$

$$p' = s^7 - s^8 \quad p' = s^6 - s^8 \quad p = s^6 - s^9$$

Omega Rank for B : cycles: $\{\{1, 2, 3, 6, 7, 8, 10, 11\}\}$ order: 8

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 2, 0], [2, 3, 1, 0, 0, 2, 1, 2, 0, 4, 1, 0], [1, 4, 2, 0, 0, 2, 1, 3, 0, 1, 2, 0], [2, 1, 2, 0, 0, 1, 2, 4, 0, 1, 3, 0], [3, 1, 1, 0, 0, 2, 2, 1, 0, 2, 4, 0], [4, 2, 2, 0, 0, 3, 1, 1, 0, 2, 1, 0], [1, 2, 3, 0, 0, 4, 2, 2, 0, 1, 1, 0], [1, 1, 4, 0, 0, 1, 3, 2, 0, 2, 2, 0], [2, 2, 1, 0, 0, 1, 4, 1, 0, 3, 2, 0]] \$$$

$$[y_1, y_2, y_3, 0, y_6, y_5, y_4, y_7, 0, y_9, y_8, 0]$$

863 . Coloring, $\{3, 5, 10, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^4 - 4s^5 - 8s^6 + 8s^7 - 16s^8$$

R: [7, 7, 8, 6, 3, A, B, C, B, 2, 4, 9]

B: [6, 8, 7, 7, A, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 10	9 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 6, 7, 10, 11\}\}$ order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 2, 1, 1, 1, 4, 1], [0, 1, 0, 4, 0, 3, 1, 0, 1, 2, 3, 1], [0, 2, 0, 3, 0, 4, 1, 0, 1, 3, 2, 0], [0, 3, 0, 2, 0, 3, 2, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 3, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 4, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 2, 3, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 3, 2, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 4, 2, 0, 0, 3, 2, 0]] \$$$

$$[0, y_2, y_1, y_2 + y_1 + y_3 - y_4 - y_8 - y_7 - y_9 + y_6 + y_5, 0, y_3, y_4, y_8, y_7, y_9, y_6, y_5]$$

$$p = -s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9
See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3] , [1, 0, 1, 0, 3, 2, 1, 0, 0, 4, 1, 3] , [1, 0, 2, 0, 3, 1, 1, 0, 0, 4, 0, 4] , [0, 0, 1, 0, 4, 1, 2, 0, 0, 4, 0, 4] , [0, 0, 1, 0, 4, 0, 1, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

[y₄, 0, y₃, 0, y₁, y₂, y₆, y₅, 0, y₉, y₇, y₈]

864 . Coloring, {3, 6, 7, 8, 9}

R: [7, 7, 8, 6, A, 3, A, B, C, C, 1, 5]

B: [6, 8, 7, 7, 3, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 9
See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3] , [1, 0, 1, 0, 3, 0, 2, 1, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 0, 1, 1, 0, 5, 1, 4] , [1, 0, 0, 0, 4, 0, 1, 0, 0, 4, 1, 5] , [1, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

[y₂, 0, y₁, 0, y₈, y₆, y₇, y₅, 0, y₄, y₃, y₉]

Omega Rank for B : cycles: {{4, 7, 11}} order: 9
See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 3, 2, 1, 1, 4, 1] , [0, 1, 0, 4, 0, 0, 3, 1, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 1, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

[0, y₁, y₃, y₂, 0, y₃, y₉, y₄, y₅, y₆, y₇, y₈]

$$p = -s^7 + s^{10}$$

865 . Coloring, {3, 6, 7, 8, 10}

R: [7, 7, 8, 6, A, 3, A, B, B, 2, 1, 5]

B: [6, 8, 7, 7, 3, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 2, 0], [2, 3, 1, 0, 0, 0, 4, 1, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 5, 1, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 5, 0, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, y_3, 0, 2y_4, y_4, y_5, y_6, 0, y_7, y_8, 0]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 1, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 3, 5], [0, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 2, 5], [0, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 3, 5]] \$

$$[0, 0, 9y_6 + 9y_5 - 7y_1 - 7y_2 + 9y_3 - 7y_4, 5y_6, 0, 9y_6 + 9y_5 - 7y_1 - 7y_2 + 9y_3 - 7y_4, 5y_5, 9y_6 + 9y_5 - 7y_1 - 7y_2 + 9y_3 - 7y_4, 5y_1, 5y_2, 5y_3, 5y_4]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8 \quad p = -s^3 + s^9$$

866 . Coloring, {3, 6, 7, 8, 11}

R: [7, 7, 8, 6, A, 3, A, B, B, C, 4, 5]

B: [6, 8, 7, 7, 3, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 10

Omega Rank for R : cycles: {{5, 10, 12}, {3, 4, 6, 8, 11}}

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 2, 2], [0, 0, 1, 2, 2, 2, 0, 1, 0, 4, 1, 3], [0, 0, 2, 1, 3, 2, 0, 1, 0, 2, 1, 4], [0, 0, 2, 1, 4, 1, 0, 2, 0, 3, 1, 2], [0, 0, 1, 1, 2, 1, 0, 2, 0, 4, 2, 3], [0, 0, 1, 2, 3, 1, 0, 1, 0, 2, 2, 4], [0, 0, 1, 2, 4, 2, 0, 1, 0, 3, 1, 2], [0, 0, 2, 1, 2, 2, 0, 1, 0, 4, 1, 3], [0, 0, 2, 1, 3, 1, 0, 2, 0, 2, 1, 4]] \$$

$[0, 0, 7 y_8, 7 y_7, 7 y_6, 7 y_5, 7 y_4, 7 y_3, 0, 7 y_2, 7 y_1, 9 y_8 + 9 y_7 - 7 y_6 + 9 y_5 - 7 y_4 + 9 y_3 - 7 y_2 + 9 y_1]$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 10

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 2, 2], [2, 1, 0, 0, 0, 2, 1, 2, 2, 1, 2, 3], [2, 1, 0, 0, 0, 2, 0, 1, 3, 2, 1, 4], [1, 2, 0, 0, 0, 2, 0, 1, 4, 2, 0, 4], [0, 2, 0, 0, 0, 1, 0, 2, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 0, 2, 5, 1, 0, 6], [0, 1, 0, 0, 0, 0, 0, 2, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$[y_3, y_1, y_2, 0, 0, y_3 - y_1 - y_2 + y_9 + y_7 + y_8 + y_6 - y_4 - y_5, y_9, y_7, y_8, y_6, y_4, y_5]$

$$p = s^9 - s^{10}$$

867 . Coloring, {3, 6, 7, 8, 12}

R: [7, 7, 8, 6, A, 3, A, B, B, C, 1, 9]

B: [6, 8, 7, 7, 3, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	10 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 2, 2], [2, 0, 1, 0, 0, 0, 2, 1, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 1, 3, 2, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 2, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 3, 2, 2], [2, 0, 0, 0, 0, 0, 4, 0, 2, 3, 2, 3], [2, 0, 0, 0, 0, 0, 2, 0, 3, 4, 2, 3], [2, 0, 0, 0, 0, 0, 2, 0, 3, 2, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 2, 3, 2]] \$$

$[y_1, 0, y_9, 0, 0, y_8, y_7, y_6, y_5, y_4, y_3, y_2]$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 9

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 2, 2], [0, 1, 2, 2, 2, 0, 3, 2, 0, 1, 2, 1], [0, 1, 2, 2, 1, 0, 4, 1, 0, 0, 3, 2], [0, 0, 1, 3, 2, 0, 4, 1, 0, 0, 4, 1], [0, 0, 2, 4, 1, 0, 4, 0, 0, 0, 4, 1], [0, 0, 1, 4, 1, 0, 6, 0, 0, 0, 4, 0], [0, 0, 1, 4, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$

$[0, y_1, y_2, y_7, y_3, y_4, y_5, y_6, 0, y_9, y_8, y_{10}]$

868 . Coloring, $\{3, 6, 7, 9, 10\}$

R: [7, 7, 8, 6, A, 3, A, C, C, 2, 1, 5]

B: [6, 8, 7, 7, 3, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 4, 1, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 3, 1, 0, 6, 0, 1] , [0, 6, 0, 0, 1, 0, 4, 0, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0]] \$

[2 y₄, y₁, y₂, 0, y₃, y₄, y₅, y₆, 0, y₇, 0, y₈]

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 1, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

[0, 0, y₇, y₂, 0, y₇, y₁, y₇, y₅, y₆, y₄, y₃]

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

869 . Coloring, {3, 6, 7, 9, 11}

R: [7, 7, 8, 6, A, 3, A, C, C, C, 4, 5]

B: [6, 8, 7, 7, 3, A, B, B, B, 2, 1, 9]

‘ See graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 2, 0, 1, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 0, 1, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 2, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

[0, 0, y₇, y₆, y₄, y₅, y₆, y₃, 0, y₂, 0, y₁]

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 4, 0], [4, 1, 0, 0, 0, 2, 1, 2, 0, 1, 5, 0], [5, 1, 0, 0, 0, 4, 0, 1, 0, 2, 3, 0], [3, 2, 0, 0, 0, 5, 0, 1, 0, 4, 1, 0], [1, 4, 0, 0, 0, 3, 0, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 1, 0, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 1, 0, 5, 0, 1, 4, 0], [4, 1, 0, 0, 0, 2, 0, 3, 0, 1, 5, 0], [5, 1, 0, 0, 0, 4, 0, 1, 0, 2, 3, 0]] \$$$

$$[y_1 - y_2 + y_3 - y_4 - y_5 - y_6 + y_7, y_1, y_2, 0, 0, y_3, y_4, y_5, 2y_2, y_6, y_7, 0]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p' = -s^3 + s^9$$

870 . Coloring, {3, 6, 7, 9, 12}

R: [7, 7, 8, 6, A, 3, A, C, C, C, 1, 9]

B: [6, 8, 7, 7, 3, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 0, 4], [0, 0, 1, 0, 0, 0, 2, 1, 4, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 1, 6, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[-4y_3 + 2y_2, 0, y_1, 0, 0, -2y_3 + y_2, 2y_1, y_3, y_4, y_2, 0, y_5]$$

$$p = s^4 - s^6 \quad p' = s^4 - s^6 \quad p'' = -s^5 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 4, 0], [0, 1, 2, 4, 0, 0, 3, 2, 0, 1, 3, 0], [0, 1, 0, 3, 0, 0, 6, 1, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 3, 1, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0]] \$$$

$$[0, y_2, -y_3 + 2y_6, y_1, 2y_3, y_3, y_4, y_7, 0, y_6, y_5, 0]$$

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

871 . Coloring, {3, 6, 7, 10, 11}

R: [7, 7, 8, 6, A, 3, A, C, B, 2, 4, 5]

B: [6, 8, 7, 7, 3, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	7 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1] , [0, 3, 1, 1, 1, 2, 2, 1, 0, 4, 0, 1] , [0, 4, 2, 0, 1, 1, 3, 1, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 4, 2, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 3, 1, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 4, 0, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[0, y_1, y_2, y_7, y_5, y_6, y_4, y_3, 0, y_{10}, y_8, y_9]$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 2, 1, 0, 3, 1, 3, 3] , [3, 0, 0, 0, 0, 3, 0, 0, 3, 2, 1, 4] , [1, 0, 0, 0, 0, 3, 0, 0, 4, 3, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_7 - y_6 - y_4 - y_3 + y_2 + y_1, 0, y_5, 0, 0, y_7, y_6, y_5, y_4, y_3, y_2, y_1]$$

$$p' = s^7 - s^8 \quad p = s^7 - s^9$$

872 . Coloring, {3, 6, 7, 10, 12}

R: [7, 7, 8, 6, A, 3, A, C, B, 2, 1, 9]

B: [6, 8, 7, 7, 3, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1], [1, 3, 1, 0, 0, 0, 4, 1, 1, 2, 2, 1], [2, 2, 0, 0, 0, 0, 4, 1, 1, 4, 1, 1], [1, 4, 0, 0, 0, 0, 4, 0, 1, 4, 1, 1], [1, 4, 0, 0, 0, 0, 5, 0, 1, 4, 1, 0], [1, 4, 0, 0, 0, 0, 5, 0, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

[y₁₀, y₉, y₈, 0, 0, y₆, y₇, y₅, y₃, y₄, y₂, y₁]

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3], [0, 0, 2, 3, 3, 0, 3, 0, 0, 1, 3, 1], [0, 0, 3, 3, 1, 0, 5, 0, 0, 0, 3, 1], [0, 0, 1, 3, 1, 0, 6, 0, 0, 0, 5, 0], [0, 0, 1, 5, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$

[0, 0, y₁, y₂, y₃, y₇, y₈, y₇, 0, y₅, y₆, y₄]

$$p = -s^6 + s^9$$

873 . Coloring, {3, 6, 7, 11, 12}

R: [7, 7, 8, 6, A, 3, A, C, B, C, 4, 9]

B: [6, 8, 7, 7, 3, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 10

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 9, 11, 12\}\}$ order: 7
See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3], [0, 0, 1, 1, 0, 2, 0, 1, 3, 2, 2, 4], [0, 0, 2, 2, 0, 1, 0, 1, 4, 0, 3, 3], [0, 0, 1, 3, 0, 2, 0, 2, 3, 0, 4, 1], [0, 0, 2, 4, 0, 3, 0, 1, 1, 0, 3, 2], [0, 0, 3, 3, 0, 4, 0, 2, 2, 0, 1, 1], [0, 0, 4, 1, 0, 3, 0, 3, 1, 0, 2, 2], [0, 0, 3, 2, 0, 1, 0, 4, 2, 0, 1, 3], [0, 0, 1, 1, 0, 2, 0, 3, 3, 0, 2, 4]] \$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_7, y_8, y_9, y_5, y_6]$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1], [3, 1, 2, 0, 1, 2, 1, 2, 0, 1, 3, 0], [3, 1, 1, 0, 0, 3, 2, 1, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 1, 1, 0, 3, 3, 0], [3, 3, 0, 0, 0, 3, 0, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 0, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 0, 3, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 0, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 0, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 0, 2, 0, 3, 3, 0]] \$$

$$[y_1 + y_2 - y_3 + y_6 - y_4 - y_5 - y_7 + y_8 + y_9, y_1, y_2, 0, y_3, y_6, y_4, y_5, 0, y_7, y_8, y_9]$$

$$p = -s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

874 . Coloring, $\{3, 6, 8, 9, 10\}$

R: [7, 7, 8, 6, A, 3, B, B, C, 2, 1, 5]

B: [6, 8, 7, 7, 3, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 0, 4, 1, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 4, 1, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_1, y_2, y_7 - y_4 + y_5, 0, 2y_7 - y_4 + y_5, y_7, y_3, y_4, 0, y_5, y_6, y_7]$$

$$p' = -s^5 + s^8 \quad p' = -s^6 + s^9 \quad p = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 0, 1, 0, 4, 3, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 2, 3, 1] , [0, 0, 0, 3, 0, 0, 4, 0, 1, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 0, 1, 0, 4, 3, 3, 3]] \$

$$[0, 0, y_3, y_1, 0, y_3, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

875 . Coloring, {3, 6, 8, 9, 11}

R: [7, 7, 8, 6, A, 3, B, B, C, C, 4, 5]

B: [6, 8, 7, 7, 3, A, A, C, B, 2, 1, 9]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	10 vs 10

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}, {5, 10, 12}}

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3] , [0, 0, 1, 3, 3, 2, 0, 1, 0, 2, 3, 1] , [0, 0, 2, 3, 1, 3, 0, 1, 0, 3, 1, 2] , [0, 0, 3, 1, 2, 3, 0, 2, 0, 1, 1, 3] , [0, 0, 3, 1, 3, 1, 0, 3, 0, 2, 2, 1] , [0, 0, 1, 2, 1, 1, 0, 3, 0, 3, 3, 2] , [0, 0, 1, 3, 2, 2, 0, 1, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 3, 0, 1, 0, 2, 1, 1] , [0, 0, 3, 1, 1, 3, 0, 2, 0, 3, 1, 2]] \$

$$[0, 0, 3 y_5, 3 y_6, 3 y_7, 3 y_8, 3 y_4, 3 y_2, 0, 3 y_3, -3 y_5 - 3 y_6 + 5 y_7 - 3 y_8 - 3 y_4 - 3 y_2 + 5 y_3 + 5 y_1, 3 y_1]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 2, 1, 2, 1, 3, 2, 1], [2, 3, 0, 0, 0, 1, 0, 3, 1, 3, 1, 2], [1, 3, 0, 0, 0, 2, 0, 3, 2, 1, 1, 3], [1, 1, 0, 0, 0, 1, 0, 3, 3, 2, 2, 3], [2, 2, 0, 0, 0, 1, 0, 1, 3, 1, 3, 3], [3, 1, 0, 0, 0, 2, 0, 2, 3, 1, 3, 1], [3, 1, 0, 0, 0, 3, 0, 1, 1, 2, 3, 2], [3, 2, 0, 0, 0, 3, 0, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 3, 0, 2, 1, 3, 2, 1]] \$$$

$$[y_5, y_6, y_7, 0, 0, y_8, y_1, y_2, y_3, y_4, y_9, y_{10}]$$

876 . Coloring, {3, 6, 8, 9, 12}

R: [7, 7, 8, 6, A, 3, B, B, C, C, 1, 9]

B: [6, 8, 7, 7, 3, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	9 vs 10

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3], [3, 0, 1, 0, 0, 0, 2, 1, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 1, 3, 0, 3, 3], [3, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3]] \$$$

$$[3 y_1, 0, -3 y_1 - 3 y_3 - 3 y_2 - 3 y_4 - 3 y_6 + 10 y_5, 0, 0, 3 y_4, 3 y_3, 3 y_2, -3 y_4 + 3 y_5, 3 y_4, 3 y_6, 3 y_5]$$

$$p' = -s^5 + s^8 \quad p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 0, 3, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 3, 3, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 1, 3, 0, 3, 0, 3] , [0, 3, 2, 0, 3, 0, 1, 3, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 2, 3, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 3, 1, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 3, 1, 0, 3, 0, 1] , [0, 3, 3, 0, 1, 0, 3, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 3, 3, 0, 3, 0, 2]] \$

$$[0, y_3, y_4, y_2, y_1, y_6, y_5, y_9, 0, y_8, y_6, y_7]$$

$$p = s^3 - s^{10}$$

877 . Coloring, {3, 6, 8, 10, 11}

R: [7, 7, 8, 6, A, 3, B, B, B, 2, 4, 5]

B: [6, 8, 7, 7, 3, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	5 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 4, 0] , [0, 1, 1, 4, 0, 2, 2, 1, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 4, 1, 1, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 2, 2, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 0, 3, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 0, 4, 0, 0, 2, 0]] \$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_7, 0, y_8, y_9, 0]$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 2, 1, 0, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[2 y_5, 0, y_5, 0, 0, -3 y_5 + 2 y_1, y_1, y_5, y_2, y_4, 0, y_3]$$

$$p = s^4 - s^8 \quad p' = s^5 - s^7 \quad p'' = -s^4 + s^6$$

878 . Coloring, {3, 6, 8, 10, 12}

R: [7, 7, 8, 6, A, 3, B, B, B, 2, 1, 9]

B: [6, 8, 7, 7, 3, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 4, 0] , [4, 1, 1, 0, 0, 0, 4, 1, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 1, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_1, y_2, y_2 - y_5, 0, 0, y_5, y_3, y_4, 2 y_5, y_5, y_6, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2] , [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3]] \$

$$[0, 0, y_2, 2 y_5, y_3, y_5, y_1, y_5, 0, y_6, 0, y_4]$$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7$$

879 . Coloring, {3, 6, 8, 11, 12}

R: [7, 7, 8, 6, A, 3, B, B, B, C, 4, 9]

B: [6, 8, 7, 7, 3, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 4, 2], [0, 0, 1, 4, 0, 2, 0, 1, 2, 0, 5, 1], [0, 0, 2, 5, 0, 4, 0, 1, 1, 0, 3, 0], [0, 0, 4, 3, 0, 5, 0, 2, 0, 0, 2, 0], [0, 0, 5, 2, 0, 3, 0, 4, 0, 0, 2, 0], [0, 0, 3, 2, 0, 2, 0, 5, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 0, 3, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 0, 2, 0, 0, 3, 0], [0, 0, 4, 3, 0, 5, 0, 2, 0, 0, 2, 0]] \$$

$$[0, 0, y_6, y_5, 0, y_3, 2y_1, y_4, y_2, y_1, y_7, y_8]$$

$$p = s^4 - s^9$$

Omega Rank for B : cycles: $\{\{2, 3, 5, 7, 8, 10, 12\}\}$ order: 7

See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 2, 1, 2, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 2, 3, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 2, 3, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 1, 3, 0, 2, 0, 3], [0, 2, 3, 0, 3, 0, 2, 2, 0, 1, 0, 3], [0, 1, 3, 0, 3, 0, 3, 2, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 3, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 3, 2, 0, 3, 0, 1]] \$$

$$[y_3, y_2, y_1, 0, y_8, y_7, y_6, y_5, 0, y_4, 0, y_9]$$

880 . Coloring, $\{3, 6, 9, 10, 11\}$

R: [7, 7, 8, 6, A, 3, B, C, C, 2, 4, 5]

B: [6, 8, 7, 7, 3, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	8 vs 9

Omega Rank for R : cycles: $\{\{2, 3, 4, 5, 6, 7, 8, 10, 11, 12\}\}$ order: 10

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 2, 2], [0, 1, 1, 2, 2, 2, 2, 1, 0, 2, 2, 1], [0, 2, 2, 2, 1, 2, 1, 1, 0, 2, 2, 1], [0, 2, 2, 2, 1, 2, 2, 2, 0, 1, 1, 1], [0, 1, 2, 1, 1, 2, 2, 2, 0, 1, 2, 2], [0, 1, 2, 2, 2, 1, 1, 2, 0, 1, 2, 2], [0, 1, 1, 2, 2, 2, 1, 2, 0, 2, 1, 2], [0, 2, 2, 1, 2, 2, 1, 1, 0, 2, 1, 2], [0, 2, 2, 1, 2, 1, 2, 2, 0, 2, 1, 1], [0, 2, 1, 1, 1, 1, 2, 2, 0, 2, 2, 2]] \$$

$$[0, y_3, y_2, y_1, -y_3 + y_2 + y_1 - y_9 + y_7 - y_8 + y_6 - y_5 + y_4, y_9, y_7, y_8, 0, y_6, y_5, y_4]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

Omega Rank for B : cycles: $\{\{1, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 2, 2], [2, 0, 0, 0, 0, 2, 1, 0, 2, 3, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 3], [2, 0, 0, 0, 3, 0, 0, 3, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 3, 3, 2], [3, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 3], [3, 0, 0, 0, 0, 3, 0, 0, 3, 3, 2, 2], [2, 0, 0, 0, 0, 3, 0, 0, 2, 3, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 3]] \$$

$$[y_1, 0, y_4, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p = -s^3 + s^9$$

881 . Coloring, $\{3, 6, 9, 10, 12\}$

R: [7, 7, 8, 6, A, 3, B, C, C, 2, 1, 9]

B: [6, 8, 7, 7, 3, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 2, 2], [2, 1, 1, 0, 0, 0, 4, 1, 2, 0, 2, 3], [2, 0, 0, 0, 0, 0, 3, 1, 3, 0, 4, 3], [4, 0, 0, 0, 0, 2, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 0, 4, 0, 4, 0, 2, 3], [2, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 4], [4, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 4, 3], [4, 0, 0, 0, 0, 0, 2, 0, 3, 0, 3, 4]] \$$

$$[2 y_2, 7 y_2 + 7 y_5 + 7 y_1 - 9 y_7 - 9 y_6 + 7 y_4 - 9 y_3, 7 y_2 + 5 y_5 + 7 y_1 - 9 y_7 - 9 y_6 + 7 y_4 - 9 y_3, 0, 0, 2 y_5, 2 y_1, 2 y_7, 2 y_6, 2 y_5, 2 y_4, 2 y_3]$$

$$p = -s^4 + s^{10} \quad p = -s^4 + s^6 + s^7 - s^9 \quad p = s^4 + s^5 - s^7 - s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 2, 2], [0, 0, 2, 2, 2, 0, 3, 0, 0, 3, 1, 3], [0, 0, 2, 1, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3]] \$$$

$$[0, 0, y_8, y_7, y_5, y_6, y_4, y_6, 0, y_3, y_2, y_1]$$

$$p = s^4 - s^9$$

882 . Coloring, {3, 6, 9, 11, 12}

R: [7, 7, 8, 6, A, 3, B, C, C, C, 4, 9]

B: [6, 8, 7, 7, 3, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 2, 4], [0, 0, 1, 2, 0, 2, 0, 1, 4, 0, 2, 4], [0, 0, 2, 2, 0, 2, 0, 1, 4, 0, 0, 5], [0, 0, 2, 0, 0, 2, 5, 0, 0, 5], [0, 0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[0, 0, y_2, y_1, 0, y_8, 2 y_6, y_7, y_5, y_6, y_4, y_3]$$

$$p = s^7 - s^9$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 2, 0] , [2, 3, 2, 0, 0, 2, 1, 2, 0, 3, 1, 0] , [1, 3, 0, 0, 0, 2, 2, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 1, 0, 3, 0, 4, 3, 0] , [3, 4, 0, 0, 0, 2, 0, 3, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 3, 0, 4, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 0, 1, 0, 3, 4, 0] , [4, 3, 0, 0, 0, 3, 0, 2, 0, 3, 1, 0] , [1, 3, 0, 0, 0, 4, 0, 3, 0, 3, 2, 0]] \$$

$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9, 0]$

883 . Coloring, $\{3, 6, 10, 11, 12\}$

R: [7, 7, 8, 6, A, 3, B, C, B, 2, 4, 9]

B: [6, 8, 7, 7, 3, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	9 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1] , [0, 1, 1, 3, 0, 2, 2, 1, 1, 0, 4, 1] , [0, 0, 2, 4, 0, 3, 1, 1, 1, 0, 3, 1] , [0, 0, 3, 3, 0, 4, 0, 2, 1, 0, 2, 1] , [0, 0, 4, 2, 0, 3, 0, 3, 1, 0, 1, 2] , [0, 0, 3, 1, 0, 2, 0, 4, 2, 0, 1, 3] , [0, 0, 2, 1, 0, 1, 0, 3, 3, 0, 2, 4] , [0, 0, 1, 2, 0, 1, 0, 2, 4, 0, 3, 3] , [0, 0, 1, 3, 0, 2, 0, 1, 3, 0, 4, 2] , [0, 0, 2, 4, 0, 3, 0, 1, 2, 0, 3, 1]] \$$

$[0, y_9, y_{10}, y_8, 0, y_7, y_6, y_4, y_5, y_3, y_1, y_2]$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 1, 0, 0, 3, 1, 3] , [1, 0, 3, 0, 3, 1, 2, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 1, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3]] \$$

$[y_3, 0, y_4, 0, y_1, y_2, y_8, y_9, 0, y_5, y_6, y_7]$

884 . Coloring, {3, 7, 8, 9, 10}

R: [7, 7, 8, 6, A, A, A, B, C, 2, 1, 5]

B: [6, 8, 7, 7, 3, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 0, 4, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, 0, 0, y_6 + y_5, y_6, y_3, y_6, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 3, 3] , [0, 0, 1, 3, 0, 0, 4, 0, 3, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0]] \$

$$[0, 0, -y_2 + y_6, y_3, 0, y_2, y_1, y_2, y_4, 0, y_5, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

885 . Coloring, {3, 7, 8, 9, 11}

R: [7, 7, 8, 6, A, A, A, B, C, C, 4, 5]

B: [6, 8, 7, 7, 3, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 2, 0, 0, 0, 5, 1, 4] , [0, 0, 0, 1, 4, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

[0, 0, 0, y_5 , y_3 , y_4 , $2y_1$, y_1 , 0, y_2 , y_6 , y_7]

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 3, 1] , [3, 0, 1, 0, 0, 2, 2, 2, 1, 0, 4, 1] , [4, 0, 2, 0, 0, 3, 1, 0, 1, 0, 3, 2] , [3, 0, 3, 0, 0, 4, 2, 0, 2, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 3, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 4, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 4, 3, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 3, 2, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 4, 4, 0, 0, 0, 2, 0]] \$

[y_1 , y_2 , y_3 , 0, 0, y_4 , y_9 , y_5 , y_6 , 0, y_7 , y_8]

886 . Coloring, {3, 7, 8, 9, 12}

R: [7, 7, 8, 6, A, A, A, B, C, C, 1, 9]

B: [6, 8, 7, 7, 3, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 3, 1, 6] , [1, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$[y_1, 0, 0, 0, 0, y_7, y_6, y_7, y_5, y_4, y_3, y_2]$

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 3, 1] , [0, 0, 3, 3, 1, 0, 4, 2, 0, 0, 2, 1] , [0, 0, 1, 2, 1, 0, 6, 0, 0, 0, 4, 2] , [0, 0, 1, 4, 2, 0, 3, 0, 0, 0, 6, 0] , [0, 0, 2, 6, 0, 0, 5, 0, 0, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 8, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 3, 0, 0, 0, 8, 0] , [0, 0, 0, 8, 0, 0, 5, 0, 0, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 8, 0, 0, 0, 5, 0]] \$

$[0, 2 y_7, y_8, y_6, y_5, y_7, y_4, y_3, 0, 0, y_1, y_2]$

$$p = s^6 - s^9$$

887 . Coloring, {3, 7, 8, 10, 11}

R: [7, 7, 8, 6, A, A, A, B, B, 2, 4, 5]

B: [6, 8, 7, 7, 3, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 2, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 2, 4, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 1, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

$$[0, y_1, 0, y_2, 2y_4, y_3, y_7, y_4, 0, y_5, y_6, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {9, 12}} order: 10

See Matrix

$$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 2, 4], [2, 0, 1, 0, 0, 2, 2, 0, 4, 0, 2, 3], [2, 0, 2, 0, 0, 2, 1, 0, 3, 0, 2, 4], [2, 0, 2, 0, 0, 2, 2, 0, 4, 0, 1, 3], [1, 0, 2, 0, 0, 2, 2, 0, 3, 0, 2, 4], [2, 0, 2, 0, 0, 1, 2, 0, 4, 0, 2, 3], [2, 0, 1, 0, 0, 2, 2, 0, 3, 0, 2, 4], [2, 0, 2, 0, 0, 2, 1, 0, 4, 0, 2, 3]] \$$$

$$[-7y_1 - 7y_2 - 7y_3 + 9y_4 + 9y_5 - 7y_6 + 9y_7, 0, 7y_1, 0, 0, 7y_2, 7y_3, 7y_4, 7y_5, 0, 7y_6, 7y_7]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

888 . Coloring, {3, 7, 8, 10, 12}

R: [7, 7, 8, 6, A, A, A, B, B, 2, 1, 9]

B: [6, 8, 7, 7, 3, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 2, 0], [2, 4, 0, 0, 0, 0, 4, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$$$

$$[y_5, y_6, 0, 0, 0, y_4, y_3, y_4, 2y_4, y_2, y_1, 0]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 2, 4] , [0, 0, 3, 2, 4, 0, 4, 0, 0, 0, 2, 1] , [0, 0, 4, 2, 1, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 1, 4, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_1, y_2, y_3, y_5, y_4, y_5, 0, 0, y_6, y_7]$$

$$p = s^5 - s^8$$

889 . Coloring, {3, 7, 8, 11, 12}

R: [7, 7, 8, 6, A, A, A, B, B, C, 4, 9]

B: [6, 8, 7, 7, 3, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 3, 3, 4] , [0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 2, 3] , [0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 4, 0, 0, 2, 2, 2, 3] , [0, 0, 0, 2, 0, 3, 0, 0, 3, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 3, 3, 4]] \$

$$[0, 0, 0, y_1, 0, y_2, 2 y_3, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 2, 2, 2, 0, 0, 2, 1] , [2, 0, 4, 0, 1, 2, 3, 0, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 2, 4, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 2, 3, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 4, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 4, 2, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 3, 3, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 4, 4, 0, 0, 0, 3, 0]] \$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, 0, y_8, y_9]$$

890 . Coloring, {3, 7, 9, 10, 11}

R: [7, 7, 8, 6, A, A, A, C, C, 2, 4, 5]

B: [6, 8, 7, 7, 3, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 2, 2, 0, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[0, y_2, 0, 2 y_5, y_1, -3 y_5 + 2 y_3, y_6, y_5, 0, y_4, 0, y_3]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 4, 2] , [4, 0, 1, 0, 0, 2, 2, 0, 2, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 1, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 5, 2, 0, 0, 0, 1, 0] , [1, 0, 5, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 1, 5, 0, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 4, 0, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 1, 0, 0, 0, 4, 0]] \$

$$[y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, 0, y_7, 2 y_5]$$

$$p = -s^3 + s^8$$

891 . Coloring, {3, 7, 9, 10, 12}

R: [7, 7, 8, 6, A, A, A, C, C, 2, 1, 9]

B: [6, 8, 7, 7, 3, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 8	6 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 4, 0, 3], [0, 4, 0, 0, 0, 0, 4, 0, 3, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 0, 2, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 3, 0, 3]] \$$

$[-10 y_1 - 10 y_2 + 22 y_3 - 10 y_4 + 22 y_5, 4 y_1, 0, 0, 0, -5 y_1 - 5 y_2 + 11 y_3 - 5 y_4 + 11 y_5, 4 y_2, -5 y_1 - 5 y_2 + 11 y_3 - 5 y_4 + 11 y_5, 4 y_3, 4 y_4, 0, 4 y_5]$

$$p' = s^3 + s^4 - s^6 - s^7 \quad p = s^2 - s^8 \quad p' = s^2 - s^4 - s^5 + s^7$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 4, 2], [0, 0, 3, 4, 2, 0, 4, 0, 0, 0, 3, 0], [0, 0, 2, 3, 0, 0, 7, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0]] \$$

$[0, 0, y_6, y_5, y_4, y_3, y_2, y_3, 0, 0, y_1, 2 y_3]$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

892 . Coloring, $\{3, 7, 9, 11, 12\}$

R: [7, 7, 8, 6, A, A, A, C, C, C, 4, 9]

B: [6, 8, 7, 7, 3, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 0, 4, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$[0, 0, 0, 2 y_3, 0, y_5, 2 y_3, y_3, y_4, y_1, 0, y_2]$

$$p' = s^4 - s^6 \quad p = s^4 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 2, 2, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 4, 3, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 3, 2, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 3, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 4, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 4, 3, 0, 0, 0, 4, 0]] \$$

$[y_5, y_4, y_3, 0, y_4, y_2, y_1, y_7, 0, 0, y_6, 0]$

$$p = s^3 - s^8$$

893 . Coloring, {3, 7, 10, 11, 12}

R: [7, 7, 8, 6, A, A, A, C, B, 2, 4, 9]

B: [6, 8, 7, 7, 3, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 2, 0, 1, 3, 2, 1] , [0, 3, 0, 2, 0, 1, 4, 0, 1, 4, 1, 0] , [0, 4, 0, 1, 0, 2, 3, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[0, y_4, 0, y_3, 0, y_2, y_1, y_9, y_8, y_7, y_6, y_5]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 3, 3] , [3, 0, 3, 0, 3, 2, 2, 0, 0, 0, 3, 0] , [3, 0, 5, 0, 0, 3, 3, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 5, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 2, 3, 0, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 3, 3, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 5, 2, 0, 0, 0, 3, 0] , [3, 0, 5, 0, 0, 3, 3, 0, 0, 0, 2, 0]] \$

$$[y_7, 0, y_6, 0, y_5, y_4, y_3, y_2, 0, 0, y_1, 3 y_2]$$

$$p = -s^3 + s^8$$

894 . Coloring, {3, 8, 9, 10, 11}

R: [7, 7, 8, 6, A, A, B, B, C, 2, 4, 5]

B: [6, 8, 7, 7, 3, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 2, 2, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 3, 2, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 3, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 3, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 2, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 2, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 3, 2, 0, 0, 3, 2, 0]] \$

$$[0, y_6, 0, y_5, y_4, y_3, y_2, y_7, 0, y_1, -y_6 + y_5 - y_4 - y_3 + y_2 + 2 y_7 + y_1, y_7]$$

$$p' = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p = s^3 - s^9$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 9, 10, 11, 12\}\}$ order: 8
 See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 1, 3] , [1, 0, 1, 0, 0, 2, 2, 0, 3, 2, 2, 3] , [2, 0, 2, 0, 0, 1, 1, 0, 3, 2, 3, 2] , [3, 0, 1, 0, 0, 2, 2, 0, 2, 1, 3, 2] , [3, 0, 2, 0, 0, 3, 1, 0, 2, 2, 2, 1] , [2, 0, 3, 0, 0, 3, 2, 0, 1, 1, 2, 2] , [2, 0, 3, 0, 0, 2, 3, 0, 2, 2, 1, 1] , [1, 0, 2, 0, 0, 2, 3, 0, 1, 3, 2, 2] , [2, 0, 2, 0, 0, 1, 2, 0, 2, 3, 1, 3]] \$$

$$[y_4, 0, y_3, 0, 0, y_1, y_2, y_9, y_7, y_8, y_6, y_5]$$

895 . Coloring, $\{3, 8, 9, 10, 12\}$

R: [7, 7, 8, 6, A, A, B, B, C, 2, 1, 9]

B: [6, 8, 7, 7, 3, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6
 See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 0, 4, 0, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1]] \$$

$$[-3 y_1 - 6 y_3 - 3 y_2 + 13 y_4 - 3 y_5 - 3 y_6 + 13 y_7, 3 y_1, 0, 0, 0, 3 y_3, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7]$$

$$p = -s^4 - s^5 + s^7 + s^8 \quad p = s^4 - s^6 - s^7 + s^9$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
 See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2] , [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2] , [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4]] \$$

$$[0, 0, y_7, y_5, y_4, y_6, y_3, y_6, 0, y_2, y_6, y_1]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

896 . Coloring, {3, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s + s^2 + 3s^4 + 4s^5 + 8s^7 + 16s^8$$

R: [7, 7, 8, 6, A, A, B, B, C, C, 4, 9]

B: [6, 8, 7, 7, 3, 3, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 3, 4], [0, 0, 0, 3, 0, 3, 0, 0, 4, 2, 0, 4], [0, 0, 0, 0, 3, 0, 0, 4, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[0, 0, 0, y_7, 0, y_6, 2y_5, y_5, y_4, y_3, y_2, y_1]$$

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 1, 1], [1, 2, 3, 0, 1, 2, 2, 2, 0, 2, 0, 1], [0, 2, 3, 0, 1, 1, 3, 2, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 3, 2, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 2, 2, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 2, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 2, 3, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 2, 2, 0, 2, 0, 3], [0, 2, 3, 0, 3, 0, 2, 2, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 3, 2, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 3, 2, 0, 2, 0, 2]] \$$$

$$[y_1, y_2, y_3, 0, y_8, y_9, y_{10}, y_4, 0, y_5, y_6, y_7]$$

897 . Coloring, {3, 8, 10, 11, 12}

R: [7, 7, 8, 6, A, A, B, B, B, 2, 4, 9]

B: [6, 8, 7, 7, 3, 3, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 2, 0, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 4, 2, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 5, 1, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 2, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 2, 4, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 1, 5, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 2, 0, 0, 1, 5, 0]] \$

[0, y_4 , 0, y_3 , 0, y_2 , y_1 , y_7 , 2 y_7 , y_6 , y_5 , 0]

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 2, 2, 0, 0, 2, 0, 3] , [0, 0, 6, 0, 3, 0, 3, 0, 0, 2, 0, 2] , [0, 0, 3, 0, 2, 0, 6, 0, 0, 3, 0, 2] , [0, 0, 2, 0, 2, 0, 3, 0, 0, 6, 0, 3] , [0, 0, 2, 0, 3, 0, 2, 0, 0, 3, 0, 6] , [0, 0, 3, 0, 6, 0, 2, 0, 0, 2, 0, 3] , [0, 0, 6, 0, 3, 0, 3, 0, 0, 2, 0, 2]] \$

[2 y_5 , 0, y_2 , 0, y_1 , y_6 , y_7 , y_5 , 0, y_4 , 0, y_3]

$$p = -s^3 + s^8$$

898 . Coloring, {3, 9, 10, 11, 12}

R: [7, 7, 8, 6, A, A, B, C, C, 2, 4, 9]

B: [6, 8, 7, 7, 3, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 6, 7, 10, 11\}, \{9, 12\}\}$ order: 6
See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 2, 2], [0, 2, 0, 2, 0, 2, 2, 0, 2, 1, 2, 3], [0, 1, 0, 2, 0, 2, 2, 0, 3, 2, 2, 2], [0, 2, 0, 2, 0, 2, 1, 0, 2, 2, 2, 3], [0, 2, 0, 2, 0, 2, 2, 0, 3, 2, 1, 2], [0, 2, 0, 1, 0, 2, 2, 0, 2, 2, 2, 3], [0, 2, 0, 2, 0, 1, 2, 0, 3, 2, 2, 2], [0, 2, 0, 2, 0, 2, 2, 0, 2, 1, 2, 3], [0, 1, 0, 2, 0, 2, 2, 0, 3, 2, 2, 2]] \$$

$[0, 3y_1, 0, 8y_1 + 8y_2 - 3y_3 - 3y_6 + 8y_5 - 11y_7, 0, 3y_2, 3y_3, 5y_1 + 5y_2 - 3y_4 + 5y_5 - 8y_7, 3y_4, 3y_6, 3y_5, 3y_7]$

$$p = -s^2 + s^8 \quad p' = s^2 - s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 2, 2], [2, 0, 3, 0, 2, 2, 2, 0, 0, 2, 1, 2], [1, 0, 4, 0, 2, 2, 3, 0, 0, 2, 0, 2], [0, 0, 4, 0, 2, 1, 4, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 3, 0, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 3, 0, 2]] \$$

$[y_1, 0, y_5, 0, y_4, y_2, y_3, y_8, 0, y_9, y_7, y_6]$

899 . Coloring, $\{4, 5, 6, 7, 8\}$

$$\Omega p(\Delta)=0: \quad p' = 3s^2 + 2s^3 - 8s^4 + 8s^5 - 32s^7 \quad p = 3s^2 + 14s^3 - 24s^5 + 32s^6 - 32s^7 - 128s^8$$

R: [7, 7, 7, 7, 3, 3, A, B, B, C, 1, 5]

B: [6, 8, 8, 6, A, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 0, 4, 0, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 0, 4, 0, 0, 4, 0, 2] , [0, 0, 2, 0, 2, 0, 4, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 0, 0, 4, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 0, 4, 0, 0, 2, 0, 2] , [0, 0, 4, 0, 2, 0, 4, 0, 0, 4, 0, 2]] \$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, 0, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 2, 0, 2, 0, 2, 0, 2, 2, 2, 2, 2] , [0, 2, 0, 2, 0, 2, 0, 2, 2, 2, 0, 4] , [0, 2, 0, 0, 0, 2, 0, 2, 4, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 2, 4, 2, 0, 6] , [0, 2, 0, 0, 0, 0, 0, 2, 6, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, y_7 - y_6 + y_5 + y_4 + y_3 - y_2 - y_1, 0, y_7, 0, y_6, 0, y_5, y_4, y_3, y_2, y_1]$$

$$p = s^7 - s^8$$

900 . Coloring, {4, 5, 6, 7, 9}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, 3, A, C, C, C, 1, 5]

B: [6, 8, 8, 6, A, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 6	6 vs 7

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 0, 4, 0, 0, 2, 0, 4] , [0, 0, 2, 0, 4, 0, 4, 0, 0, 4, 0, 2] , [0, 0, 4, 0, 2, 0, 2, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 4, 0, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 4, 0, 2] , [0, 0, 4, 0, 2, 0, 4, 0, 0, 2, 0, 4]] \$

$$[y_1, 0, y_2, 0, y_3, 0, y_5, 0, 0, y_6, 0, y_4]$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 2, 0, 2, 2, 2, 4, 0], [0, 2, 0, 4, 0, 2, 0, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 4, 0, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 4, 0, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 0, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 0, 4, 0, 2, 2, 0], [0, 2, 0, 2, 0, 2, 0, 4, 0, 2, 4, 0]] \$$$

$$[0, y_1 - y_2 + y_3 + y_4 + y_5 - y_6, 0, y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, 0]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

901 . Coloring, {4, 5, 6, 7, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, C, B, 2, 1, 5]

B: [6, 8, 8, 6, A, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 2, 0, 4, 0, 0, 2, 1, 1], [1, 2, 2, 0, 1, 0, 6, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[y_3, y_1, y_2, 0, y_3, 0, y_4, 0, 0, y_5, y_6, y_6]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$\$ [[0, 0, 0, 2, 0, 2, 0, 2, 2, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 2, 4], [0, 0, 0, 2, 0, 3, 0, 0, 4, 2, 0, 5], [0, 0, 0, 0, 2, 0, 0, 5, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[0, 0, 0, y_2, 0, y_2 + y_1 + y_4 + y_5 - y_6 - y_3, 0, y_1, y_4, y_5, y_6, y_3]$$

$$p = s^6 - s^7$$

902 . Coloring, {4, 5, 6, 7, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, C, B, C, 4, 5]

B: [6, 8, 8, 6, A, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	6 vs 8

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 0, 4, 0, 0, 2, 1, 3], [0, 0, 2, 1, 3, 0, 4, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2]] \$$

$$[0, 0, y_1, y_2, y_3, 0, y_4, 0, 0, y_6, y_7, y_5]$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 2, 0, 2, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 0, 2, 1, 2, 2, 2], [2, 2, 0, 0, 0, 3, 0, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 2, 0, 2, 1, 3, 2, 2], [2, 3, 0, 0, 0, 2, 0, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2], [2, 2, 0, 0, 0, 2, 0, 2, 2, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 0, 2, 1, 2, 2, 2]] \$$

$$[-3 y_1 + 5 y_2 - 3 y_3 + 8 y_5, 3 y_4, 0, 0, 0, -3 y_4 + 8 y_2 - 3 y_6 + 5 y_5, 0, 3 y_1, 3 y_2, 3 y_3, 3 y_6, 3 y_5]$$

$$p = -s + s^7 \quad p' = -s + s^7$$

903 . Coloring, {4, 5, 6, 7, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, C, B, C, 1, 9]

B: [6, 8, 8, 6, A, A, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 2, 0, 0, 0, 4, 0, 2, 2, 1, 3], [1, 0, 0, 0, 0, 0, 4, 0, 3, 4, 2, 2], [2, 0, 0, 0, 0, 0, 1, 0, 2, 4, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 1, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 2, 4, 1], [4, 0, 0, 0, 0, 0, 2, 0, 1, 3, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 2, 1, 3]] \$$$

$$[-y_1 + y_2 - y_3 - y_4 + y_5 + y_6, 0, y_1, 0, 0, 0, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 2, 0, 2, 0, 2, 3, 1], [0, 2, 0, 3, 1, 2, 0, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 3, 0, 2, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 3, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 4, 0, 2, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 2, 0, 4, 2, 0]] \$$$

$$[0, y_1, 0, y_2, y_3, y_4, 0, y_5, 0, y_6, y_7, y_8]$$

904 . Coloring, {4, 5, 6, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, B, C, C, 1, 5]
B: [6, 8, 8, 6, A, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 6	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
 See Matrix

\$ [[2, 0, 2, 0, 2, 0, 4, 0, 0, 0, 3, 3] , [3, 0, 2, 0, 3, 0, 4, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, 0, 0, 0, y_5, y_6]$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 9, 10, 11, 12}} order: 8
 See Matrix

\$ [[0, 2, 0, 2, 0, 2, 0, 2, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 0, 2, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 1, 0, 4, 2, 2, 1, 2] , [0, 2, 0, 1, 0, 2, 0, 2, 2, 1, 2, 4] , [0, 1, 0, 2, 0, 1, 0, 2, 4, 2, 2, 2] , [0, 2, 0, 2, 0, 2, 0, 1, 2, 1, 4, 2] , [0, 1, 0, 4, 0, 2, 0, 2, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 4, 0, 1, 1, 2, 2, 2]] \$

$$[0, y_1, 0, y_2, 0, y_3, 0, y_4, y_5, y_6, y_7, y_8]$$

905 . Coloring, {4, 5, 6, 8, 10}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7 \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8$$

R: [7, 7, 7, 7, 3, 3, B, B, B, 2, 1, 5]
B: [6, 8, 8, 6, A, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	5 vs 6

Omega Rank for R : cycles: {{1, 7, 11}} order: 3
See Matrix

\$ [[2, 2, 2, 0, 2, 0, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[y_1, y_3, y_2, 0, y_3, 0, y_4, 0, 0, 0, y_5, 0]$$

$$p = s^3 - s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 4
See Matrix

\$ [[0, 0, 0, 2, 0, 2, 0, 2, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 0, 4, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$

$$[0, 0, 0, y_4, 0, y_5, 0, y_4, y_3, y_2, 0, y_1]$$

$$p = -s^4 + s^6$$

906 . Coloring, {4, 5, 6, 8, 11}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 8s^5 - 16s^6 \quad p' = s^3 - 8s^6 - 16s^7 \quad p = s^2 - 8s^5 - 16s^6$$

R: [7, 7, 7, 7, 3, 3, B, B, B, C, 4, 5]
B: [6, 8, 8, 6, A, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	6 vs 6	7 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 0, 2, 2, 2, 0, 4, 0, 0, 0, 4, 2] , [0, 0, 2, 4, 2, 0, 4, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$$[0, 0, y_1, y_3, y_2, 0, y_4, 0, 0, 0, y_6, y_5]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 2, 0, 2, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 2, 0, 2, 2, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 4, 4, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 2, 4, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$$$

$$[y_1, y_2, 0, 0, 0, y_3, 0, y_4, y_5, y_6, 0, y_7]$$

907 . Coloring, {4, 5, 6, 8, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, 3, B, B, B, C, 1, 9]

B: [6, 8, 8, 6, A, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	7 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 0, 2, 0, 0, 0, 4, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$$$

$$[y_4, 0, y_5, 0, 0, 0, y_1, 0, y_2, 0, y_3, y_5]$$

$$p = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[0, 2, 0, 2, 2, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 2, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 4, 0, 2]] \$$$

$$[0, y_1, 0, y_2, y_3, y_4, 0, y_5, 0, y_6, 0, y_7]$$

908 . Coloring, {4, 5, 6, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, 3, B, C, C, 2, 1, 5]

B: [6, 8, 8, 6, A, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 7	7 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 2, 0, 4, 0, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 6, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$$$

$$[y_2, y_6, y_1, 0, y_4, 0, y_3, 0, 0, 0, y_5, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 2, 0, 2, 2, 4, 2, 2], [0, 0, 0, 2, 0, 2, 0, 0, 2, 2, 4, 4], [0, 0, 0, 4, 0, 2, 0, 0, 4, 2, 2, 2], [0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 4, 2], [0, 0, 0, 4, 0, 2, 0, 0, 2, 4, 2, 2], [0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 2, 4], [0, 0, 0, 2, 0, 2, 0, 0, 4, 4, 2, 2]] \$$$

$$[0, 0, 0, y_3, 0, y_1, 0, y_2, y_4, y_5, y_6, y_7]$$

909 . Coloring, {4, 5, 6, 9, 11}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^5 + 32s^7 \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 + 32s^7 - 64s^8$$

R: [7, 7, 7, 7, 3, 3, B, C, C, C, 4, 5]
B: [6, 8, 8, 6, A, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 6	7 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
 See Matrix

\$ [[0, 0, 2, 2, 2, 0, 4, 0, 0, 0, 2, 4] , [0, 0, 2, 2, 4, 0, 4, 0, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 0, 4, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 8, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 4, 0, 0, 0, 8, 0] , [0, 0, 0, 8, 0, 0, 4, 0, 0, 0, 4, 0]] \$

$$[0, 0, y_1, y_2, y_4, 0, y_5, 0, 0, 0, y_3, y_6]$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6
 See Matrix

\$ [[2, 2, 0, 0, 0, 2, 0, 2, 2, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 4, 0, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 2, 0, 4, 0, 4, 2, 0]] \$

$$[y_7, y_6, 0, 0, 0, y_5, 0, y_4, y_3, y_2, y_1, 0]$$

910 . Coloring, {4, 5, 6, 9, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 - 32s^7 \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 - 32s^7 + 64s^8$$

R: [7, 7, 7, 7, 3, 3, B, C, C, C, 1, 9]
B: [6, 8, 8, 6, A, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	6 vs 7

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 0, 4, 0, 2, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 4, 0, 4, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 0, 2, 0, 4, 4] , [4, 0, 0, 0, 0, 0, 4, 0, 4, 0, 2, 2] , [2, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 4] , [4, 0, 0, 0, 0, 0, 2, 0, 4, 0, 4, 2]] \$

$$[3y_1, 0, -3y_1 - 3y_2 + 5y_5 - 3y_4 + 5y_3, 0, 0, 0, 3y_2, 0, 3y_5, 0, 3y_4, 3y_3]$$

$$p = -s^2 - s^3 + s^5 + s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 0, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 4, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 4, 0, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 0, 2, 0, 4, 2, 0]] \$

$$[0, y_1 - y_2 - y_3 + y_4 + y_5 - y_6, 0, y_1, y_2, y_3, 0, y_4, 0, y_5, y_6, 0]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

911 . Coloring, {4, 5, 6, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, C, B, 2, 4, 5]

B: [6, 8, 8, 6, A, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 4, 0, 0, 0, 3, 1] , [0, 0, 2, 3, 1, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 1, 4, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, 2 y_6, y_4, y_1, y_2, 0, y_3, 0, 0, 0, y_5, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 2, 0, 2, 2, 4, 1, 3], [1, 0, 0, 0, 0, 2, 0, 0, 3, 2, 2, 6], [2, 0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 5], [0, 0, 0, 0, 2, 0, 0, 5, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$$$

$$[y_1, 0, 0, 0, 0, y_7, 0, y_6, y_4, y_5, y_3, y_2]$$

912 . Coloring, {4, 5, 6, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, C, B, 2, 1, 9]

B: [6, 8, 8, 6, A, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 2, 2, 0, 0, 0, 4, 0, 2, 0, 3, 1], [3, 0, 0, 0, 0, 0, 6, 0, 1, 0, 6, 0], [6, 0, 0, 0, 0, 0, 3, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 6, 0, 0, 0, 3, 0], [3, 0, 0, 0, 0, 0, 7, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 3, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 6, 0, 0, 0, 3, 0]] \$$$

$$[y_1, 2 y_5, 2 y_5, 0, 0, 0, y_2, 0, y_4, 0, y_3, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 0, 2, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 2, 0, 0, 0, 4, 2, 4] , [0, 0, 0, 2, 4, 1, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

[0, 0, 0, $y_7, y_6, y_5, 0, y_4, 0, y_3, y_2, y_1$]

913 . Coloring, {4, 5, 6, 11, 12}

$\Omega p(\Delta)=0$: $p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$

R: [7, 7, 7, 7, 3, 3, B, C, B, C, 4, 9]

B: [6, 8, 8, 6, A, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 4, 0, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 6, 0, 0, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 7, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 0, 0, 0, 7, 0]] \$

[0, 0, 2 $y_1, 2 y_2, 0, 0, 2 y_5, 0, 2 y_4, 0, 2 y_3, 3 y_1$]

$p = s^3 - s^6$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 0, 2, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 2, 0, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 1, 0, 4, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 0, 4, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 2, 0, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 4, 0, 1, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 4, 0, 2, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 3, 0, 2, 0, 4, 2, 0]] \$

[$y_1, y_2, 0, 0, y_8, y_6, 0, y_7, 0, y_3, y_4, y_5$]

914 . Coloring, {4, 5, 7, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, A, A, B, C, C, 1, 5]

B: [6, 8, 8, 6, A, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 3, 1, 3], [1, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3]] \$$$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, 0, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 1, 3, 1], [0, 1, 2, 3, 0, 2, 0, 3, 1, 0, 2, 2], [0, 0, 2, 2, 0, 3, 0, 3, 2, 0, 1, 3], [0, 0, 3, 1, 0, 2, 0, 2, 3, 0, 2, 3], [0, 0, 2, 2, 0, 1, 0, 3, 3, 0, 3, 2], [0, 0, 1, 3, 0, 2, 0, 2, 2, 0, 3, 3], [0, 0, 2, 3, 0, 3, 0, 1, 3, 0, 2, 2], [0, 0, 3, 2, 0, 3, 0, 2, 2, 0, 3, 1], [0, 0, 3, 3, 0, 2, 0, 3, 1, 0, 2, 2]] \$$$

$$[0, y_1, y_2, y_3, 0, y_4, 0, y_5, y_6, y_7, y_8, y_9]$$

915 . Coloring, {4, 5, 7, 8, 10}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, A, B, B, 2, 1, 5]

B: [6, 8, 8, 6, A, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 3, 2, 0] , [2, 3, 2, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0]] \$

$$[y_1, y_2, y_3, 0, 2y_1 - 2y_3, 0, y_4, 0, 0, y_5, 2y_1 - 2y_3, 0]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 1, 2, 4] , [0, 0, 2, 2, 0, 2, 0, 1, 4, 0, 0, 5] , [0, 0, 2, 0, 0, 2, 0, 2, 5, 0, 0, 5] , [0, 0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, 0, y_3, y_2, 0, y_1, 0, y_6, y_5, y_4, 2y_4, y_7]$$

$$p = s^6 - s^8$$

916 . Coloring, {4, 5, 7, 8, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, A, B, B, C, 4, 5]

B: [6, 8, 8, 6, A, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 3, 2, 2], [0, 0, 2, 2, 2, 0, 3, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 4, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2], [0, 0, 4, 0, 2, 0, 3, 0, 0, 4, 0, 3]] \$$

$$[0, 0, y_4, y_3, y_2, 0, y_1, 0, 0, y_7, y_5, y_6]$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 1, 2, 2], [2, 1, 2, 0, 0, 2, 0, 3, 2, 0, 0, 4], [0, 0, 2, 0, 0, 2, 0, 3, 4, 0, 0, 5], [0, 0, 2, 0, 0, 0, 2, 5, 0, 0, 7], [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$$[2 y_2 - 2 y_6, y_2, y_1, 0, 0, y_4, 0, y_3, y_7, y_6, 2 y_6, y_5]$$

$$p' = -s^6 + s^8 \quad p = -s^6 + s^8$$

917 . Coloring, $\{4, 5, 7, 8, 12\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, A, B, B, C, 1, 9]

B: [6, 8, 8, 6, A, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 3, 0, 2, 4, 2, 3] , [2, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 4, 2, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 0, 3, 2, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 3, 2, 2]] \$

$$[-y_1 + y_2 - y_3 - y_4 + y_5 + y_6, 0, y_1, 0, 0, 0, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 1, 2, 2] , [0, 1, 2, 2, 2, 2, 0, 3, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 2, 0, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 0, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 2, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 4, 0, 2, 0, 3]] \$

$$[0, y_2, y_1, y_7, y_8, y_6, 0, y_5, 0, y_3, y_4, y_9]$$

918 . Coloring, {4, 5, 7, 9, 10}

$$\Omega p(\Delta)=0: p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, A, C, C, 2, 1, 5]

B: [6, 8, 8, 6, A, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_6, y_5, y_4, 0, y_3, 0, y_2, 0, 0, y_1, 0, y_6]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 1, 4, 2], [0, 0, 2, 4, 0, 2, 0, 1, 2, 0, 4, 1], [0, 0, 2, 4, 0, 4, 0, 2, 1, 0, 3, 0], [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0], [0, 0, 4, 3, 0, 3, 0, 4, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 0, 3, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0]] \$$$

$$[0, 0, y_3, y_2, 0, y_1, 0, y_7, y_8, y_6, y_4, y_5]$$

919 . Coloring, {4, 5, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, A, C, C, C, 4, 5]

B: [6, 8, 8, 6, A, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 6	7 vs 8

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 3, 0, 0, 4, 0, 3], [0, 0, 4, 0, 3, 0, 2, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 3, 0, 4]] \$$$

$$[0, 0, y_1, y_2, y_3, 0, y_4, 0, 0, y_5, 0, y_6]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 1, 4, 0], [4, 1, 2, 0, 0, 2, 0, 3, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 0, 4, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 0, 3, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0]] \$$$

$$[y_3, y_4, y_5, 0, 0, y_6, 0, y_7, 2y_1, y_1, y_2, 0]$$

$$p = -s^3 + s^8$$

920 . Coloring, {4, 5, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, A, C, C, C, 1, 9]

B: [6, 8, 8, 6, A, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 6	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 3, 0, 4], [0, 0, 0, 0, 0, 0, 3, 0, 4, 4, 0, 5], [0, 0, 0, 0, 0, 0, 0, 0, 5, 3, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[2y_4, 0, y_4, 0, 0, 0, y_3, 0, y_1, y_2, 0, 3y_4 - y_3 + y_1 + y_2]$$

$$p' = -s^4 + s^5 \quad p = s^4 - s^5$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 1, 4, 0], [0, 1, 2, 4, 0, 2, 0, 3, 0, 2, 2, 0], [0, 2, 2, 2, 0, 4, 0, 3, 0, 0, 3, 0], [0, 0, 4, 3, 0, 2, 0, 4, 0, 0, 3, 0], [0, 0, 2, 3, 0, 3, 0, 4, 0, 0, 4, 0], [0, 0, 3, 4, 0, 3, 0, 2, 0, 0, 4, 0], [0, 0, 3, 4, 0, 4, 0, 3, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 0, 3, 0, 0, 3, 0]] \$$$

$$[0, y_5, y_1, y_2, y_3, y_4, 0, y_6, 0, y_7, y_8, 0]$$

921 . Coloring, {4, 5, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, A, A, C, B, 2, 4, 5]

B: [6, 8, 8, 6, A, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_3, y_4, y_2, y_2, 0, y_1, 0, 0, y_5, y_6, y_6]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 1, 3, 3] , [3, 0, 2, 0, 0, 2, 0, 1, 3, 0, 2, 3] , [2, 0, 2, 0, 0, 3, 0, 2, 3, 0, 1, 3] , [1, 0, 3, 0, 0, 2, 0, 2, 3, 0, 2, 3] , [2, 0, 2, 0, 0, 1, 0, 3, 3, 0, 2, 3] , [2, 0, 1, 0, 0, 2, 0, 2, 3, 0, 3, 3] , [3, 0, 2, 0, 0, 2, 0, 1, 3, 0, 2, 3] , [2, 0, 2, 0, 0, 3, 0, 2, 3, 0, 1, 3]] \$

$$[-3y_1 - 3y_3 - 3y_2 - 3y_5 + 10y_6, 0, 3y_1, 0, 0, 3y_3, 0, 3y_2, -3y_4 + 3y_6, 3y_4, 3y_5, 3y_6]$$

$$p' = -s^2 + s^7 \quad p = -s^2 + s^7$$

922 . Coloring, {4, 5, 7, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, A, A, C, B, 2, 1, 9]

B: [6, 8, 8, 6, A, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 5, 0, 1, 4, 2, 0], [2, 4, 0, 0, 0, 0, 4, 0, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$$

$[y_2, y_1, y_3, 0, 0, 0, y_7, 0, y_5, y_6, y_4, y_3]$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}, \{5, 10, 12\}\}$

See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 0, 1, 0, 2, 2, 1], [0, 0, 2, 2, 1, 3, 0, 2, 0, 3, 1, 2], [0, 0, 3, 1, 2, 2, 0, 2, 0, 1, 2, 3], [0, 0, 2, 2, 3, 1, 0, 3, 0, 2, 2, 1], [0, 0, 1, 2, 1, 2, 0, 2, 0, 3, 3, 2], [0, 0, 2, 3, 2, 2, 0, 1, 0, 1, 2, 3], [0, 0, 2, 2, 3, 3, 0, 2, 0, 2, 1, 1]] \$$

$[0, 0, 3y_2, 3y_3, 3y_1, -3y_2 - 3y_3 + 5y_1 - 3y_4 + 5y_5 - 3y_6 + 5y_7, 0, 3y_4, 0, 3y_5, 3y_6, 3y_7]$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

923 . Coloring, $\{4, 5, 7, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, A, A, C, B, C, 4, 9]

B: [6, 8, 8, 6, A, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 4, 2, 3] , [0, 0, 0, 2, 0, 0, 1, 0, 3, 3, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 2, 4, 1] , [0, 0, 0, 4, 0, 0, 3, 0, 1, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 3, 1, 3]] \$

$$[0, 0, -y_1 + y_2 - y_6 - y_3 + y_4 + y_5, y_1, 0, 0, y_2, 0, y_6, y_3, y_4, y_5]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5
See Matrix

\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 0, 3, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 3, 0, 3, 0, 1, 3, 0] , [3, 1, 3, 0, 0, 2, 0, 4, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 3, 0, 4, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 3, 0, 2, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 4, 0, 3, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 0, 3, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 2, 0, 4, 0, 0, 3, 0]] \$

$$[y_1, y_8, y_7, 0, y_6, y_5, 0, y_4, 0, y_3, y_2, y_9]$$

924 . Coloring, {4, 5, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, A, B, B, C, 2, 1, 5]

B: [6, 8, 8, 6, A, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 1, 3, 1], [3, 1, 2, 0, 1, 0, 5, 0, 0, 0, 4, 0], [4, 0, 1, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$[y_1, y_3, y_2, 0, y_3, 0, y_4, 0, 0, y_6, y_5, y_6]$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 3, 1, 3], [0, 0, 2, 1, 0, 2, 0, 1, 3, 0, 2, 5], [0, 0, 2, 2, 0, 1, 0, 2, 5, 0, 3, 1], [0, 0, 1, 3, 0, 2, 0, 2, 1, 0, 5, 2], [0, 0, 2, 5, 0, 3, 0, 1, 2, 0, 1, 2], [0, 0, 3, 1, 0, 5, 0, 2, 2, 0, 2, 1], [0, 0, 5, 2, 0, 1, 0, 3, 1, 0, 2, 2], [0, 0, 1, 2, 0, 2, 0, 5, 2, 0, 1, 3]] \$$

$[0, 0, y_6, y_7, 0, y_5, 0, y_3, y_4, y_2, y_1, y_8]$

925 . Coloring, $\{4, 5, 8, 9, 11\}$

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^5 - 32s^7 \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 - 32s^7 + 64s^8$$

R: [7, 7, 7, 7, 3, A, B, B, C, C, 4, 5]

B: [6, 8, 8, 6, A, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 1, 3, 3], [0, 0, 2, 3, 3, 0, 3, 0, 0, 0, 4, 1], [0, 0, 3, 4, 1, 0, 5, 0, 0, 0, 3, 0], [0, 0, 1, 3, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0]] \$$

$$[0, 0, y_3, y_2, y_1, 0, y_7, 0, 0, y_6, y_5, y_4]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 3, 1, 1], [1, 3, 2, 0, 0, 2, 0, 3, 1, 0, 2, 2], [2, 0, 2, 0, 0, 1, 0, 5, 2, 0, 1, 3], [1, 0, 1, 0, 0, 2, 0, 2, 3, 0, 2, 5], [2, 0, 2, 0, 0, 1, 0, 1, 5, 0, 3, 2], [3, 0, 1, 0, 0, 2, 0, 2, 2, 0, 5, 1], [5, 0, 2, 0, 0, 3, 0, 1, 1, 0, 2, 2], [2, 0, 3, 0, 0, 5, 0, 2, 2, 0, 1, 1], [1, 0, 5, 0, 0, 2, 0, 3, 1, 0, 2, 2]] \$$$

$$[y_3, y_4, y_2, 0, 0, y_1, 0, y_6, y_5, y_8, y_9, y_7]$$

926 . Coloring, {4, 5, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p' = -s^2 - 2s^3 + 8s^4 + 8s^5 - 32s^7 \quad p = s^2 + 2s^3 - 8s^4 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, A, B, B, C, C, 1, 9]

B: [6, 8, 8, 6, A, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3]] \$$$

$$[3 y_4, 0, 3 y_3, 0, 0, 0, 3 y_2, 0, 3 y_1, 3 y_3, -3 y_4 + 7 y_3 - 3 y_2 + 10 y_1, 3 y_3 + 3 y_1]$$

$$p' = -s^2 + s^5 \quad p' = -s^3 + s^6 \quad p = -s^2 + s^5$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 0, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 1, 0, 5, 0, 1, 0, 3], [0, 1, 1, 0, 3, 0, 0, 4, 0, 2, 0, 5], [0, 2, 0, 0, 5, 0, 0, 2, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 2, 0, 5, 0, 2], [0, 5, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 5, 0, 2, 0, 3], [0, 2, 0, 0, 3, 0, 0, 4, 0, 2, 0, 5]] \$$$

$$[0, y_2, y_1, y_9, y_8, y_7, 0, y_6, 0, y_5, y_4, y_3]$$

927 . Coloring, {4, 5, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, B, B, B, 2, 4, 5]

B: [6, 8, 8, 6, A, 3, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	6 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 1, 4, 0], [0, 1, 2, 4, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0]] \$$$

$$[0, y_4, 2y_4 - 3y_1, y_3, 2y_1, 0, y_2, 0, 0, y_1, y_5, 0]$$

$$p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 3, 0, 4], [0, 0, 2, 0, 0, 2, 0, 1, 4, 0, 0, 7], [0, 0, 2, 0, 0, 0, 0, 2, 7, 0, 0, 5], [0, 0, 0, 0, 0, 2, 5, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[2y_1, 0, 2y_2, 0, 0, 2y_3, 0, 2y_4, 2y_5, 3y_1, 0, 2y_6]$$

$$p = -s^5 + s^7$$

928 . Coloring, {4, 5, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, B, B, B, 2, 1, 9]

B: [6, 8, 8, 6, A, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 1, 4, 0], [4, 1, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[y_2, y_1, y_4, 0, 0, 0, y_5, 0, 2y_4, y_4, y_3, 0]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 3, 0, 4], [0, 0, 2, 0, 4, 2, 0, 1, 0, 2, 0, 5], [0, 0, 2, 0, 5, 0, 0, 2, 0, 4, 0, 3], [0, 0, 0, 3, 0, 0, 2, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 3, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 6, 0, 3], [0, 0, 0, 0, 3, 0, 0, 0, 0, 7, 0, 6]] \$$$

$$[0, 0, y_1, y_2, y_3, y_4, 0, y_5, 0, y_6, 0, y_7]$$

929 . Coloring, {4, 5, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, B, B, B, C, 4, 9]

B: [6, 8, 8, 6, A, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

[0, 0, $y_4, y_1, 0, 0, y_2, 0, y_6, y_4, y_5, y_3$]

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 2, 0, 3, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 0, 5, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 4, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 2, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 2, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 5, 0, 2, 0, 3]] \$

[$y_1, y_2, y_3, 0, y_4, y_5, 0, y_6, 0, y_7, 0, y_8$]

930 . Coloring, {4, 5, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, B, C, C, 2, 4, 5]

B: [6, 8, 8, 6, A, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 1, 2, 2] , [0, 1, 2, 2, 2, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, y_1, y_2, y_3, 2y_1 - 2y_6, 0, y_5, 0, 0, y_6, y_4, 2y_6]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 3, 2, 2] , [2, 0, 2, 0, 0, 2, 0, 1, 2, 0, 4, 3] , [4, 0, 2, 0, 0, 2, 0, 2, 3, 0, 3, 0] , [3, 0, 2, 0, 0, 4, 0, 2, 0, 0, 5, 0] , [5, 0, 4, 0, 0, 3, 0, 2, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 5, 0, 4, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 2, 0, 3, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 5, 0, 0, 3, 0]] \$

$$[y_8, 0, y_7, 0, 0, y_6, 0, y_5, y_4, y_3, y_2, y_1]$$

931 . Coloring, {4, 5, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, B, C, C, 2, 1, 9]

B: [6, 8, 8, 6, A, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 1, 2, 2] , [2, 1, 0, 0, 0, 0, 5, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 2] , [5, 0, 0, 0, 0, 4, 0, 2, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 2]] \$

$$[y_1, y_2, y_3, 0, 0, 0, -y_1 - y_2 - 2y_3 + 6y_5 - y_4, 0, y_5, y_3, y_4, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}, {5, 10, 12}}

See Matrix

$$\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 3, 2, 2], [0, 0, 2, 2, 2, 2, 0, 1, 0, 2, 2, 3], [0, 0, 2, 2, 3, 2, 0, 2, 0, 2, 1, 2], [0, 0, 2, 1, 2, 2, 0, 2, 0, 3, 2, 2], [0, 0, 2, 2, 2, 1, 0, 2, 0, 2, 2, 3], [0, 0, 1, 2, 3, 2, 0, 2, 0, 2, 2, 2], [0, 0, 2, 2, 2, 2, 0, 1, 0, 3, 2, 2], [0, 0, 2, 2, 2, 2, 0, 2, 0, 2, 1, 3]] \$$$

$$[0, 0, 7y_1, -7y_1 + 9y_3 - 7y_4 - 7y_2 + 9y_5 - 7y_6 + 9y_7, 7y_3, 7y_4, 0, 7y_2, 0, 7y_5, 7y_6, 7y_7]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

932 . Coloring, {4, 5, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, B, C, C, C, 4, 9]

B: [6, 8, 8, 6, A, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 1, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 4, 3], [0, 0, 0, 4, 0, 0, 2, 0, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 4, 0, 4, 0, 2, 3], [0, 0, 0, 2, 0, 0, 3, 0, 3, 0, 4, 4], [0, 0, 0, 4, 0, 0, 2, 0, 4, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2, 4]] \$$$

$$[0, 0, 7y_1 + 7y_2 - 9y_5 + 7y_3 - 9y_4, 2y_1, 0, 0, 2y_2, 0, 2y_5, 7y_1 + 7y_2 - 9y_5 + 7y_3 - 9y_4, 2y_3, 2y_4]$$

$$p = s^2 - s^4 - s^5 + s^7 \quad p' = s^2 + s^3 - s^5 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 3, 2, 0] , [2, 3, 2, 0, 0, 2, 0, 3, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 2, 0, 5, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 2, 0, 4, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 3, 0, 2, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 5, 0, 2, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 4, 0, 3, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 0, 5, 0, 0, 3, 0]] \$

[y₃, y₁, y₂, 0, y₅, y₄, 0, y₈, 0, y₇, y₆, 0]

933 . Coloring, {4, 5, 10, 11, 12}

$\Omega p(\Delta)=0: p' = -3s^2 + 2s^3 - 8s^4 - 8s^5 - 32s^7$ $p = 3s^2 + 10s^3 + 40s^5 + 32s^6 + 32s^7 + 128s^8$

R: [7, 7, 7, 7, 3, A, B, C, B, 2, 4, 9]

B: [6, 8, 8, 6, A, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	9 vs 9	8 vs 9	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 5, 0, 1, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

[0, y₅, y₄, y₃, 0, 0, y₂, 0, y₅, y₄, y₁, y₄]

$p = -s^3 + s^6$ $p' = -s^3 + s^6$ $p' = -s^4 + s^7$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 8, 11}}

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 1, 0, 2, 2, 3] , [2, 0, 2, 0, 3, 1, 0, 2, 0, 3, 1, 2] , [1, 0, 1, 0, 2, 2, 0, 2, 0, 3, 2, 3] , [2, 0, 2, 0, 3, 1, 0, 1, 0, 2, 2, 3] , [2, 0, 1, 0, 3, 2, 0, 2, 0, 3, 1, 2] , [1, 0, 2, 0, 2, 2, 0, 1, 0, 3, 2, 3] , [2, 0, 2, 0, 3, 1, 0, 2, 0, 2, 1, 3]] \$

$$[y_4, 0, y_3, 0, y_2, y_1, 0, -y_4 - y_3 + y_2 - y_1 + y_7 - y_6 + y_5, 0, y_7, y_6, y_5]$$

$$p = s + s^2 + s^3 - s^6 - s^7 - s^8$$

934 . Coloring, {4, 6, 7, 8, 9}

$$\Omega p(\Delta)=0: \quad p = 9s^2 - 4s^4 + 24s^5 - 16s^6 + 96s^7 - 64s^8 \quad p' = 3s^2 + 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, 3, A, B, C, C, 1, 5]

B: [6, 8, 8, 6, 3, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	8 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 4, 0, 0, 3, 1, 3], [1, 0, 0, 0, 3, 0, 3, 0, 0, 6, 0, 3], [0, 0, 0, 0, 3, 0, 1, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$$$

$$[y_1, 0, y_5, 0, y_2, 0, y_3, 0, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 0, 2, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 0, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 3, 0, 1, 2, 2, 1, 3], [0, 2, 0, 1, 0, 2, 0, 2, 3, 3, 2, 1], [0, 3, 0, 2, 0, 1, 0, 2, 1, 2, 3, 2], [0, 2, 0, 3, 0, 2, 0, 3, 2, 1, 1, 2], [0, 1, 0, 1, 0, 3, 0, 2, 2, 2, 2, 3], [0, 2, 0, 2, 0, 1, 0, 1, 3, 3, 2, 2], [0, 3, 0, 2, 0, 2, 0, 2, 2, 1, 3, 1]] \$$$

$$[0, y_7, y_8, y_9, 0, y_1, 0, y_2, y_3, y_4, y_5, y_6]$$

935 . Coloring, {4, 6, 7, 8, 10}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, A, B, B, 2, 1, 5]

B: [6, 8, 8, 6, 3, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_3, y_2, y_1, 0, 2y_1, 0, y_5, 0, 0, y_4, 2y_1, 0]$$

$$p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 1, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 1, 4, 2, 0, 5] , [0, 0, 0, 0, 0, 2, 0, 0, 5, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, y_1, -2y_1 + 2y_3, 0, y_2, 0, y_3, y_6, y_4, 2y_1, y_5]$$

$$p = -s^5 + s^7 \quad p' = -s^5 + s^7$$

936 . Coloring, {4, 6, 7, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, A, B, B, C, 4, 5]

B: [6, 8, 8, 6, 3, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 3, 2, 2] , [0, 0, 0, 2, 2, 0, 3, 0, 0, 6, 0, 3] , [0, 0, 0, 0, 3, 0, 2, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[0, 0, y_1, y_2, y_4, 0, y_3, 0, 0, y_5, 2y_1, y_6]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 1, 2, 2] , [2, 1, 0, 0, 0, 2, 0, 3, 2, 2, 0, 4] , [0, 2, 0, 0, 0, 2, 0, 1, 4, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 2, 5, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[y_2, y_6, y_1, 0, 0, y_5, 0, y_4, y_3, y_7, 2y_1, y_8]$$

$$p = s^7 - s^9$$

937 . Coloring, {4, 6, 7, 8, 12}

$$\Omega p(\Delta)=0: \quad p = -s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, A, B, B, C, 1, 9]

B: [6, 8, 8, 6, 3, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6
See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 3, 2, 2], [2, 0, 0, 0, 0, 0, 3, 0, 2, 4, 2, 3], [2, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 4], [2, 0, 0, 0, 0, 2, 0, 4, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 2, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 3, 2, 2]] \$$

$$[-y_2 + y_1 - y_5 - y_6 + y_4 + y_3, 0, y_2, 0, 0, 0, y_1, 0, y_5, y_6, y_4, y_3]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8
See Matrix

$\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 1, 2, 2], [0, 1, 2, 2, 2, 2, 0, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 2, 0, 3, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 0, 4, 0, 2, 0, 3], [0, 2, 3, 0, 3, 0, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$$

$$[0, y_9, y_7, y_8, y_6, y_5, 0, y_4, 0, y_3, y_2, y_1]$$

938 . Coloring, $\{4, 6, 7, 9, 10\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, 3, A, C, C, 2, 1, 5]

B: [6, 8, 8, 6, 3, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 3, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0] , [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 3, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0]] \$

$$[2 y_5, y_4, y_5, 0, y_1, 0, y_2, 0, 0, y_3, 0, 2 y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 1, 2, 2, 4, 1] , [0, 0, 0, 4, 0, 4, 0, 0, 1, 2, 3, 2] , [0, 0, 0, 3, 0, 4, 0, 0, 2, 4, 1, 2] , [0, 0, 0, 1, 0, 3, 0, 0, 2, 4, 2, 4] , [0, 0, 0, 2, 0, 1, 0, 0, 4, 3, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 1, 4, 3] , [0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 4, 1]] \$

$$[0, 0, y_3, y_1, 0, y_2, 0, y_8, y_6, y_7, y_4, y_5]$$

939 . Coloring, {4, 6, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, A, C, C, C, 4, 5]

B: [6, 8, 8, 6, 3, A, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 3, 0, 4] , [0, 0, 0, 0, 4, 0, 3, 0, 0, 6, 0, 3] , [0, 0, 0, 0, 3, 0, 0, 0, 0, 7, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 3, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 6, 0, 3] , [0, 0, 0, 0, 3, 0, 0, 0, 0, 7, 0, 6]] \$

$$[0, 0, y_1, 2y_1, y_2, 0, y_4, 0, 0, y_3, 0, y_5]$$

$$p = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 1, 4, 0], [4, 1, 0, 0, 0, 2, 0, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 4, 0, 1, 0, 2, 3, 0], [3, 2, 0, 0, 0, 4, 0, 2, 0, 4, 1, 0], [1, 4, 0, 0, 0, 3, 0, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 1, 0, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 0, 4, 0, 1, 4, 0], [4, 1, 0, 0, 0, 2, 0, 3, 0, 2, 4, 0]] \$$$

$$[y_7, y_6, y_5, 0, 0, y_4, 0, y_3, 2y_5, y_2, y_1, 0]$$

$$p = -s^2 + s^8$$

940 . Coloring, {4, 6, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, 3, A, C, C, C, 1, 9]

B: [6, 8, 8, 6, 3, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 6	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 3, 0, 4], [0, 0, 0, 0, 0, 0, 3, 0, 4, 4, 0, 5], [0, 0, 0, 0, 0, 0, 0, 0, 5, 3, 0, 8], [0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[2y_1, 0, y_1, 0, 0, 0, 3y_1 + y_2 + y_3 - y_4, 0, y_2, y_3, 0, y_4]$$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 1, 4, 0] , [0, 1, 2, 4, 0, 2, 0, 3, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 0, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 2, 0, 2, 0, 4, 3, 0] , [0, 4, 0, 3, 0, 3, 0, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 3, 0, 4, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 0, 2, 0, 3, 4, 0] , [0, 3, 0, 4, 0, 2, 0, 3, 0, 2, 2, 0]] \$

[0, y₄, y₅, y₃, y₁, y₂, 0, y₈, 0, y₇, y₆, 0]

941 . Coloring, {4, 6, 7, 10, 11}

$\Omega p(\Delta)=0$: $p = s^2 - 4s^4 - 8s^5 - 16s^6 + 32s^7 + 64s^8$ $p' = s^2 - 2s^3 - 8s^5 + 32s^7$

R: [7, 7, 7, 7, A, 3, A, C, B, 2, 4, 5]

B: [6, 8, 8, 6, 3, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 3, 1, 1] , [0, 3, 0, 1, 1, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

[0, y₁, y₅, y₃, y₃, 0, y₂, 0, 0, y₄, y₅, y₅]

$p' = s^4 - s^7$ $p' = -s^3 + s^6$ $p = -s^3 + s^6$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 1, 3, 2, 2, 3] , [2, 0, 0, 0, 0, 3, 0, 0, 3, 2, 1, 5] , [1, 0, 0, 0, 0, 2, 0, 0, 5, 3, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[y₈, 0, y₇, 0, 0, y₆, 0, y₄, y₅, y₃, y₁, y₂]

942 . Coloring, {4, 6, 7, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, 3, A, C, B, 2, 1, 9]

B: [6, 8, 8, 6, 3, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\begin{aligned} \$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 5, 0, 1, 4, 2, 0], [2, 4, 0, 0, 0, 0, 4, 0, 0, 5, 1, 0], [1, 5, \\ 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, \\ 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$ \end{aligned}$$

$$[y_5, y_1, y_7, 0, 0, 0, y_2, 0, y_3, y_4, y_6, y_7]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{3, 4, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 0, 1, 0, 2, 2, 1], [0, 0, 3, 2, 1, 3, 0, 2, 0, 2, 1, 2], [0, 0, \\ 1, 1, 2, 2, 0, 3, 0, 3, 2, 2], [0, 0, 2, 2, 2, 1, 0, 1, 0, 2, 3, 3], [0, 0, 2, 3, 3, 2, 0, 2, 0, 1, 1, 2], [0, 0, 3, 1, 2, 3, \\ 0, 2, 0, 2, 2, 1], [0, 0, 2, 2, 1, 1, 0, 3, 0, 3, 2, 2]] \$ \end{aligned}$$

$$[0, 0, y_1, y_2, y_3, y_5, 0, y_4, 0, y_8, y_6, y_7]$$

943 . Coloring, {4, 6, 7, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7 \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 + 32s^7 - 64s^8$$

R: [7, 7, 7, 7, A, 3, A, C, B, C, 4, 9]

B: [6, 8, 8, 6, 3, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 4, 2, 3] , [0, 0, 0, 2, 0, 0, 1, 0, 3, 3, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 2, 4, 1] , [0, 0, 0, 4, 0, 0, 3, 0, 1, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 3, 1, 3]] \$

$$[0, 0, -y_1 + y_2 - y_3 - y_4 + y_6 + y_5, y_1, 0, 0, y_2, 0, y_3, y_4, y_6, y_5]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 0, 3, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 3, 0, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 0, 3, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 0, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 0, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 0, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 0, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 0, 3, 0, 2, 3, 0]] \$

$$[y_1, y_7, y_6, 0, y_5, y_4, 0, y_3, 0, y_2, y_9, y_8]$$

944 . Coloring, {4, 6, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7 \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 + 32s^7 - 64s^8$$

R: [7, 7, 7, 7, A, 3, B, B, C, 2, 1, 5]

B: [6, 8, 8, 6, 3, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 1, 3, 1], [3, 1, 0, 0, 1, 0, 5, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 4, 0, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$[y_1, y_2, y_6, 0, y_4, 0, y_3, 0, 0, y_5, y_7, y_6]$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{4, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 3, 1, 3], [0, 0, 0, 1, 0, 2, 0, 1, 3, 2, 2, 5], [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 5, 2], [0, 0, 0, 5, 0, 3, 0, 0, 2, 2, 3, 1], [0, 0, 0, 3, 0, 5, 0, 0, 1, 3, 2, 2], [0, 0, 0, 2, 0, 3, 0, 0, 2, 5, 1, 3], [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 2, 5]] \$$

$[0, 0, y_1, y_4, 0, y_2, 0, y_3, y_5, y_6, y_8, y_7]$

945 . Coloring, $\{4, 6, 8, 9, 11\}$

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 - 32s^7 \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 - 32s^7 - 64s^8$$

R: $[7, 7, 7, 7, A, 3, B, B, C, C, 4, 5]$

B: $[6, 8, 8, 6, 3, A, A, C, B, 2, 1, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 1, 3, 3], [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 4, 1], [0, 0, 0, 4, 1, 0, 3, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 3, 3], [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 4, 1], [0, 0, 0, 4, 1, 0, 3, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 3, 3]] \$$

$$[0, 0, y_2, y_1, y_4, 0, 4y_2 + 4y_1 + 5y_4 - 6y_3, 0, 0, -2y_2 - 2y_1 - 4y_4 + 5y_3, y_3, 5y_2 + 5y_1 + 6y_4 - 8y_3]$$

$$p' = -s^3 + s^6 \quad p' = -s^2 + s^5 \quad p = -s^2 + s^5$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2], [2, 2, 0, 0, 0, 1, 0, 3, 2, 2, 1, 3], [1, 2, 0, 0, 0, 2, 0, 2, 3, 1, 2, 3], [2, 1, 0, 0, 0, 1, 0, 2, 3, 2, 3, 2], [3, 2, 0, 0, 0, 2, 0, 1, 2, 1, 3, 2], [3, 1, 0, 0, 0, 3, 0, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 3, 0, 1, 1, 3, 2, 2], [2, 3, 0, 0, 0, 2, 0, 2, 2, 3, 1, 1]] \$$$

$$[y_1, y_5, y_4, 0, 0, y_3, 0, y_2, y_8, y_9, y_7, y_6]$$

946 . Coloring, {4, 6, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, 3, B, B, C, C, 1, 9]

B: [6, 8, 8, 6, 3, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3]] \$$$

$$[-3y_2 - 3y_1 + 10y_4 - 3y_3, 0, 3y_2, 0, 0, 0, 3y_1, 0, -3y_2 + 3y_4, 3y_2, 3y_3, 3y_4]$$

$$p = s^2 - s^5 \quad p' = -s^2 + s^5 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 2, 0, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 1, 0, 5, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 0, 3, 0, 1, 0, 5] , [0, 1, 3, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3]] \$

$$[0, y_1, y_5, y_2, y_3, y_4, 0, y_6, 0, y_7, y_8, y_9]$$

947 . Coloring, {4, 6, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, 3, B, B, B, 2, 4, 5]

B: [6, 8, 8, 6, 3, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	5 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 5, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, y_4, y_3, y_2, 2y_3, 0, y_1, 0, 0, y_6, y_5, 0]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 1, 4, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[2y_5, 0, y_5, 0, 0, -2y_5 + 2y_3, 0, y_3, y_4, y_2, 0, y_1]$$

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6$$

948 . Coloring, {4, 6, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, B, B, B, 2, 1, 9]

B: [6, 8, 8, 6, 3, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 1, 4, 0], [4, 1, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[y_2, y_3, y_5, 0, 0, 0, y_4, 0, 2y_5, y_5, y_1, 0]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[0, 0, 1, 2, 2, 0, 2, 0, 3, 0, 4], [0, 0, 2, 0, 4, 2, 0, 1, 0, 2, 0, 5], [0, 0, 4, 0, 5, 0, 0, 2, 0, 2, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3]] \$$$

$$[0, 0, y_3, y_1, y_2, y_7, 0, y_6, 0, y_5, 0, y_4]$$

949 . Coloring, {4, 6, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 8s^5 - 24s^6 - 16s^7 - 64s^8 \quad p' = s^3 + 4s^4 + 8s^5 + 8s^6 + 16s^7$$

R: [7, 7, 7, 7, A, 3, B, B, B, C, 4, 9]

B: [6, 8, 8, 8, 6, 3, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

[0, 0, y₅, y₆, 0, 0, y₄, 0, y₃, y₅, y₂, y₁]

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 2, 0, 3, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 0, 5, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5]] \$

[y₄, y₃, y₂, 0, y₁, y₆, 0, y₅, 0, y₈, 0, y₇]

950 . Coloring, {4, 6, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, 3, B, C, C, 2, 4, 5]

B: [6, 8, 8, 8, 6, 3, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 1, 2, 2] , [0, 1, 0, 2, 2, 0, 5, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 3, 0, 0, 2, 5, 0] , [0, 2, 0, 5, 0, 0, 6, 0, 0, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 7, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 6, 0, 0, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 7, 0, 0, 0, 6, 0]] \$

$$[0, y_2, y_1, y_5, y_4, 0, y_3, 0, 0, y_7, y_6, 2y_1]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 3, 2, 2] , [2, 0, 0, 0, 0, 2, 0, 1, 2, 2, 4, 3] , [4, 0, 0, 0, 0, 2, 0, 0, 3, 2, 3, 2] , [3, 0, 0, 0, 0, 4, 0, 0, 2, 2, 3, 2] , [3, 0, 0, 0, 0, 3, 0, 0, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 3, 0, 0, 2, 3, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 3, 2, 3] , [2, 0, 0, 0, 0, 2, 0, 0, 3, 2, 4, 3]] \$

$$[y_1, 0, y_2, 0, 0, y_6, 0, y_4, y_5, y_3, y_8, y_7]$$

951 . Coloring, {4, 6, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, B, C, C, 2, 1, 9]

B: [6, 8, 8, 6, 3, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 1, 2, 2], [2, 1, 0, 0, 0, 0, 5, 0, 2, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 2], [5, 0, 0, 0, 0, 4, 0, 2, 0, 3, 2], [3, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 2], [3, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 2]] \$$

$$[y_1, -y_1 - 2y_4 - y_3 + 6y_5 - y_2, y_4, 0, 0, 0, y_3, 0, y_5, y_4, y_2, y_5]$$

$$p' = s^3 - s^6 \quad p' = s^4 - s^7 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: $\{\{3, 4, 5, 6, 8, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 3, 2, 2], [0, 0, 2, 2, 2, 2, 0, 1, 0, 2, 2, 3], [0, 0, 2, 2, 3, 2, 0, 2, 0, 2, 1, 2], [0, 0, 3, 1, 2, 2, 0, 2, 0, 2, 2, 2], [0, 0, 2, 2, 2, 2, 1, 0, 3, 0, 2, 2], [0, 0, 2, 2, 2, 2, 0, 2, 0, 1, 3, 2], [0, 0, 2, 3, 2, 2, 0, 2, 0, 2, 2, 1], [0, 0, 2, 2, 1, 3, 0, 2, 0, 2, 2, 2]] \$$

$$[0, 0, y_4, y_3, y_2, y_1, 0, y_7, 0, y_6, y_5, y_8]$$

952 . Coloring, $\{4, 6, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, B, C, C, C, 4, 9]

B: [6, 8, 8, 6, 3, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 1, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 4, 3], [0, 0, 0, 4, 0, 0, 2, 0, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 4, 0, 4, 0, 2, 3], [0, 0, 0, 2, 0, 0, 3, 0, 3, 0, 4, 4], [0, 0, 0, 4, 0, 0, 2, 0, 4, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2, 4]] \$$

$$[0, 0, 7y_5 + 7y_4 - 9y_3 + 7y_2 - 9y_1, 2y_5, 0, 0, 2y_4, 0, 2y_3, 7y_5 + 7y_4 - 9y_3 + 7y_2 - 9y_1, 2y_2, 2y_1]$$

$$p' = s^2 + s^3 - s^5 - s^6 \quad p = s^2 - s^4 - s^5 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 3, 2, 0], [2, 3, 2, 0, 0, 2, 0, 3, 0, 2, 2, 0], [2, 2, 0, 0, 0, 2, 0, 5, 0, 2, 3, 0], [3, 2, 0, 0, 0, 2, 0, 2, 0, 2, 5, 0], [5, 2, 0, 0, 0, 3, 0, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 5, 0, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 0, 2, 0, 5, 2, 0], [2, 5, 0, 0, 0, 2, 0, 3, 0, 2, 2, 0]] \$$$

$$[y_8, y_7, y_6, 0, y_5, y_4, 0, y_3, 0, y_2, y_1, 0]$$

953 . Coloring, {4, 6, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 2s^3 - 8s^5 - 32s^7 \quad p' = -s^2 + 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, 3, B, C, B, 2, 4, 9]

B: [6, 8, 8, 6, 3, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 8	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 5, 0, 1, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$$$

$$[0, y_5, y_4, y_1, 0, 0, y_2, 0, y_5, y_4, y_3, y_4]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 1, 0, 2, 2, 3] , [2, 0, 3, 0, 3, 1, 0, 2, 0, 2, 1, 2] , [1, 0, 3, 0, 2, 2, 0, 3, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 1, 0, 3, 0, 2, 3, 1] , [3, 0, 2, 0, 1, 2, 0, 2, 0, 1, 3, 2] , [3, 0, 1, 0, 2, 3, 0, 2, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 3, 0, 1, 0, 3, 2, 2]] \$

$$[y_1, 0, y_8, 0, y_7, y_6, 0, y_5, 0, y_4, y_3, y_2]$$

954 . Coloring, {4, 7, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, A, B, C, 2, 1, 5]

B: [6, 8, 8, 6, 3, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[2, 2, 0, 0, 2, 0, 4, 0, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_2, y_1, 0, 0, y_2, 0, y_3, 0, 0, y_4, y_5, y_5]$$

$$p = s^3 - s^6 \quad p' = s^3 - s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[0, 0, 2, 2, 0, 2, 0, 2, 2, 0, 3, 3] , [0, 0, 2, 3, 0, 2, 0, 2, 3, 0, 2, 2] , [0, 0, 2, 2, 0, 3, 0, 2, 2, 0, 3, 2] , [0, 0, 3, 3, 0, 2, 0, 2, 2, 0, 2, 2] , [0, 0, 2, 2, 0, 3, 0, 3, 2, 0, 2, 2] , [0, 0, 3, 2, 0, 2, 0, 2, 2, 0, 2, 3] , [0, 0, 2, 2, 0, 2, 0, 3, 3, 0, 2, 2]] \$

$$[0, 0, y_1, y_7, 0, y_6, 0, y_5, y_4, 0, y_3, y_2]$$

955 . Coloring, {4, 7, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, A, B, C, C, 4, 5]

B: [6, 8, 8, 6, 3, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 6	8 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 2, 0, 4, 0, 0, 4, 1, 3], [0, 0, 0, 1, 3, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$$

$$[0, 0, 0, y_1, y_2, 0, y_6, 0, 0, y_3, y_4, y_5]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

$$\$ [[2, 2, 2, 0, 0, 2, 0, 2, 2, 0, 3, 1], [3, 0, 2, 0, 0, 2, 0, 4, 1, 0, 2, 2], [2, 0, 2, 0, 0, 3, 0, 2, 2, 0, 1, 4], [1, 0, 3, 0, 0, 2, 0, 2, 4, 0, 2, 2], [2, 0, 2, 0, 0, 1, 0, 3, 2, 0, 4, 2], [4, 0, 1, 0, 0, 2, 0, 2, 2, 0, 2, 3], [2, 0, 2, 0, 0, 4, 0, 1, 3, 0, 2, 2], [2, 0, 4, 0, 0, 2, 0, 2, 2, 0, 3, 1]] \$$$

$$[y_2, y_1, y_8, 0, 0, y_7, 0, y_6, y_5, 0, y_4, y_3]$$

956 . Coloring, {4, 7, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, A, B, C, C, 1, 9]

B: [6, 8, 8, 6, 3, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 4, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 4, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_3 - y_4 - y_5 + y_1 + y_2, 0, 0, 0, 0, 0, y_3, 0, y_4, y_5, y_1, y_2]$$

$$p = -s^5 + s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[0, 2, 2, 2, 2, 2, 0, 2, 0, 0, 3, 1] , [0, 0, 4, 3, 1, 2, 0, 4, 0, 0, 0, 2] , [0, 0, 3, 0, 2, 3, 0, 4, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4]] \$

$$[0, 2y_1, 2y_2, 2y_3, 2y_4, 2y_5, 0, 2y_7, 0, 0, 3y_1, 2y_6]$$

$$p = -s^4 + s^8$$

957 . Coloring, {4, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 + 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, A, A, B, B, 2, 4, 5]

B: [6, 8, 8, 6, 3, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[0, 2, 0, 2, 2, 0, 4, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$

$$[0, y_1, 0, y_2, y_5, 0, y_3, 0, 0, y_4, y_5, 0]$$

$$p = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 2, 0, 2, 2, 0, 2, 4] , [2, 0, 2, 0, 0, 2, 0, 2, 4, 0, 0, 4] , [0, 0, 2, 0, 0, 2, 0, 2, 4, 0, 0, 6] , [0, 0, 2, 0, 0, 0, 0, 2, 6, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_2, 0, y_1, 0, 0, y_2 + y_1 - y_4 - y_3 - y_6 + y_5, 0, y_4, y_3, 0, y_6, y_5]$$

$$p = s^6 - s^7$$

958 . Coloring, {4, 7, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, A, A, B, B, 2, 1, 9]

B: [6, 8, 8, 6, 3, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 6	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 0, 4, 0, 2, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 4, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$

$$[y_1, y_2, 0, 0, 0, 0, y_3, 0, y_4, y_5, y_6, 0]$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[0, 0, 2, 2, 2, 2, 0, 2, 0, 0, 2, 4], [0, 0, 4, 2, 4, 2, 0, 2, 0, 0, 0, 2], [0, 0, 6, 0, 2, 2, 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6], [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2]] \$$$

$$[0, 0, y_4, y_3, y_2, y_1, 0, y_4 + y_3 - y_2 - y_1 - y_6 + y_5, 0, 0, y_6, y_5]$$

$$p = s^4 - s^5 + s^6 - s^7$$

959 . Coloring, {4, 7, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 - 32s^7 \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 - 32s^7 + 64s^8$$

R: [7, 7, 7, 7, A, A, A, B, B, C, 4, 9]

B: [6, 8, 8, 6, 3, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	4 vs 8

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 0, 4, 0, 2, 4, 2, 2], [0, 0, 0, 2, 0, 0, 2, 0, 2, 4, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 2, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 2, 4, 2], [0, 0, 0, 4, 0, 0, 2, 0, 2, 2, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 2, 2, 2]] \$$$

$$[0, 0, 0, y_5 - y_3 - y_4 + y_2 + y_1, 0, 0, y_5, 0, y_3, y_4, y_2, y_1]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 0, 2, 0, 0, 2, 2], [2, 0, 4, 0, 2, 2, 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 2, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$$$

$$[y_3 + y_4 - y_2, y_3, y_4, 0, y_1, y_3 + y_4 - y_1, 0, y_4, 0, 0, y_3, y_2]$$

$$p' = s^4 - s^5 \quad p' = -s^5 + s^7 \quad p = s^4 - s^6 \quad p' = -s^5 + s^6$$

960 . Coloring, {4, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^5 - 32s^7 \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 - 32s^7 + 64s^8$$

R: [7, 7, 7, 7, A, A, A, C, C, 2, 4, 5]

B: [6, 8, 8, 6, 3, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	7 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

$$\$ [[0, 2, 0, 2, 2, 0, 4, 0, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$$$

$$[0, y_1, 0, y_4, y_5, 0, y_3, 0, 0, y_2, 0, y_4]$$

$$p = s^3 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 0, 2, 0, 2, 2, 0, 4, 2], [4, 0, 2, 0, 0, 2, 0, 2, 2, 0, 4, 0], [4, 0, 2, 0, 0, 4, 0, 2, 0, 0, 4, 0], [4, 0, 4, 0, 0, 4, 0, 2, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 0, 4, 0, 0, 2, 0], [2, 0, 4, 0, 0, 2, 0, 4, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0]] \$$$

$$[y_1, 0, y_2, 0, 0, y_3, 0, y_4, y_5, 0, y_6, y_7]$$

961 . Coloring, {4, 7, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, A, A, C, C, 2, 1, 9]

B: [6, 8, 8, 6, 3, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	2 vs 6	7 vs 7

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2]] \$$$

$$[-y_1 + 2y_2, y_1, 0, 0, 0, 0, 2y_2, 0, y_2, 2y_2, 0, y_2]$$

$$p = -s^2 + s^3 \quad p = -s^2 + s^4 \quad p = -s^2 + s^5 \quad p = -s^2 + s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 2, 0, 2, 0, 0, 4, 2], [0, 0, 4, 4, 2, 2, 0, 2, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 2, 0, 0, 4, 0], [0, 0, 4, 4, 0, 4, 0, 2, 0, 0, 2, 0]] \$$$

$$[0, 0, y_5, y_4, y_2, y_3, 0, y_1, 0, 0, y_7, y_6]$$

962 . Coloring, {4, 7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7 \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8$$

R: [7, 7, 7, 7, A, A, A, C, C, C, 4, 9]

B: [6, 8, 8, 6, 3, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 5	6 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 0, 2, 0, 0, 4, 0, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 0, 4, 4, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, 0, y_4, 0, 0, y_3, 0, y_1, y_2, 0, y_4 - y_3 + y_1 + y_2]$$

$$p = -s^4 + s^5$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 0, 2, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 2, 0, 4, 0, 0, 2, 0] , [2, 0, 2, 0, 0, 4, 0, 4, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 2, 0, 2, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 0, 2, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 2, 0, 4, 0, 0, 2, 0]] \$

$$[y_1, y_3, y_2, 0, y_3, y_4, 0, y_5, 0, 0, y_6, 0]$$

$$p = -s^2 + s^7$$

963 . Coloring, {4, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, A, C, B, 2, 4, 9]

B: [6, 8, 8, 6, 3, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 7

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6
 See Matrix

$\$ [[0, 2, 0, 2, 0, 0, 4, 0, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 4, 0, 1, 4, 2, 0], [0, 4, 0, 2, 0, 0, 5, 0, 0, 4, 1, 0], [0, 4, 0, 1, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$$[0, y_1, 0, y_2, 0, 0, y_3, 0, y_4, y_6, y_5, y_7]$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}\}$ order: 5
 See Matrix

$\$ [[2, 0, 2, 0, 2, 2, 0, 2, 0, 0, 3, 3], [3, 0, 4, 0, 3, 2, 0, 2, 0, 0, 2, 0], [2, 0, 5, 0, 0, 3, 0, 4, 0, 0, 2, 0], [2, 0, 3, 0, 0, 2, 0, 5, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 0, 3, 0, 0, 5, 0], [5, 0, 2, 0, 0, 4, 0, 2, 0, 0, 3, 0], [3, 0, 4, 0, 0, 5, 0, 2, 0, 0, 2, 0]] \$$

$$[y_2, 0, y_1, 0, y_3, y_4, 0, y_5, 0, 0, y_6, y_7]$$

964 . Coloring, $\{4, 8, 9, 10, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, B, B, C, 2, 4, 5]

B: [6, 8, 8, 6, 3, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6
 See Matrix

$\$ [[0, 2, 0, 2, 2, 0, 4, 0, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 4, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 5, 0, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$$[0, y_2, 0, y_1, y_7, 0, y_6, 0, 0, y_5, y_4, y_3]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

$$\$ [[2, 0, 2, 0, 0, 2, 0, 2, 2, 2, 1, 3], [1, 0, 2, 0, 0, 2, 0, 2, 3, 0, 2, 4], [2, 0, 2, 0, 0, 1, 0, 2, 4, 0, 3, 2], [3, 0, 1, 0, 0, 2, 0, 2, 2, 0, 4, 2], [4, 0, 2, 0, 0, 3, 0, 1, 2, 0, 2, 2], [2, 0, 3, 0, 0, 4, 0, 2, 2, 0, 2, 1], [2, 0, 4, 0, 0, 2, 0, 3, 1, 0, 2, 2], [2, 0, 2, 0, 0, 2, 0, 4, 2, 0, 1, 3]] \$$$

$$[y_1, 0, y_2, 0, 0, y_3, 0, y_4, y_5, y_6, y_7, y_8]$$

965 . Coloring, {4, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, B, B, C, 2, 1, 9]

B: [6, 8, 8, 6, 3, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 0, 4, 0, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1]] \$$$

$$[3 y_6, 3 y_5, 0, 0, 0, 0, 3 y_4, 0, 3 y_3, 3 y_2, -3 y_6 - 3 y_5 - 3 y_4 + 13 y_3 - 3 y_2 + 13 y_1, 3 y_1]$$

$$p = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[0, 0, 2, 2, 2, 2, 0, 2, 0, 2, 1, 3], [0, 0, 4, 1, 3, 2, 0, 2, 0, 0, 0, 4], [0, 0, 5, 0, 4, 1, 0, 4, 0, 0, 0, 2], [0, 0, 5, 0, 2, 0, 0, 5, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 5, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 2, 0, 0, 0, 5], [0, 0, 5, 0, 5, 0, 0, 4, 0, 0, 0, 2], [0, 0, 5, 0, 2, 0, 0, 5, 0, 0, 0, 4]] \$$$

$$[0, 0, y_1, y_3, y_4, y_2, 0, y_6, 0, 2y_5, y_5, y_7]$$

$$p = s^4 - s^8$$

966 . Coloring, {4, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, B, B, C, C, 4, 9]

B: [6, 8, 8, 6, 3, 3, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 0, 4, 0, 2, 2, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 0, 4, 4], [0, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2, 3], [0, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 2, 4]] \$$$

$$[0, 0, 0, -7y_5 + 9y_4 + 9y_3 - 7y_2 + 9y_1, 0, 0, 7y_5, 0, 7y_4, 7y_3, 7y_2, 7y_1]$$

$$p = -s^2 - s^3 + s^5 + s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 0, 2, 0, 2, 1, 1], [1, 2, 4, 0, 1, 2, 0, 4, 0, 0, 0, 2], [0, 0, 3, 0, 2, 1, 0, 6, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6], [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3], [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3], [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6], [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3]] \$$$

$$[y_1, 2y_1 - 2y_6, y_2, 0, y_4, y_3, 0, y_5, 0, 2y_6, y_6, y_7]$$

$$p' = -s^4 + s^8 \quad p = -s^4 + s^8$$

967 . Coloring, {4, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7 \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8$$

R: [7, 7, 7, 7, A, A, B, B, B, 2, 4, 9]

B: [6, 8, 8, 6, 3, 3, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	5 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 2, 0, 2, 0, 0, 4, 0, 2, 2, 4, 0], [0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$$$

$$[0, y_1, 0, y_2, 0, 0, y_3, 0, y_4, y_4, y_5, 0]$$

$$p = s^3 - s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[2, 0, 2, 0, 2, 2, 0, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 2, 0, 2, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6], [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2]] \$$$

$$[y_4, 0, y_1 + y_2 + y_3 - y_5, 0, y_1, y_2, 0, y_3, 0, y_4, 0, y_5]$$

$$p = -s^3 + s^7 \quad p = -s^3 + s^4 - s^5 + s^6$$

968 . Coloring, {4, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^2 + 2s^3 - 8s^5 + 32s^7 \quad p = -9s^2 + 4s^4 - 24s^5 - 16s^6 + 96s^7 + 64s^8$$

R: [7, 7, 7, 7, A, A, B, C, C, 2, 4, 9]

B: [6, 8, 8, 6, 3, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	3 vs 7	8 vs 8

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 0, 4, 0, 2, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 4, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4, 2]] \$

$$[0, -y_1 + 2 y_3, 0, y_1, 0, 0, 2 y_3, 0, y_3, -y_2 + 2 y_3, y_2, y_3]$$

$$p = s^3 - s^7 \quad p' = s^4 - s^6 \quad p'' = s^5 - s^6 \quad p''' = s^3 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 0, 2, 0, 2, 2, 2] , [2, 0, 4, 0, 2, 2, 0, 2, 0, 0, 2, 2] , [2, 0, 4, 0, 2, 2, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 2, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 4, 0, 2, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 0, 4, 0, 0, 2, 0]] \$

$$[y_2, 0, y_3, 0, y_1, y_8, 0, y_7, 0, y_6, y_5, y_4]$$

969 . Coloring, {5, 6, 7, 8, 9}

R: [7, 7, 7, 6, 3, 3, A, B, C, C, 1, 5]

B: [6, 8, 8, 7, A, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 2, 1, 3], [1, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 3, 0, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3]] \$$

$[y_1, 0, y_3, 0, y_2, y_6, y_4, 0, 0, y_5, y_6, y_7]$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 9

See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 2, 3, 1], [0, 2, 0, 3, 0, 0, 2, 2, 1, 1, 3, 2], [0, 1, 0, 3, 0, 0, 3, 2, 2, 0, 3, 2], [0, 0, 0, 3, 0, 0, 3, 1, 2, 0, 5, 2], [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$[0, y_1, 0, y_2, 0, y_5, y_6, y_7, y_4, y_3, y_8, y_9]$

970 . Coloring, $\{5, 6, 7, 8, 10\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, B, B, 2, 1, 5]

B: [6, 8, 8, 7, A, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	6 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 3

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 2, 2, 0] , [2, 2, 3, 0, 0, 0, 6, 0, 0, 3, 0, 0] , [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 3, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0] , [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 3, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0]] \$

$$[2y_1, 2y_2, 3y_1 - 2y_3, 0, 4y_3, 2y_3, 2y_4, 0, 0, 2y_5, 4y_3, 0]$$

$$p' = s^3 - s^6 \quad p' = s^4 - s^7 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 1, 1, 6] , [0, 0, 0, 1, 0, 0, 2, 0, 6, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 1, 5] , [0, 0, 0, 1, 0, 0, 2, 0, 5, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 1, 0, 6, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 1, 6]] \$

$$[0, 0, 0, 5y_3, 0, 5y_1, 5y_2, 10y_1, 11y_3 - 15y_1 + 11y_2 - 5y_4 + 11y_5 - 5y_6, 5y_4, 5y_5, 5y_6]$$

$$p = -s^3 + s^5 + s^6 - s^8 \quad p = s^3 + s^4 - s^6 - s^7$$

971 . Coloring, {5, 6, 7, 8, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, B, B, C, 4, 5]

B: [6, 8, 8, 7, A, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 2, 2, 2] , [0, 0, 3, 2, 2, 2, 2, 0, 0, 3, 0, 2] , [0, 0, 4, 0, 2, 2, 3, 0, 0, 2, 0, 3] , [0, 0, 4, 0, 3, 0, 4, 0, 0, 3, 0, 2] , [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 4] , [0, 0, 3, 0, 4, 0, 2, 0, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 3, 0, 0, 2, 0, 3]] \$

$$[0, 0, y_4, y_1, y_2, y_5, y_3, 0, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 2, 2, 2], [2, 2, 0, 0, 0, 2, 0, 2, 2, 1, 1, 4], [1, 1, 0, 0, 0, 2, 0, 2, 4, 2, 0, 4], [0, 2, 0, 0, 0, 1, 0, 1, 4, 2, 0, 6], [0, 2, 0, 0, 0, 0, 0, 2, 6, 1, 0, 5], [0, 1, 0, 0, 0, 0, 0, 2, 5, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 1, 8, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[y_2, y_1, 0, 0, 0, y_3, y_4, y_6, y_5, y_9, y_8, y_7]$$

972 . Coloring, {5, 6, 7, 8, 12}

$$\Omega p(\Delta)=0: \quad p = -6s^2 + s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, B, B, C, 1, 9]

B: [6, 8, 8, 7, A, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 2, 2, 2], [2, 0, 1, 0, 0, 0, 4, 0, 2, 3, 2, 2], [2, 0, 0, 0, 0, 0, 3, 0, 2, 4, 2, 3], [2, 0, 0, 0, 0, 2, 0, 3, 3, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 2, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 3, 2, 2]] \$$$

$$[-y_1 + y_3 + y_2 - y_5 - y_4 + y_6 + y_7, 0, y_1, 0, 0, y_3, y_2, 0, y_5, y_4, y_6, y_7]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}, {4, 7, 11}}

See Matrix

$$\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 2, 2, 0, 3, 1, 2], [0, 3, 0, 1, 2, 0, 2, 2, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 1, 3, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 2, 2, 0, 2, 1, 3], [0, 2, 0, 1, 3, 0, 2, 2, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 1, 2, 0, 3, 2, 2], [0, 3, 0, 2, 2, 0, 2, 2, 0, 2, 1, 2], [0, 2, 0, 1, 2, 0, 2, 3, 0, 2, 2, 2]] \$$$

$$[0, 11 y_1 - 5 y_2 - 5 y_3 + 11 y_4 - 5 y_5 - 5 y_6 + 11 y_7 - 5 y_8, 0, 5 y_1, 5 y_2, 5 y_3, 5 y_4, 5 y_5, 0, 5 y_6, 5 y_7, 5 y_8]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

973 . Coloring, {5, 6, 7, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, C, C, 2, 1, 5]

B: [6, 8, 8, 7, A, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 6, 0, 0, 3, 0, 0], [0, 3, 2, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[2 y_1, y_4, y_3, 0, y_2, y_1, y_6, 0, 0, y_5, 0, 2 y_1]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 2, 4, 2], [0, 0, 0, 4, 0, 0, 2, 0, 2, 1, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$$$

$$[0, 0, 0, y_3, 0, y_1, y_2, 2 y_1, y_4, y_5, y_6, y_7]$$

$$p = s^5 - s^8$$

Â» SYNC'D !RANK'D

974 . Coloring, {5, 6, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, C, C, C, 4, 5]

B: [6, 8, 8, 7, A, A, B, B, B, 2, 1, 9]

' See graph

' ' See pair graph

'

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 2, 2, 0, 0, 3, 0, 2] , [0, 0, 6, 0, 2, 0, 3, 0, 0, 2, 0, 3] , [0, 0, 2, 0, 3, 0, 6, 0, 0, 3, 0, 2] , [0, 0, 3, 0, 2, 0, 2, 0, 0, 6, 0, 3] , [0, 0, 2, 0, 3, 0, 3, 0, 0, 2, 0, 6] , [0, 0, 3, 0, 6, 0, 2, 0, 0, 3, 0, 2]] \$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, 0, 0, y_6, 0, y_7]$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 5, 0, 1, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 2, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 1, 0, 5, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 1, 5, 0]] \$

$$[y_2, y_1, 0, 0, 0, y_7, y_6, y_5, 2y_6, y_4, y_3, 0]$$

$$p = s^2 - s^8$$

975 . Coloring, {5, 6, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, C, C, C, 1, 9]

B: [6, 8, 8, 7, A, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 2, 0, 4] , [0, 0, 1, 0, 0, 0, 4, 0, 4, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 1, 0, 4, 4, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[2y_4, 0, y_5, 0, 0, y_4, y_3, 0, y_2, y_1, 0, y_5 + y_4 - y_3 + y_2 + y_1]$$

$$p = s^5 - s^7 \quad p' = s^5 - s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 2, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 4, 2, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 3, 3, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[0, y_1, 0, y_3, 2y_2, y_2, y_5, y_6, 0, y_7, y_4, 0]$$

$$p = -s^5 + s^8$$

976 . Coloring, {5, 6, 7, 10, 11}

R: [7, 7, 7, 6, 3, 3, A, C, B, 2, 4, 5]

B: [6, 8, 8, 7, A, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6
See Matrix

\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 2, 1, 1] , [0, 2, 3, 1, 1, 2, 4, 0, 0, 3, 0, 0] , [0, 3, 3, 0, 0, 1, 5, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

[0, $y_7, y_6, y_5, y_5, y_4, y_3, 0, 0, y_2, y_1, y_1$]

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6
See Matrix

\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 3, 4] , [3, 0, 0, 0, 0, 3, 0, 0, 4, 2, 0, 4] , [0, 0, 0, 0, 0, 3, 0, 0, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[$y_1, 0, 0, 0, 0, y_2, y_3, 2y_3, y_4, y_7, y_5, y_6$]

$$p = s^6 - s^8$$

977 . Coloring, {5, 6, 7, 10, 12}

R: [7, 7, 7, 6, 3, 3, A, C, B, 2, 1, 9]

B: [6, 8, 8, 7, A, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	4 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 2, 1, 1] , [1, 2, 1, 0, 0, 0, 6, 0, 1, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 4, 0, 0, 6, 1, 0] , [1, 6, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0]] \$

$[y_7, y_6, y_5, 0, 0, y_4, y_3, 0, y_5, y_2, y_1, y_4]$

$$p' = s^5 - s^8 \quad p = -s^5 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {4, 7, 11}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2]] \$

$[0, 0, 0, y_1, y_2, -y_2 + y_4, 2y_2 - 2y_4 + y_3, -2y_2 + 2y_4, 0, y_1, y_4, y_3]$

$$p = s^2 - s^5 \quad p' = s^2 - s^5 \quad p' = -s^4 + s^7 \quad p' = -s^3 + s^6$$

978 . Coloring, {5, 6, 7, 11, 12}

R: [7, 7, 7, 6, 3, 3, A, C, B, C, 4, 9]

B: [6, 8, 8, 7, A, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 2, 1, 3] , [0, 0, 1, 1, 0, 2, 2, 0, 3, 3, 2, 2] , [0, 0, 2, 2, 0, 1, 1, 0, 2, 2, 3, 3] , [0, 0, 1, 3, 0, 2, 2, 0, 3, 1, 2, 2] , [0, 0, 2, 2, 0, 3, 1, 0, 2, 2, 3, 1] , [0, 0, 3, 3, 0, 2, 2, 0, 1, 1, 2, 2] , [0, 0, 2, 2, 0, 3, 3, 0, 2, 2, 1, 1] , [0, 0, 3, 1, 0, 2, 2, 0, 1, 3, 2, 2]] \$

$$[0, 0, y_1 - y_5 + y_4, y_1 + y_4 - y_3, 0, y_1 + y_4 - y_2, y_1, 0, y_5, y_3, y_4, y_2]$$

$$p = s - s^2 + s^5 - s^6 \quad p' = -s + s^2 - s^5 + s^6 \quad p'' = -s + s^3 - s^5 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 2, 3, 1], [3, 2, 0, 0, 1, 2, 0, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 3, 0, 2, 0, 3, 2, 0], [2, 3, 0, 0, 3, 0, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 0, 3, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 0, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 0, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 0, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 3, 0, 2, 0, 3, 2, 0]] \$$$

$$[y_1 + y_6 + y_5 - y_4 - y_3 + y_2 - 2y_7, y_1, 0, 0, y_6, y_5, y_7, y_4, 0, y_3, y_2, y_7]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p' = -s^3 + s^9$$

979 . Coloring, {5, 6, 8, 9, 10}

R: [7, 7, 7, 6, 3, 3, B, B, C, 2, 1, 5]

B: [6, 8, 8, 7, A, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 0, 3, 1], [3, 0, 3, 0, 1, 0, 6, 0, 0, 0, 3, 0], [3, 0, 1, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$$$

$$[y_1, 2y_6, y_2, 0, y_3, y_6, y_4, 0, 0, 0, y_5, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 2, 2, 6] , [0, 0, 0, 2, 0, 0, 1, 0, 6, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 2, 0, 2, 1, 6, 2] , [0, 0, 0, 6, 0, 0, 3, 0, 2, 2, 2, 1] , [0, 0, 0, 2, 0, 0, 6, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 0, 2, 6, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 2, 2, 6]] \$

[0, 0, 0, y_1 , 0, y_2 , y_7 , 2 y_2 , y_6 , y_4 , y_5 , y_3]

$$p = -s^2 + s^8$$

980 . Coloring, {5, 6, 8, 9, 11}

R: [7, 7, 7, 6, 3, 3, B, B, C, C, 4, 5]

B: [6, 8, 8, 7, A, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 0, 3, 3] , [0, 0, 3, 3, 3, 2, 2, 0, 0, 0, 3, 0] , [0, 0, 5, 3, 0, 3, 3, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 5, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 2, 3, 0, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 3, 3, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 5, 2, 0, 0, 0, 3, 0]] \$

[0, 0, y_2 , y_1 , y_7 , y_6 , y_5 , 0, 0, 0, y_4 , y_3]

Omega Rank for B : cycles: {{1, 2, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 2, 0, 2, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 1, 0, 4, 2, 2, 1, 2] , [1, 2, 0, 0, 0, 2, 0, 2, 2, 1, 2, 4] , [2, 1, 0, 0, 0, 1, 0, 2, 4, 2, 2, 2] , [2, 2, 0, 0, 0, 2, 0, 1, 2, 1, 4, 2] , [4, 1, 0, 0, 0, 2, 0, 2, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 4, 0, 1, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 2, 0, 2, 2, 4, 1, 1]] \$

[y_6 , y_7 , 0, 0, 0, y_3 , y_4 , y_5 , y_2 , y_1 , y_8 , y_9]

981 . Coloring, {5, 6, 8, 9, 12}

R: [7, 7, 7, 6, 3, 3, B, B, C, C, 1, 9]
B: [6, 8, 8, 7, A, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6
 See Matrix

\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 0, 3, 3] , [3, 0, 1, 0, 0, 0, 4, 0, 3, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 3]] \$

$$[-5 y_1 - 5 y_2 - 5 y_3 + 11 y_4 - 5 y_5 + 11 y_6, 0, 5 y_1, 0, 0, 5 y_2, 5 y_3, 0, 5 y_4, 0, 5 y_5, 5 y_6]$$

$$p = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5
 See Matrix

\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 0, 2, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 1, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4]] \$

$$[0, y_1, 0, y_8, y_7, y_6, y_5, y_4, 0, y_3, y_6, y_2]$$

$$p = s^4 - s^9$$

982 . Coloring, {5, 6, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, B, B, 2, 4, 5]
B: [6, 8, 8, 7, A, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 7	5 vs 7

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 4, 0, 0, 0, 3, 0], [0, 0, 2, 3, 0, 4, 3, 0, 0, 0, 4, 0], [0, 0, 4, 4, 0, 3, 2, 0, 0, 0, 3, 0], [0, 0, 3, 3, 0, 4, 4, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 3, 3, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 4, 0, 0, 0, 3, 0]] \$$

$[0, y_3, y_1, y_2, y_3, y_4, y_5, 0, 0, 0, y_6, 0]$

$$p = -s^2 + s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 4

See Matrix

$\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 4, 0, 4], [0, 0, 0, 0, 0, 2, 0, 0, 4, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6], [0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$$

$[2y_3, 0, 0, 0, 0, y_4, y_3, 2y_3, y_2, y_1, 0, y_5]$

$$p' = s^4 - s^6 \quad p = s^4 - s^6$$

Â» SYNC'D !RANK'D

983 . Coloring, {5, 6, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, B, B, 2, 1, 9]

B: [6, 8, 8, 7, A, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	5 vs 7	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 3
See Matrix

\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 0, 4, 0], [4, 0, 1, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_3, 2y_5, y_4, 0, 0, y_5, y_2, 0, 2y_5, 0, y_1, 0]$$

$$p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3
See Matrix

\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

$$[0, 0, 0, 2y_4, y_5, y_4, y_3, 2y_4, 0, y_2, 0, y_1]$$

$$p' = s^3 - s^6 \quad p = s^3 - s^6$$

Â» SYNC'D !RANK'D

984 . Coloring, {5, 6, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, B, B, C, 4, 9]

B: [6, 8, 8, 7, A, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 0, 4, 2] , [0, 0, 1, 4, 0, 2, 2, 0, 2, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 1, 0, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 5, 2, 0, 0, 0, 1, 0] , [0, 0, 5, 1, 0, 4, 4, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 1, 5, 0, 0, 0, 4, 0] , [0, 0, 1, 4, 0, 2, 4, 0, 0, 0, 5, 0]] \$

[0, 0, y₁, y₄, 0, y₃, y₂, 0, y₅, 0, y₆, y₇]

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 2, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2]] \$

[2 y₄, y₁, 0, 0, y₂, y₃, y₄, y₅, 0, y₇, 0, y₆]

$$p = s^3 - s^8$$

985 . Coloring, {5, 6, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, C, C, 2, 4, 5]

B: [6, 8, 8, 7, A, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 0, 2, 2] , [0, 0, 3, 2, 2, 2, 4, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 2, 3, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 3, 4, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 4, 2, 0, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 3, 3, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 4, 4, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 2, 3, 0, 0, 0, 4, 0]] \$

$$[0, y_7, y_5, y_4, y_3, y_2, y_1, 0, 0, 0, y_6, y_7]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 4, 2, 2], [2, 0, 0, 0, 0, 2, 0, 0, 2, 2, 4, 4], [4, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 2], [2, 0, 0, 0, 0, 4, 0, 0, 2, 2, 4, 2], [4, 0, 0, 0, 0, 2, 0, 0, 2, 4, 2, 2], [2, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 4, 2, 2], [2, 0, 0, 0, 0, 2, 0, 0, 2, 2, 4, 4]] \$$$

$$[y_1, 0, 0, 0, 0, y_7, y_2, 2y_2, y_3, y_4, y_5, y_6]$$

$$p = -s^2 + s^8$$

986 . Coloring, {5, 6, 9, 10, 12}

$$\Omega p(\Delta)=0: p = -2s^2 + 7s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, C, C, 2, 1, 9]

B: [6, 8, 8, 7, A, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 0, 2, 2], [2, 0, 1, 0, 0, 0, 6, 0, 2, 0, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 2], [6, 0, 0, 0, 0, 3, 0, 2, 0, 3, 2], [3, 0, 0, 0, 0, 0, 6, 0, 2, 0, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 2], [6, 0, 0, 0, 0, 0, 3, 0, 2, 0, 3, 2], [3, 0, 0, 0, 0, 0, 6, 0, 2, 0, 3, 2]] \$$$

$$[-y_1 - 3y_2 - y_3 + 6y_5 - y_4, 2y_2, y_1, 0, 0, y_2, y_3, 0, y_5, 0, y_4, y_5]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 0, 2, 0, 0, 4, 2, 4] , [0, 0, 0, 2, 4, 0, 2, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6]] \$

$$[0, 0, 0, y_1, y_2, y_5, y_4, 2y_5, 0, y_3, y_7, y_6]$$

$$p = -s^5 + s^8$$

987 . Coloring, {5, 6, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 7s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, C, C, C, 4, 9]

B: [6, 8, 8, 7, A, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 7	6 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 0, 2, 4] , [0, 0, 1, 2, 0, 2, 2, 0, 4, 0, 3, 2] , [0, 0, 2, 3, 0, 2, 1, 0, 2, 0, 2, 4] , [0, 0, 2, 2, 0, 3, 2, 0, 4, 0, 1, 2] , [0, 0, 3, 1, 0, 2, 2, 0, 2, 0, 2, 4] , [0, 0, 2, 2, 0, 1, 3, 0, 4, 0, 2, 2] , [0, 0, 1, 2, 0, 2, 0, 2, 0, 2, 0, 3, 4]] \$

$$[0, 0, 3y_2, 3y_1, 0, -3y_2 - 3y_1 - 3y_6 + 5y_5 - 3y_4 + 5y_3, 3y_6, 0, 3y_5, 0, 3y_4, 3y_3]$$

$$p = -s - s^2 + s^6 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 2, 0, 4, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 4, 0, 2, 0, 4, 2, 0]] \$

$$[y_1 + y_2 + 3y_3 - y_4 - y_5 + y_6, y_1, 0, 0, 2y_3, y_2, y_3, y_4, 0, y_5, y_6, 0]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 \quad p = -s^2 + s^8$$

Â» SYNC'D !RANK'D

988 . Coloring, {5, 6, 10, 11, 12}

R: [7, 7, 7, 6, 3, 3, B, C, B, 2, 4, 9]

B: [6, 8, 8, 7, A, A, A, B, C, C, 1, 5]

' See graph

' ' See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 0, 3, 1] , [0, 0, 1, 3, 0, 2, 4, 0, 1, 0, 5, 0] , [0, 0, 2, 5, 0, 3, 1, 0, 0, 0, 5, 0] , [0, 0, 3, 5, 0, 5, 2, 0, 0, 0, 1, 0] , [0, 0, 5, 1, 0, 5, 3, 0, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 1, 5, 0, 0, 0, 3, 0] , [0, 0, 1, 3, 0, 2, 5, 0, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 3, 1, 0, 0, 0, 5, 0]] \$

$$[0, 2y_6, y_1, y_2, 0, y_3, y_4, 0, y_7, 0, y_5, y_6]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 4, 2, 4] , [2, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[y_2, 0, 0, 0, y_1, y_5, y_4, 2y_4, 0, y_3, y_7, y_6]$$

$$p = s^5 - s^8$$

989 . Coloring, {5, 7, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 7s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, A, B, C, 2, 1, 5]

B: [6, 8, 8, 7, A, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 1, 1], [1, 3, 2, 0, 1, 0, 5, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, \\ & 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, \\ & 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$ \end{aligned}$$

$$[y_6, y_5, y_4, 0, y_6, y_2, y_3, 0, 0, y_1, y_2, y_2]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 3, 3], [0, 0, 1, 3, 0, 0, 2, 1, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 1, 3, 0, 5, 1], [0, 0, \\ & 0, 5, 0, 0, 3, 0, 1, 0, 6, 1], [0, 0, 0, 6, 0, 0, 5, 0, 1, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, \\ & 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$ \end{aligned}$$

$$[0, 0, y_1, y_8, 0, y_7, y_6, y_5, y_4, y_7, y_3, y_2]$$

$$p = s^6 - s^9$$

Â» SYNC'D !RANK'D

990 . Coloring, {5, 7, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 7s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, A, B, C, C, 4, 5]

B: [6, 8, 8, 7, A, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	8 vs 8	9 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 2, 1, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 1, 2, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4]] \$

[0, 0, $y_3, y_4, y_5, y_6, y_7, 0, 0, y_1, y_2, y_8$]

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 3, 1] , [3, 1, 1, 0, 0, 2, 0, 3, 1, 0, 3, 2] , [3, 0, 2, 0, 0, 3, 0, 2, 2, 0, 1, 3] , [1, 0, 3, 0, 0, 3, 0, 2, 3, 0, 2, 2] , [2, 0, 3, 0, 0, 1, 0, 3, 2, 0, 3, 2] , [3, 0, 1, 0, 0, 2, 0, 3, 2, 0, 2, 3] , [2, 0, 2, 0, 0, 3, 0, 1, 3, 0, 2, 3] , [2, 0, 3, 0, 0, 2, 0, 2, 3, 0, 3, 1] , [3, 0, 2, 0, 0, 2, 0, 3, 1, 0, 3, 2] , [3, 0, 2, 0, 0, 3, 0, 2, 2, 0, 1, 3]] \$

[$y_1, y_2, y_3, 0, 0, y_4, y_7, y_5, y_6, y_7, y_9, y_8$]

$$p = -s^3 + s^{10}$$

991 . Coloring, {5, 7, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, A, B, C, C, 1, 9]

B: [6, 8, 8, 7, A, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	9 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 1, 3], [1, 0, 0, 0, 0, 0, 3, 0, 3, 4, 0, 5], [0, 0, 0, 0, 0, 0, 1, 0, 5, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[y_1, 0, y_3, 0, 0, y_3, y_1 - y_3 + y_5 + y_4 - y_2, 0, y_5, y_4, y_3, y_2]$$

$$p' = s^6 - s^7 \quad p' = s^5 - s^7 \quad p = s^5 - s^8$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}, {4, 7, 11}}

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 3, 1], [0, 1, 1, 3, 1, 0, 2, 3, 0, 2, 1, 2], [0, 2, 0, 1, 2, 0, 3, 2, 0, 1, 2, 3], [0, 1, 0, 2, 3, 0, 1, 2, 0, 2, 3, 2], [0, 2, 0, 3, 2, 0, 2, 1, 0, 3, 1, 2], [0, 3, 0, 1, 2, 0, 3, 2, 0, 2, 2, 1], [0, 2, 0, 2, 1, 0, 1, 3, 0, 2, 3, 2], [0, 2, 0, 3, 2, 0, 2, 2, 0, 1, 1, 3], [0, 1, 0, 1, 3, 0, 3, 2, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 1, 1, 0, 3, 3, 2]] \$$

$$[0, -3y_1 + 5y_2 - 3y_3 - 3y_8 + 5y_4 - 3y_5 - 3y_6 + 5y_9 - 3y_7, 3y_1, 3y_2, 3y_3, 3y_8, 3y_4, 3y_5, 0, 3y_6, 3y_9, 3y_7]$$

$$p = -s^3 - s^4 - s^5 + s^8 + s^9 + s^{10}$$

992 . Coloring, {5, 7, 8, 10, 11}

R: [7, 7, 7, 6, 3, A, A, B, B, 2, 4, 5]

B: [6, 8, 8, 7, A, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 2, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0]] \$

$$[0, y_1, y_2, y_3, -2y_2 + 2y_3, y_4, y_5, 0, 0, y_6, -2y_2 + 2y_3, 0]$$

$$p' = s^4 - s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 8
See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 2, 4] , [2, 0, 1, 0, 0, 2, 0, 1, 4, 0, 1, 5] , [1, 0, 2, 0, 0, 2, 0, 1, 5, 0, 0, 5] , [0, 0, 2, 0, 0, 1, 0, 2, 5, 0, 0, 6] , [0, 0, 1, 0, 0, 0, 0, 2, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[-y_1 + y_2 + y_5 + y_3 + y_6 - y_7, 0, y_1, 0, 0, y_2, y_4, y_5, y_3, y_4, y_6, y_7]$$

$$p = s^7 - s^9 \quad p' = s^7 - s^8$$

993 . Coloring, {5, 7, 8, 10, 12}

R: [7, 7, 7, 6, 3, A, A, B, B, 2, 1, 9]

B: [6, 8, 8, 7, A, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 5, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$[y_1, y_2, y_4, 0, 0, y_4, y_3, 0, 2y_4, y_6, y_5, 0]$

$$p = s^4 - s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}, \{4, 7, 11\}\}$ order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 2, 4] , [0, 0, 1, 2, 4, 0, 2, 1, 0, 2, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 1, 0, 4, 2, 3] , [0, 0, 0, 2, 3, 0, 1, 0, 0, 3, 2, 5] , [0, 0, 0, 2, 5, 0, 2, 0, 0, 3, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 5, 2, 3] , [0, 0, 0, 2, 3, 0, 1, 0, 0, 3, 2, 5] , [0, 0, 0, 2, 5, 0, 2, 0, 0, 3, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 5, 2, 3]] \$

$[0, 0, 3y_6, 3y_5, 3y_4, 3y_3, 3y_2, 3y_1, 0, -7y_6 + 8y_5 - 7y_4 + 14y_2 - 3y_1, -5y_6 + 7y_5 - 5y_4 + 7y_2, -7y_6 + 14y_5 - 7y_4 - 3y_3 + 8y_2]$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

994 . Coloring, $\{5, 7, 8, 11, 12\}$

R: [7, 7, 7, 6, 3, A, A, B, B, C, 4, 9]

B: [6, 8, 8, 7, A, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{4, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 2, 1, 0, 2, 4, 2, 3] , [0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 4, 2] , [0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 3, 2] , [0, 0, 0, 3, 0, 4, 0, 0, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 3, 0, 0, 2, 4, 2, 3]] \$

$$[0, 0, y_3, y_2, 0, y_1, y_3 + y_2 - y_1 + y_6 + y_7 - y_5 - y_4, 0, y_6, y_7, y_5, y_4]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 10

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 2, 2], [2, 1, 1, 0, 2, 2, 0, 3, 0, 2, 1, 2], [1, 2, 2, 0, 2, 2, 0, 2, 0, 2, 0, 3], [0, 2, 2, 0, 3, 1, 0, 4, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 0, 4, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4]] \$$$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9, y_{10}]$$

995 . Coloring, {5, 7, 9, 10, 11}

R: [7, 7, 7, 6, 3, A, A, C, C, 2, 4, 5]

B: [6, 8, 8, 7, A, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 0, 2], [0, 3, 2, 0, 2, 2, 3, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$$

$$[0, y_2, y_3, 2y_4 - 2y_5, y_4, y_5, y_6, 0, 0, y_1, 0, 2y_4 - 2y_5]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 4, 2], [4, 0, 1, 0, 0, 2, 0, 1, 2, 0, 5, 1], [5, 0, 2, 0, 0, 4, 0, 1, 1, 0, 3, 0], [3, 0, 4, 0, 0, 5, 0, 2, 0, 0, 2, 0], [2, 0, 5, 0, 0, 3, 0, 4, 0, 0, 2, 0], [2, 0, 3, 0, 0, 2, 0, 5, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 0, 5, 0, 0, 4, 0]] \$$$

$0, 3, 0, 0, 5, 0], [5, 0, 2, 0, 0, 4, 0, 2, 0, 0, 3, 0], [3, 0, 4, 0, 0, 5, 0, 2, 0, 0, 2, 0]] \$$

$[y_1, 0, y_2, 0, 0, y_3, y_8, y_4, y_7, y_8, y_6, y_5]$

$$p = s^4 - s^9$$

996 . Coloring, {5, 7, 9, 10, 12}

R: [7, 7, 7, 6, 3, A, A, C, C, 2, 1, 9]

B: [6, 8, 8, 7, A, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	6 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2]] \$$

$[2y_1, y_4, y_1, 0, 0, y_1, -y_4 - 4y_1 + 6y_3 - y_2, 0, y_3, y_2, 0, y_3]$

$$p = -s^2 + s^8 \quad p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}, {5, 10, 12}} order: 6

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 4, 2], [0, 0, 1, 4, 2, 0, 2, 1, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 4, 1, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 5, 2], [0, 0, 0, 5, 2, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 5, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 5, 2], [0, 0, 0, 5, 2, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 5, 0, 0, 2, 3, 2]] \$$

$[0, 0, 3y_1, 3y_2, 3y_4, -7y_1 - 7y_2 + 14y_4 + 8y_5 - 3y_6, -7y_1 - 7y_2 + 8y_4 - 3y_3 + 14y_5, 3y_3, 0, 3y_5, 3y_6, -5y_1 - 5y_2 + 7y_4 + 7y_5]$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

997 . Coloring, {5, 7, 9, 11, 12}

R: [7, 7, 7, 6, 3, A, A, C, C, C, 4, 9]

B: [6, 8, 8, 7, A, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 2, 1, 0, 4, 4, 0, 5] , [0, 0, 0, 0, 0, 0, 0, 0, 5, 3, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_1, 2y_1, 0, -5y_1 + 2y_2, y_2, 0, -8y_1 + 3y_2 - y_3 + y_4, y_3, 0, y_4]$$

$$p = s^4 - s^5 \quad p' = -s^4 + s^5 \quad p'' = -s^4 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 4, 0] , [4, 1, 1, 0, 0, 2, 0, 3, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 0, 3, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 0, 4, 0, 0, 2, 0]] \$

$$[y_6, y_4, y_5, 0, 2y_2, y_3, y_2, y_1, 0, y_8, y_7, 0]$$

$$p = -s^4 + s^9$$

998 . Coloring, {5, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, A, C, B, 2, 4, 9]

B: [6, 8, 8, 7, A, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 3, 0, 1, 4, 2, 0], [0, 4, 0, 2, 0, 1, 3, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 1, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$$

$[0, y_1, y_4, y_7, 0, y_8, y_5, 0, y_6, y_2, y_3, y_4]$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}, \{5, 10, 12\}\}$

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 3, 3], [3, 0, 1, 0, 3, 2, 0, 1, 0, 2, 3, 1], [3, 0, 2, 0, 1, 3, 0, 1, 0, 3, 1, 2], [1, 0, 3, 0, 2, 3, 0, 2, 0, 1, 1, 3], [1, 0, 3, 0, 3, 1, 0, 3, 0, 2, 2, 1], [2, 0, 1, 0, 1, 1, 0, 3, 0, 3, 3, 2], [3, 0, 1, 0, 2, 2, 0, 1, 0, 1, 3, 3], [3, 0, 2, 0, 3, 3, 0, 1, 0, 2, 1, 1], [1, 0, 3, 0, 1, 3, 0, 2, 0, 3, 1, 2]] \$$

$[-3y_1 + 5y_2 - 3y_3 - 3y_4 - 3y_5 + 5y_6 - 3y_7 + 5y_8, 0, 3y_1, 0, 3y_2, 3y_3, 3y_4, 3y_5, 0, 3y_6, 3y_7, 3y_8]$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

999 . Coloring, $\{5, 8, 9, 10, 11\}$

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, B, B, C, 2, 4, 5]

B: [6, 8, 8, 7, A, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 6, 7, 10, 11\}\}$ order: 6
See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 3, 1], [0, 1, 2, 3, 1, 2, 3, 0, 0, 1, 3, 0], [0, 1, 1, 3, 0, 3, 3, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 2, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 2, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 3, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 3, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 3, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 3, 0, 0, 2, 3, 0]] \$$

$$[0, -y_1 + y_5 + y_2 - y_3 + y_4 + y_6 - y_7 - y_8, y_1, y_5, y_2, y_3, y_4, 0, 0, y_6, y_7, y_8]$$

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7
See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 1, 3], [1, 0, 1, 0, 0, 2, 0, 1, 3, 1, 2, 5], [2, 0, 2, 0, 0, 1, 0, 1, 5, 0, 3, 2], [3, 0, 1, 0, 0, 2, 0, 2, 2, 0, 5, 1], [5, 0, 2, 0, 0, 3, 0, 1, 1, 0, 2, 2], [2, 0, 3, 0, 0, 5, 0, 2, 2, 0, 1, 1], [1, 0, 5, 0, 0, 2, 0, 3, 1, 0, 2, 2], [2, 0, 2, 0, 0, 1, 0, 5, 2, 0, 1, 3], [1, 0, 1, 0, 0, 2, 0, 2, 3, 0, 2, 5]] \$$

$$[y_2, 0, y_1, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

1000 . Coloring, $\{5, 8, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, B, B, C, 2, 1, 9]

B: [6, 8, 8, 7, A, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	7 vs 9	6 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 0, 5, 0, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1]] \$

$[-3y_1 - 6y_2 - 3y_7 + 13y_6 - 3y_5 - 3y_3 + 13y_4, 3y_1, 3y_2, 0, 0, 3y_2, 3y_7, 0, 3y_6, 3y_5, 3y_3, 3y_4]$

$$p' = s^4 + s^5 - s^7 - s^8 \quad p = s^4 - s^6 - s^7 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 0, 2, 1, 0, 3, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 1, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 6, 0, 4]] \$

$$[0, 0, y_4, y_4 + y_6, y_3, y_6, y_2, -y_4 + 2y_6 + y_2, 0, y_1, y_6, y_5]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p' = -s^5 + s^8$$

Â» SYNC'D !RANK'D

1001 . Coloring, {5, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, B, B, C, C, 4, 9]

B: [6, 8, 8, 7, A, 3, A, C, B, 2, 1, 5]

' See graph

' ' See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 8
See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 2, 1, 0, 3, 1, 3, 3] , [0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 1, 4] , [0, 0, 0, 1, 0, 3, 0, 0, 4, 3, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_3, y_1, 0, y_2, y_3 - y_1 + y_2 - y_5 - y_6 + y_7 + y_4, 0, y_5, y_6, y_7, y_4]$$

$$p = s^7 - s^8$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 1, 1] , [1, 3, 1, 0, 1, 2, 0, 3, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 1, 0, 4, 0, 1, 0, 3] , [0, 1, 1, 0, 3, 0, 0, 5, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 2, 0, 3, 0, 5] , [0, 3, 0, 0, 5, 0, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 2, 0, 3, 0, 5]] \$

$$[y_1, y_2, y_3, 0, y_6, y_4, y_8, y_5, 0, y_7, y_8, y_9]$$

$$p = -s^5 + s^{10}$$

Â» SYNC'D !RANK'D

1002 . Coloring, {5, 8, 10, 11, 12}

R: [7, 7, 7, 6, 3, A, B, B, B, 2, 4, 9]

B: [6, 8, 8, 7, A, 3, A, C, C, C, 1, 5]

' See graph

' ' See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 4, 0] , [0, 1, 0, 4, 0, 2, 3, 0, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 4, 1, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 5, 1, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 3, 2, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 1, 4, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 1, 5, 0, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 2, 3, 0, 0, 1, 5, 0]] \$

$$[0, y_4 + y_5 - y_3 + y_1 + y_2 - y_6, y_4, y_5, 0, y_3, y_1, 0, 2y_4, y_2, y_6, 0]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 0, 4], [0, 0, 1, 0, 4, 2, 0, 1, 0, 3, 0, 5], [0, 0, 2, 0, 5, 0, 0, 1, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 0, 2, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$$$

$$[2y_3, 0, y_4, 0, y_1, y_2, y_3, y_5, 0, y_7, 0, y_6]$$

$$p = s^5 - s^8$$

1003 . Coloring, {5, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 3s^3 - 6s^4 + 8s^5 - 24s^6 + 32s^7 - 32s^8$$

R: [7, 7, 7, 6, 3, A, B, C, C, 2, 4, 9]

B: [6, 8, 8, 7, A, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 2, 2], [0, 1, 0, 2, 0, 2, 3, 0, 2, 1, 3, 2], [0, 1, 0, 3, 0, 2, 1, 0, 2, 2, 3, 2], [0, 2, 0, 3, 0, 3, 1, 0, 2, 2, 1, 2], [0, 2, 0, 1, 0, 3, 2, 0, 2, 3, 1, 2], [0, 3, 0, 1, 0, 1, 2, 0, 2, 3, 2, 2], [0, 3, 0, 2, 0, 1, 3, 0, 2, 1, 2, 2], [0, 1, 0, 2, 0, 2, 3, 0, 2, 1, 3, 2], [0, 1, 0, 3, 0, 2, 1, 0, 2, 2, 3, 2]] \$$$

$$[0, -y_1 - y_2 + 3y_6 - y_5, y_1, -y_3 + 3y_6 - y_4, 0, y_2, y_3, 0, y_6, y_4, y_5, y_6]$$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8 \quad p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {5, 10, 12}}

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 2, 0, 1, 0, 3, 2, 3] , [2, 0, 2, 0, 3, 2, 0, 1, 0, 2, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 2, 0, 3, 1, 2] , [1, 0, 2, 0, 2, 1, 0, 2, 0, 3, 2, 3] , [2, 0, 1, 0, 3, 1, 0, 2, 0, 2, 2, 3] , [2, 0, 1, 0, 3, 2, 0, 1, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 2, 0, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 2, 0, 2, 1, 3]] \$

$$[-y_1 + y_2 - y_3 + y_4 - y_5 + y_6 - y_7 + y_8, 0, y_1, 0, y_2, y_3, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

M \ ; \ N

\$ [[0, 0, 0, 0, 168, 0, 78, 0, 0, 208, 0, 152] , [0, 0, 0, 152, 0, 0, 208, 0, 0, 81, 0, 165] , [0, 0, 0, 52, 94, 0, 170, 0, 0, 127, 0, 163] , [0, 152, 52, 0, 0, 78, 0, 0, 168, 0, 156, 0] , [168, 0, 94, 0, 0, 76, 0, 164, 0, 0, 104, 0] , [0, 0, 0, 78, 76, 0, 102, 0, 0, 162, 0, 188] , [78, 208, 170, 0, 0, 102, 0, 102, 240, 0, 312, 0] , [0, 0, 0, 0, 164, 0, 102, 0, 0, 236, 0, 104] , [0, 0, 0, 168, 0, 0, 240, 0, 0, 94, 0, 104] , [208, 81, 127, 0, 0, 162, 0, 236, 94, 0, 304, 0] , [0, 0, 0, 156, 104, 0, 312, 0, 0, 304, 0, 336] , [152, 165, 163, 0, 0, 188, 0, 104, 104, 0, 336, 0]] \$
 \$ [[0, 0, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1] , [0, 0, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1] , [0, 0, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1] , [1, 1, 1, 0, 0, 1, 0, 1, 1, 0, 1, 0] , [1, 1, 1, 0, 0, 1, 0, 1, 1, 0, 1, 0] , [0, 0, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1] , [1, 1, 1, 0, 0, 1, 0, 0, 1, 0, 1, 0] , [0, 0, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1] , [0, 0, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1] , [1, 1, 1, 0, 0, 1, 0, 1, 1, 0, 1, 0]] \$

$$\tau = 74, r' = 1/2$$

R: [7, 7, 7, 6, 3, A, B, C, C, 2, 4, 9]

B: [6, 8, 8, 7, A, 3, A, B, B, C, 1, 5]

Ranges

Action of R on ranges, [[11], [25], [6], [24], [20], [25], [6], [24], [20], [11], [25], [6], [24], [21], [22], [14], [12], [13], [9], [30], [7], [28], [31], [31], [16], [8], [29], [8], [29], [5], [15]]

Action of B on ranges, [[21], [21], [22], [17], [23], [26], [27], [18], [23], [26], [26], [27], [18], [11], [25], [2], [12], [30], [3], [12], [13], [10], [30], [30], [3], [31], [19], [31], [19], [4], [1]]

Cycles: R , {{2, 4, 6, 7, 10, 11}, {9, 12}}, B , {{1, 3, 6, 8, 11}, {5, 10, 12}}

$$\beta(\{1, 5\}) = 7/202$$

$$\beta(\{1, 7\}) = 13/808$$

$$\beta(\{1, 10\}) = 13/303$$

$$\beta(\{1, 12\}) = 19/606$$

$$\beta(\{2, 4\}) = 19/606$$

$$\beta(\{2, 7\}) = 13/303$$

$$\beta(\{2, 10\}) = 27/1616$$

$$\beta(\{2, 12\}) = 55/1616$$

$$\beta(\{3, 4\}) = 13/1212$$

$$\beta(\{3, 5\}) = 47/2424$$

$$\beta(\{3, 7\}) = 85/2424$$

$$\beta(\{3, 10\}) = 127/4848$$

$$\beta(\{3, 12\}) = 163/4848$$

$\beta(\{4, 6\}) = 13/808$
 $\beta(\{4, 9\}) = 7/202$
 $\beta(\{4, 11\}) = 13/404$
 $\beta(\{5, 6\}) = 19/1212$
 $\beta(\{5, 8\}) = 41/1212$
 $\beta(\{5, 11\}) = 13/606$
 $\beta(\{6, 7\}) = 17/808$
 $\beta(\{6, 10\}) = 27/808$
 $\beta(\{6, 12\}) = 47/1212$
 $\beta(\{7, 8\}) = 17/808$
 $\beta(\{7, 9\}) = 5/101$
 $\beta(\{7, 11\}) = 13/202$
 $\beta(\{8, 10\}) = 59/1212$
 $\beta(\{8, 12\}) = 13/606$
 $\beta(\{9, 10\}) = 47/2424$
 $\beta(\{9, 12\}) = 13/606$
 $\beta(\{10, 11\}) = 19/303$
 $\beta(\{11, 12\}) = 7/101$

Partitions

$\alpha(\{\{1, 2, 3, 6, 8, 9, 11\}, \{4, 5, 7, 10, 12\}\}) = 1/1$

$b_1 = \{1, 2, 3, 6, 8, 9, 11\}$, $b_2 = \{4, 5, 7, 10, 12\}$

Action of R and B on the blocks of the partitions: = [2, 1] [1, 2]
with invariant measure [1, 1]

N by blocks, check: true . ‘ See partition graph.

‘ ‘ See level-2 partition graph.

‘

Right Group	
Coloring	{5, 9, 10, 11, 12}
Rank	2
R,B	[7, 7, 7, 6, 3, A, B, C, C, 2, 4, 9], [6, 8, 8, 7, A, 3, A, B, B, C, 1, 5]
π_2	[0, 0, 0, 168, 0, 78, 0, 0, 208, 0, 152, 0, 152, 0, 0, 208, 0, 0, 81, 0, 165, 52, 94, 0, 170, 0, 0, 127, 0, 163, 0, 78, 0, 0, 168, 0, 156, 0, 76, 0, 164, 0, 0, 104, 0, 102, 0, 0, 162, 0, 188, 102, 240, 0, 312, 0, 0, 236, 0, 104, 94, 0, 104, 304, 0, 336]
u_2	[0, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1, 1, 1, 0, 1, 0, 0, 1, 0, 1, 0, 1, 0, 1, 1, 0, 1, 0, 1, 1, 0, 1, 0, 1, 1, 0, 1, 0, 1, 1, 0, 1, 1, 0, 1] (dim 1)
wpp	[7, 7, 7, 5, 5, 7, 5, 7, 7, 5, 7, 5]

1004 . Coloring, {6, 7, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = -6s^2 + 5s^3 - 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, A, B, C, 2, 1, 5]

B: [6, 8, 8, 7, 3, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 9	7 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 1, 1] , [1, 3, 1, 0, 1, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[y_2, y_1, y_2 - y_4, 0, y_2, y_4, y_3, 0, 0, y_5, y_4, y_4]$$

$$p' = -s^5 + s^8 \quad p = s^3 - s^6 \quad p' = -s^4 + s^7 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 1, 3, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, 0, y_3, y_1, 0, y_3, y_2, y_3 + y_6, y_4, y_6, y_5, y_7]$$

$$p = s^5 - s^8 \quad p' = -s^5 + s^8$$

1005 . Coloring, {6, 7, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 6s^2 + 5s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, 3, A, B, C, C, 4, 5]

B: [6, 8, 8, 7, 3, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 2, 1, 0, 0, 5, 0, 3] , [0, 0, 2, 0, 3, 1, 1, 0, 0, 4, 0, 5] , [0, 0, 1, 0, 5, 0, 2, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4]] \$

[0, 0, y_7 , y_8 , y_1 , y_4 , y_2 , 0, 0, y_3 , y_5 , y_6]

Omega Rank for B : cycles: {{1, 2, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 0, 3, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 3, 0, 1, 2, 2, 1, 3] , [1, 2, 0, 0, 0, 3, 0, 1, 3, 3, 2, 1] , [2, 3, 0, 0, 0, 1, 0, 2, 1, 3, 3, 1] , [3, 3, 0, 0, 0, 2, 0, 3, 1, 1, 1, 2] , [1, 1, 0, 0, 0, 3, 0, 3, 2, 2, 1, 3] , [1, 2, 0, 0, 0, 1, 0, 1, 3, 3, 2, 3] , [2, 3, 0, 0, 0, 1, 0, 2, 3, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 0, 3, 1, 1, 3, 2]] \$

[$y_1 + y_2 - y_7 - y_5 - y_6 + y_4 + y_8$, y_1, y_3 , 0, 0, $y_2, y_3, y_7, y_5, y_6, y_4, y_8$]

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9 \quad p = -s^2 + s^{10}$$

1006 . Coloring, {6, 7, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = 9s^3 + 2s^4 - 16s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, A, B, C, C, 1, 9]

B: [6, 8, 8, 7, 3, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$[[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 1, 3], [1, 0, 1, 0, 0, 0, 3, 0, 3, 3, 0, 5], [0, 0, 0, 0, 0, 0, 2, 0, 5, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[y_1 + y_4, 0, y_1, 0, 0, y_4, y_2, 0, -2y_1 + y_4 + y_2 - y_5 + y_3, y_5, y_4, y_3]$$

$$p' = s^5 - s^6 \quad p = s^5 - s^7 \quad p' = -s^6 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {4, 7, 11}} order: 12

See Matrix

$$[[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 3, 1], [0, 1, 2, 3, 1, 0, 2, 3, 0, 1, 1, 2], [0, 1, 1, 1, 2, 0, 3, 3, 0, 0, 2, 3], [0, 0, 2, 2, 3, 0, 1, 2, 0, 0, 3, 3], [0, 0, 3, 3, 3, 0, 2, 2, 0, 0, 1, 2], [0, 0, 3, 1, 2, 0, 3, 3, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 1, 3, 0, 0, 3, 3], [0, 0, 2, 3, 3, 0, 2, 2, 0, 0, 1, 3], [0, 0, 3, 1, 3, 0, 3, 2, 0, 0, 2, 2], [0, 0, 3, 2, 2, 0, 1, 3, 0, 0, 3, 2]] \$$$

$$[0, 5y_3, -5y_3 + 5y_1 - 5y_2 + 5y_5 + 5y_6 - 5y_8, 6y_1 - 5y_4 + 6y_5 + 6y_6 - 5y_7, 5y_1, 5y_2, 5y_4, 5y_5, 0, 5y_6, 5y_7, 5y_8]$$

$$p' = -s^4 - s^6 + s^7 + s^9 \quad p = -s^4 - s^6 + s^7 + s^9$$

1007 . Coloring, {6, 7, 8, 10, 11}

R: [7, 7, 7, 6, A, 3, A, B, B, 2, 4, 5]

B: [6, 8, 8, 7, 3, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 2, 0] , [0, 3, 1, 2, 0, 2, 3, 0, 0, 5, 0, 0] , [0, 5, 2, 0, 0, 2, 4, 0, 0, 3, 0, 0] , [0, 3, 2, 0, 0, 0, 7, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0]] \$

[0, y₁, y₂, y₃, y₇, y₄, y₅, 0, 0, y₆, y₇, 0]

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 1, 4, 1, 1, 5] , [1, 0, 0, 0, 0, 2, 0, 0, 5, 2, 0, 6] , [0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

[y₁ - y₃ - y₄ + y₅, 0, y₂, 0, 0, y₁, y₂, y₆, y₃, y₄, y₆, y₅]

$$p = s^6 - s^7 \quad p' = -s^6 + s^7 \quad p'' = -s^6 + s^8$$

1008 . Coloring, {6, 7, 8, 10, 12}

R: [7, 7, 7, 6, A, 3, A, B, B, 2, 1, 9]

B: [6, 8, 8, 7, 3, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 2, 0] , [2, 3, 1, 0, 0, 0, 5, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$[y_5, y_3, y_4, 0, 0, y_2, y_1, 0, 2y_2, y_6, 2y_4, 0]$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {4, 7, 11}} order: 12

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 2, 4] , [0, 0, 2, 2, 4, 0, 2, 1, 0, 1, 1, 3] , [0, 0, 4, 1, 3, 0, 2, 2, 0, 0, 2, 2] , [0, 0, 3, 2, 2, 0, 1, 4, 0, 0, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 3, 0, 0, 1, 4] , [0, 0, 2, 1, 4, 0, 2, 2, 0, 0, 2, 3] , [0, 0, 4, 2, 3, 0, 1, 2, 0, 0, 2, 2] , [0, 0, 3, 2, 2, 0, 2, 4, 0, 0, 1, 2] , [0, 0, 2, 1, 2, 0, 2, 3, 0, 0, 2, 4]] \$

$[0, 0, 11y_1 - 5y_2 - 5y_3 + 11y_4 - 5y_5 - 5y_6 + 11y_7 - 5y_8, 5y_1, 5y_2, 5y_3, 5y_4, 5y_5, 0, 5y_6, 5y_7, 5y_8]$

$$p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9$$

1009 . Coloring, {6, 7, 8, 11, 12}

R: [7, 7, 7, 6, A, 3, A, B, B, C, 4, 9]

B: [6, 8, 8, 7, 3, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{3, 4, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 2, 2] , [0, 0, 1, 2, 0, 2, 1, 0, 2, 3, 2, 3] , [0, 0, 2, 2, 0, 2, 1, 0, 3, 1, 2, 3] , [0, 0, 2, 2, 0, 2, 0, 3, 1, 3, 1] , [0, 0, 2, 3, 0, 2, 2, 0, 1, 2, 3, 1] , [0, 0, 2, 3, 0, 3, 2, 0, 1, 2, 1, 2] , [0, 0, 3, 1, 0, 3, 2, 0, 2, 2, 1, 2] , [0, 0, 3, 1, 0, 1, 3, 0, 2, 2, 2, 2]] \$

$$[0, 0, -y_2 + y_1 + y_3 - y_5 - y_4 + y_6 + y_7, y_2, 0, y_1, y_3, 0, y_5, y_4, y_6, y_7]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 2, 2], [2, 1, 2, 0, 2, 2, 0, 3, 0, 1, 1, 2], [1, 1, 2, 0, 2, 2, 0, 3, 0, 2, 0, 3], [0, 2, 2, 0, 3, 1, 0, 3, 0, 2, 0, 3], [0, 2, 3, 0, 3, 0, 0, 4, 0, 1, 0, 3], [0, 1, 3, 0, 3, 0, 0, 5, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4]] \$$$

$$[y_2, y_3, y_2 - y_3 + y_1 - y_5 + y_6 + y_4 + y_9 - y_7 - y_8, 0, y_1, y_5, y_6, y_4, 0, y_9, y_7, y_8]$$

$$p = s^7 - s^8 + s^9 - s^{10}$$

1010 . Coloring, {6, 7, 9, 10, 11}

R: [7, 7, 7, 6, A, 3, A, C, C, 2, 4, 5]

B: [6, 8, 8, 7, 3, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 0, 2], [0, 3, 1, 0, 2, 2, 3, 0, 0, 5, 0, 0], [0, 5, 2, 0, 0, 0, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0]] \$$$

$$[0, y_6, y_5, 2y_4 - 2y_3, y_4, y_3, y_2, 0, 0, y_1, 0, 2y_4 - 2y_3]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 4, 2] , [4, 0, 0, 0, 0, 2, 0, 1, 2, 1, 5, 1] , [5, 0, 0, 0, 0, 4, 0, 0, 1, 2, 3, 1] , [3, 0, 0, 0, 0, 5, 0, 0, 1, 4, 1, 2] , [1, 0, 0, 0, 0, 3, 0, 0, 2, 5, 1, 4] , [1, 0, 0, 0, 0, 1, 0, 0, 4, 3, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 0, 5, 1, 4, 3] , [4, 0, 0, 0, 0, 2, 0, 0, 3, 1, 5, 1] , [5, 0, 0, 0, 0, 4, 0, 0, 1, 2, 3, 1]] \$

$$[y_5 - y_2 - y_3 - y_4 + y_6 + y_7, 0, y_1, 0, 0, y_5, y_1, y_2, y_3, y_4, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

1011 . Coloring, {6, 7, 9, 10, 12}

R: [7, 7, 7, 6, A, 3, A, C, C, 2, 1, 9]

B: [6, 8, 8, 7, 3, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 0, 2] , [0, 3, 1, 0, 0, 0, 5, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 3, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 3, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 3, 0, 2]] \$

$$[2y_2, -y_1 - 3y_2 - y_3 - y_4 + 6y_5, y_1, 0, 0, y_2, y_3, 0, y_5, y_4, 0, y_5]$$

$$p' = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 9

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 0, 2, 1, 0, 1, 3, 1] , [0, 0, 2, 3, 1, 0, 4, 2, 0, 0, 3, 1] , [0, 0, 1, 3, 1, 0, 3, 2, 0, 0, 6, 0] , [0, 0, 1, 6, 0, 0, 3, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 1, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0]] \$

$$[0, 0, y_9, y_8, y_6, y_7, y_5, y_4, 0, y_3, y_1, y_2]$$

1012 . Coloring, {6, 7, 9, 11, 12}

R: [7, 7, 7, 6, A, 3, A, C, C, C, 4, 9]

B: [6, 8, 8, 8, 7, 3, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	7 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 0, 4] , [0, 0, 1, 0, 0, 2, 1, 0, 4, 3, 0, 5] , [0, 0, 2, 0, 0, 0, 1, 0, 5, 1, 0, 7] , [0, 0, 0, 0, 0, 2, 0, 7, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_2, y_3, 0, y_2 + y_3 - y_1 + y_4 + y_5 - y_6, y_1, 0, y_4, y_5, 0, y_6]$$

$$p = -s^6 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 4, 0] , [4, 1, 2, 0, 0, 2, 0, 3, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 4, 0, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 0, 1, 0, 4, 3, 0] , [3, 4, 0, 0, 0, 3, 0, 2, 0, 3, 1, 0] , [1, 3, 0, 0, 0, 3, 0, 4, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 1, 0, 3, 0, 3, 4, 0] , [4, 3, 0, 0, 0, 2, 0, 3, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 4, 0, 3, 0, 2, 3, 0]] \$

$$[y_1 + y_2 + y_3 - 3y_4 - y_5 - y_6 + y_7, y_1, y_2, 0, 2y_4, y_3, y_4, y_5, 0, y_6, y_7, 0]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

1013 . Coloring, {6, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 16s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, 3, A, C, B, 2, 4, 9]

B: [6, 8, 8, 8, 7, 3, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 9

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 1, 1], [0, 3, 1, 1, 0, 2, 3, 0, 1, 3, 2, 0], [0, 3, 2, 2, 0, 1, 4, 0, 0, 3, 1, 0], [0, 3, 1, 1, 0, 2, 5, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 1, 4, 0, 0, 5, 0, 0], [0, 5, 1, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$$

$[0, y_5, y_3, y_4, 0, y_1, y_2, 0, y_8, y_9, y_7, y_6]$

Omega Rank for B : cycles: $\{\{1, 3, 5, 6, 8, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 0, 1, 0, 1, 3, 1], [3, 0, 3, 0, 1, 3, 0, 2, 0, 2, 1, 1], [1, 0, 1, 0, 1, 3, 0, 3, 0, 3, 2, 2], [2, 0, 1, 0, 2, 1, 0, 1, 0, 3, 3, 3], [3, 0, 2, 0, 3, 2, 0, 1, 0, 1, 1, 3], [1, 0, 3, 0, 3, 3, 0, 2, 0, 2, 1, 1], [1, 0, 3, 0, 1, 1, 0, 3, 0, 3, 2, 2], [2, 0, 1, 0, 2, 1, 0, 3, 0, 1, 3, 3]] \$$

$[y_1 - y_2 + y_6 - y_3 - y_4 - y_8 + y_5 + y_7, 0, y_1, 0, y_2, y_6, y_3, y_4, 0, y_8, y_5, y_7]$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

1014 . Coloring, $\{6, 8, 9, 10, 11\}$

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 + 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, 3, B, B, C, 2, 4, 5]

B: [6, 8, 8, 7, 3, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 3, 1] , [0, 1, 1, 3, 1, 2, 3, 0, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 3, 2, 0, 0, 1, 3, 0] , [0, 1, 3, 3, 0, 3, 4, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 4, 0, 0, 0, 2, 0]] \$$

$[0, y_1, y_2, y_4, y_3, y_5, y_6, 0, 0, y_9, y_8, y_7]$

Omega Rank for B : cycles: $\{\{1, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 1, 3, 2, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 5, 2] , [5, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 1] , [3, 0, 0, 0, 0, 5, 0, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 3, 0, 0, 2, 5, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 3, 3]] \$$

$[y_1, 0, y_3, 0, 0, y_2, y_3, y_4, y_5, y_8, y_6, y_7]$

$$p = -s^3 + s^9$$

1015 . Coloring, $\{6, 8, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: $[7, 7, 7, 6, A, 3, B, B, C, 2, 1, 9]$

B: $[6, 8, 8, 7, 3, A, A, C, B, C, 4, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 3, 1] , [3, 1, 1, 0, 0, 0, 5, 0, 1, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 5, 0, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 3, 0, 1, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 5, 0, 2, 0, 3, 1] , [3, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 5, 0, 2, 0, 5, 1]] \$$

$$[-6y_1 - 9y_4 - 3y_2 + 13y_3 - 3y_5 + 13y_6, 3y_1 + 3y_4, 3y_1, 0, 0, 3y_4, 3y_2, 0, 3y_3, 3y_4, 3y_5, 3y_6]$$

$$p = -s^3 + s^9 \quad p = s^3 - s^5 - s^6 + s^8 \quad p = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 1, 3], [0, 0, 2, 1, 3, 0, 2, 1, 0, 2, 0, 5], [0, 0, 3, 0, 5, 0, 1, 2, 0, 2, 0, 3], [0, 0, \\ & 5, 0, 3, 0, 0, 3, 0, 1, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, \\ & 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4]] \$ \end{aligned}$$

$$[0, 0, y_2, y_1, y_3, y_7, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^5 + s^9$$

1016 . Coloring, {6, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, B, B, C, C, 4, 9]

B: [6, 8, 8, 7, 3, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 10

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 3, 3], [0, 0, 1, 3, 0, 2, 1, 0, 3, 0, 3, 3], [0, 0, 2, 3, 0, 3, 1, 0, 3, 0, 1, 3], [0, 0, \\ & 3, 1, 0, 3, 2, 0, 3, 0, 1, 3], [0, 0, 3, 1, 0, 1, 3, 0, 3, 0, 2, 3], [0, 0, 1, 2, 0, 1, 3, 0, 3, 0, 3, 3], [0, 0, 1, 3, 0, 2, \\ & 1, 0, 3, 0, 3, 3], [0, 0, 2, 3, 0, 3, 1, 0, 3, 0, 1, 3]] \$ \end{aligned}$$

$$[0, 0, -3y_1 - 3y_2 - 3y_3 + 10y_6 - 3y_5, 3y_1, 0, 3y_2, 3y_3, 0, -3y_4 + 3y_6, 3y_4, 3y_5, 3y_6]$$

$$p' = s^2 - s^7 \quad p = -s^2 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 0, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 1, 0, 5, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 0, 3, 0, 1, 0, 5] , [0, 1, 3, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_8, y_6, 0, y_7, y_8, y_9]$$

$$p = -s^6 + s^{10}$$

1017 . Coloring, {6, 8, 10, 11, 12}

R: [7, 7, 7, 6, A, 3, B, B, B, 2, 4, 9]

B: [6, 8, 8, 7, 3, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 4, 0] , [0, 1, 1, 4, 0, 2, 3, 0, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 5, 2, 0, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 3, 4, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 2, 5, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 3, 0, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 2, 0, 0, 0, 3, 0]] \$

$$[0, y_1, y_2, y_3, 0, y_6, y_5, 0, 2y_4, y_4, y_7, 0]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 2, 0, 1, 0, 2, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 2, 0, 2, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$

$$[2y_5, 0, y_1, 0, y_2, y_3, y_5, y_4, 0, y_6, 0, y_7]$$

$$p = -s^4 + s^8$$

1018 . Coloring, {6, 9, 10, 11, 12}

R: [7, 7, 7, 6, A, 3, B, C, C, 2, 4, 9]

B: [6, 8, 8, 7, 3, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 2, 2] , [0, 1, 1, 2, 0, 2, 3, 0, 2, 0, 3, 2] , [0, 0, 2, 3, 0, 2, 2, 0, 2, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 2, 0, 2, 0, 2, 2] , [0, 0, 3, 2, 0, 3, 2, 0, 2, 0, 2, 2] , [0, 0, 3, 2, 0, 2, 3, 0, 2, 0, 2, 2] , [0, 0, 2, 2, 0, 2, 3, 0, 2, 0, 3, 2] , [0, 0, 2, 3, 0, 2, 2, 0, 2, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 2, 0, 2, 0, 2, 2]] \$

$$[0, -y_1 - y_2 - y_3 - y_4 + 6y_7 - y_5 - y_6, y_1, y_2, 0, y_3, y_4, 0, y_7, y_5, y_6, y_7]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 2, 0, 1, 0, 2, 2, 3] , [2, 0, 2, 0, 3, 2, 0, 2, 0, 2, 1, 2] , [1, 0, 3, 0, 2, 2, 0, 2, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 1, 0, 3, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 2, 0, 2, 0, 1, 3, 2] , [3, 0, 2, 0, 2, 2, 0, 2, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 3, 0, 2, 0, 2, 2, 2] , [2, 0, 1, 0, 2, 2, 0, 2, 0, 3, 2, 2]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

1019 . Coloring, {7, 8, 9, 10, 11}

R: [7, 7, 7, 6, A, A, A, B, C, 2, 4, 5]

B: [6, 8, 8, 7, 3, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 4, 1, 1], [0, 4, 0, 1, 1, 2, 2, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$[0, y_1, 0, y_4, y_4, y_3, y_2, 0, 0, y_6, y_5, y_5]$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 0, 3, 3], [3, 0, 1, 0, 0, 2, 0, 2, 3, 0, 3, 2], [3, 0, 2, 0, 0, 3, 0, 1, 2, 0, 3, 2], [3, 0, 3, 0, 0, 3, 0, 2, 2, 0, 2, 1], [2, 0, 3, 0, 0, 3, 0, 3, 1, 0, 2, 2], [2, 0, 3, 0, 0, 2, 0, 3, 2, 0, 1, 3], [1, 0, 2, 0, 0, 2, 0, 3, 3, 0, 2, 3], [2, 0, 2, 0, 0, 1, 0, 2, 3, 0, 3, 3]] \$$

$[y_1, 0, y_8, 0, 0, y_7, y_6, y_5, y_4, 0, y_3, y_2]$

1020 . Coloring, $\{7, 8, 9, 10, 12\}$

R: [7, 7, 7, 6, A, A, A, B, C, 2, 1, 9]

B: [6, 8, 8, 7, 3, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 10	10 vs 10	6 vs 8	6 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2]] \$$

$[3 y_1, -3 y_1 - 6 y_2 - 3 y_6 + 13 y_5 - 3 y_4 + 13 y_3, 0, 0, 0, 3 y_2, 3 y_6, 0, 3 y_5, 3 y_4, 3 y_2, 3 y_3]$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p' = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}, \{4, 7, 11\}\}$ order: 12

See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 0, 3, 3], [0, 0, 3, 3, 3, 0, 2, 2, 0, 0, 1, 2], [0, 0, 3, 1, 2, 0, 3, 3, 0, 0, 2, 2], [0, 0, 2, 2, 0, 1, 3, 0, 0, 3, 3], [0, 0, 2, 3, 3, 0, 2, 2, 0, 0, 1, 3], [0, 0, 3, 1, 3, 0, 3, 2, 0, 0, 2, 2], [0, 0, 3, 2, 2, 0, 1, 3, 0, 0, 3, 2], [0, 0, 2, 3, 2, 0, 2, 3, 0, 0, 1, 3]] \$$

$[0, 0, 5 y_1 + 5 y_2 + 5 y_4 - 5 y_6, 6 y_1 + 6 y_2 + 6 y_4 - 5 y_3 - 5 y_5, 5 y_1, 5 y_2, 5 y_3, 5 y_4, 0, 0, 5 y_5, 5 y_6]$

$$p = -s^2 - s^4 + s^5 + s^7 \quad p' = -s^2 - s^3 - s^4 + s^6 + s^7 + s^8$$

1021 . Coloring, $\{7, 8, 9, 11, 12\}$

R: $[7, 7, 7, 6, A, A, A, B, C, C, 4, 9]$

B: $[6, 8, 8, 7, 3, 3, B, C, B, 2, 1, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 4, 1, 3], [0, 0, 0, 1, 0, 2, 0, 0, 3, 4, 0, 6], [0, 0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 7], [0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[0, 0, 0, y_5, 0, y_4, 3y_1, 0, y_3, y_2, y_1, y_5 - y_4 + y_3 + y_2 - 4y_1]$$

$$p = -s^5 + s^7 \quad p = -s^5 + s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 0, 3, 1], [3, 0, 3, 0, 1, 2, 0, 4, 0, 0, 1, 2], [1, 0, 3, 0, 2, 3, 0, 3, 0, 0, 0, 4], [0, 0, 5, 0, 4, 1, 0, 3, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 5, 0, 0, 0, 3], [0, 0, 3, 0, 3, 0, 0, 5, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 3, 0, 0, 0, 5], [0, 0, 5, 0, 5, 0, 0, 3, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 5, 0, 0, 0, 3]] \$$$

$$[-y_1 + y_2 + y_3 - 3y_4 + y_5 + y_6 - y_7, 2y_4, y_1, 0, y_2, y_3, y_4, y_5, 0, 0, y_6, y_7]$$

$$p = -s^5 + s^6 - s^7 + s^8 \quad p = -s^5 + s^9$$

1022 . Coloring, {7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 5s^3 - 2s^4 - 16s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, A, B, B, 2, 4, 9]

B: [6, 8, 8, 7, 3, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 7	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 4, 2, 0], [0, 4, 0, 2, 0, 2, 2, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 2, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$$$

$$[0, y_2, 0, y_1, 0, y_3, y_4, 0, y_5, y_7, y_6, 0]$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 0, 2, 4] , [2, 0, 3, 0, 4, 2, 0, 2, 0, 0, 1, 2] , [1, 0, 6, 0, 2, 2, 0, 3, 0, 0, 0, 2] , [0, 0, 4, 0, 2, 1, 0, 6, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 4, 0, 0, 0, 6] , [0, 0, 3, 0, 6, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 6, 0, 4, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 6, 0, 0, 0, 3]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, y_8, 0, 0, y_6, y_7]$$

1023 . Coloring, {7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 + 2s^4 - 16s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, A, A, C, C, 2, 4, 9]

B: [6, 8, 8, 7, 3, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	3 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 2, 2, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2]] \$

$$[0, -y_1 + 2y_3, 0, y_1, 0, -y_2 + 2y_3, y_2, 0, y_3, 2y_3, 0, y_3]$$

$$p = -s^3 + s^5 \quad p = -s^3 + s^7 \quad p = -s^3 + s^6 \quad p = -s^3 + s^4$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 0, 4, 2] , [4, 0, 3, 0, 2, 2, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 3, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 0, 4, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 0, 3, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 3, 0, 0, 2, 0]] \$

$$[y_7, 0, y_6, 0, y_5, y_4, y_3, y_2, 0, 0, y_1, 2y_3]$$

$$p = -s^3 + s^8$$

1024 . Coloring, {8, 9, 10, 11, 12}

R: [7, 7, 7, 6, A, A, B, B, C, 2, 4, 9]

B: [6, 8, 8, 7, 3, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 2, 0, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 3, 2, 0, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 3, 1, 0, 1, 3, 2, 2] , [0, 3, 0, 2, 0, 2, 2, 0, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 2, 3, 0, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 1, 3, 0, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 2, 0, 1, 1, 3, 2]] \$

$$[0, -3y_1 + 5y_3 - 3y_4 + 8y_5, 0, -3y_2 + 8y_3 - 3y_6 + 5y_5, 0, 3y_1, 3y_2, 0, 3y_3, 3y_6, 3y_4, 3y_5]$$

$$p = -s + s^7 \quad p' = -s + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 2, 1, 3] , [1, 0, 3, 0, 3, 2, 0, 2, 0, 1, 0, 4] , [0, 0, 5, 0, 4, 1, 0, 3, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 5, 0, 0, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 5, 0, 5, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 5, 0, 0, 0, 5]] \$

$$[y_4, 0, y_1 + y_2 + y_3 - y_6, 0, y_1, y_2, y_5, y_3, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^5 - s^6 + s^7 \quad p = -s^4 + s^8 \quad p' = -s^4 + s^8$$

1025 . Coloring, {2, 3, 4, 5, 6, 7}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, C, B, C, 1, 5]
B: [6, 7, 7, 6, A, A, B, B, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	6 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 0, 2, 0, 2, 0, 2, 2, 0, 2, 1, 3] , [1, 0, 2, 0, 3, 0, 2, 2, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 1, 2, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 1, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$

$$[-y_4 + y_5 + y_3, 0, y_5, 0, y_4, 0, y_3, y_2, 0, y_5 + y_3 - y_2, y_5 + y_3 - y_1, y_1]$$

$$p = -s^5 + s^7 \quad p = -s^5 + s^8 \quad p = -s^5 + s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 2, 2, 0, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 2, 0, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 3, 2, 0, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 2, 2, 0, 1, 3, 2, 2] , [0, 3, 0, 2, 0, 2, 2, 0, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 2, 3, 0, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 2, 2, 0, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 2, 0, 1, 2, 2, 2]] \$

$$[0, -3y_1 + 8y_3 - 3y_5 + 5y_6, 0, -3y_2 + 5y_3 - 3y_4 + 8y_6, 0, 3y_1, 3y_2, 0, 3y_3, 3y_4, 3y_5, 3y_6]$$

$$p' = s - s^7 \quad p = s - s^7$$

1026 . Coloring, {2, 3, 4, 5, 6, 8}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7$$

R: [7, 8, 8, 7, 3, 3, B, B, B, C, 1, 5]
B: [6, 7, 7, 6, A, A, A, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	3 vs 7

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 2, 0, 2, 0, 2, 2, 0, 0, 4, 2], [4, 0, 2, 0, 2, 0, 2, 2, 0, 0, 4, 0], [4, 0, 2, 0, 0, 0, 4, 2, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 4, 2, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_5, 0, 0, y_6, y_7]$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 2, 2, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 2, 2, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2]] \$$

$$[0, -y_2 + 2y_3, 0, y_2, 0, -y_1 + 2y_3, y_1, 0, y_3, 2y_3, 0, y_3]$$

$$p = -s^3 + s^4 \quad p = -s^3 + s^5 \quad p = -s^3 + s^6 \quad p = -s^3 + s^7$$

1027 . Coloring, $\{2, 3, 4, 5, 6, 9\}$

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 - 32s^7 \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 - 32s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, 3, B, C, C, C, 1, 5]

B: [6, 7, 7, 6, A, A, A, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	7 vs 7

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{1, 7, 11\}\}$ order: 12

See Matrix

$\$ [[2, 0, 2, 0, 2, 0, 2, 2, 0, 0, 2, 4], [2, 0, 2, 0, 4, 0, 2, 2, 0, 0, 2, 2], [2, 0, 4, 0, 2, 0, 2, 2, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 2, 4, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 2, 2, 0, 0, 2, 4], [2, 0, 2, 0, 4, 0, 2, 2, 0, 0, 2, 2], [2, 0, 4, 0, 2, 0, 2, 2, 0, 0, 2, 2]] \$$

$$[y_1, 0, y_2, 0, y_3, 0, y_1, 5y_1 - y_2 - y_3 - y_4, 0, 0, y_1, y_4]$$

$$p' = -s^2 + s^6 \quad p = s - s^5 \quad p' = s - s^5$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 2, 2, 0, 2, 4, 2, 0], [0, 4, 0, 2, 0, 2, 2, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 2, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$$

$$[0, y_1, 0, y_2, 0, y_4, y_5, 0, y_3, y_6, y_7, 0]$$

1028 . Coloring, $\{2, 3, 4, 5, 6, 10\}$

$$\Omega p(\Delta)=0: \quad p = 9s^3 - 16s^5 - 24s^6 - 16s^7 + 64s^8 \quad p' = 3s^3 + 4s^4 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, 3, 3, B, C, B, 2, 1, 5]

B: [6, 7, 7, 6, A, A, A, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	5 vs 7

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{1, 7, 11\}\}$ order: 12

See Matrix

$\$ [[2, 2, 2, 0, 2, 0, 2, 2, 0, 0, 3, 1], [3, 0, 2, 0, 1, 0, 2, 4, 0, 0, 2, 2], [2, 0, 1, 0, 2, 0, 3, 2, 0, 0, 2, 4], [2, 0, 2, 0, 4, 0, 2, 1, 0, 0, 3, 2], [3, 0, 4, 0, 2, 0, 2, 2, 0, 0, 2, 1], [2, 0, 2, 0, 1, 0, 3, 4, 0, 0, 2, 2], [2, 0, 1, 0, 2, 0, 2, 2, 0, 0, 3, 4], [3, 0, 2, 0, 4, 0, 2, 1, 0, 0, 2, 2]] \$$

$$[7 y_4, 7 y_5, 7 y_3, 0, 7 y_2, 0, 7 y_1, 9 y_4 - 7 y_5 - 7 y_3 - 7 y_2 + 9 y_1 + 9 y_7 - 7 y_6, 0, 0, 7 y_7, 7 y_6]$$

$$p = -s^2 - s^3 - s^4 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 2, 2, 0, 2, 4, 1, 3], [0, 0, 0, 1, 0, 2, 0, 0, 3, 4, 0, 6], [0, 0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[0, 0, 0, y_1 - y_2 - y_3 + 3 y_4 + y_5, 0, y_1, 2 y_4, 0, y_2, y_3, y_4, y_5]$$

$$p = s^5 - s^6 \quad p' = -s^5 + s^6$$

1029 . Coloring, {2, 3, 4, 5, 6, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, 3, B, C, B, C, 4, 5]

B: [6, 7, 7, 6, A, A, A, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}, {4, 7, 11}} order: 12

See Matrix

$$\$ [[0, 0, 2, 2, 2, 0, 2, 2, 0, 0, 3, 3], [0, 0, 2, 3, 3, 0, 2, 2, 0, 0, 2, 2], [0, 0, 3, 2, 2, 0, 3, 2, 0, 0, 2, 2], [0, 0, 2, 2, 0, 2, 3, 0, 0, 3, 2], [0, 0, 2, 3, 2, 0, 2, 2, 0, 0, 2, 3], [0, 0, 2, 2, 3, 0, 3, 2, 0, 0, 2, 2], [0, 0, 3, 2, 2, 0, 2, 2, 0, 0, 3, 2]] \$$$

$$[0, 0, 9 y_1 - 7 y_2 + 9 y_3 - 7 y_4 + 9 y_5 - 7 y_6, 7 y_1, 7 y_2, 0, 7 y_3, 7 y_4, 0, 0, 7 y_5, 7 y_6]$$

$$p = -s - s^2 - s^3 + s^5 + s^6 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 2, 2, 0, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 2, 2, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 1, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 4, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2]] \$$

$$[3 y_6, 3 y_7, 0, 0, 0, 3 y_3, 3 y_4, 0, 3 y_5, -3 y_6 - 3 y_7 - 3 y_3 - 3 y_4 + 13 y_5 - 3 y_2 + 13 y_1, 3 y_2, 3 y_1]$$

$$p = -s^4 - s^5 + s^7 + s^8$$

1030 . Coloring, {2, 3, 4, 5, 6, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, 3, B, C, B, C, 1, 9]

B: [6, 7, 7, 6, A, A, A, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$\$ [[2, 0, 2, 0, 0, 0, 2, 2, 2, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 2, 3, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 2] , [5, 0, 0, 0, 0, 4, 0, 2, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$$[y_1, 0, y_5, 0, 0, 0, y_2, y_3, y_4, 0, y_7, y_6]$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 2, 2, 0, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 2, 2, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$

$$[0, y_1, 0, y_2, y_2, y_3, y_4, 0, 0, y_5, y_6, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1031 . Coloring, {2, 3, 4, 5, 7, 8}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, A, B, B, C, 1, 5]

B: [6, 7, 7, 6, A, 3, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 9

Omega Rank for R : cycles: {{1, 3, 5, 7, 8, 10, 11, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 3, 2, 2], [2, 0, 2, 0, 2, 0, 2, 1, 0, 2, 2, 3], [2, 0, 2, 0, 3, 0, 2, 2, 0, 2, 1, 2], [1, 0, 3, 0, 2, 0, 2, 2, 0, 2, 2, 2], [2, 0, 2, 0, 2, 0, 1, 3, 0, 2, 2, 2], [2, 0, 2, 0, 2, 0, 2, 2, 0, 1, 3, 2], [3, 0, 2, 0, 2, 0, 2, 2, 0, 2, 2, 1], [2, 0, 2, 0, 1, 0, 3, 2, 0, 2, 2, 2]] \$$$

$$[y_1, 0, y_4, 0, y_3, 0, y_2, y_7, 0, y_6, y_5, y_8]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 1, 2, 2], [0, 1, 2, 2, 0, 2, 3, 0, 2, 0, 2, 2], [0, 0, 2, 2, 0, 2, 3, 0, 2, 0, 3, 2], [0, 0, 2, 3, 0, 2, 2, 0, 2, 0, 3, 2], [0, 0, 2, 3, 0, 3, 2, 0, 2, 0, 2, 2], [0, 0, 3, 2, 0, 3, 2, 0, 2, 0, 2, 2], [0, 0, 3, 2, 0, 2, 3, 0, 2, 0, 2, 2], [0, 0, 2, 2, 0, 2, 3, 0, 2, 0, 3, 2], [0, 0, 2, 3, 0, 2, 2, 0, 2, 0, 3, 2]] \$$$

$$[0, -y_1 - y_2 - y_3 - y_4 + 6y_7 - y_5 - y_6, y_1, y_2, 0, y_3, y_4, 0, y_7, y_5, y_6, y_7]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

1032 . Coloring, {2, 3, 4, 5, 7, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, A, A, C, C, C, 1, 5]

B: [6, 7, 7, 6, A, 3, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 1, 0, 2, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 2, 0, 2, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3]] \$

[$y_1, 0, y_2, 0, y_3, 0, y_7, y_4, 0, y_5, 0, y_6$]

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 1, 4, 0] , [0, 1, 2, 4, 0, 2, 3, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 4, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0]] \$

[0, $y_1, y_4, y_2, 0, y_3, y_5, 0, 2 y_6, y_6, y_7, 0$]

$$p = s^3 - s^8$$

1033 . Coloring, {2, 3, 4, 5, 7, 10}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7$$

R: [7, 8, 8, 7, 3, A, A, C, B, 2, 1, 5]

B: [6, 7, 7, 6, A, 3, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	9 vs 9	6 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8
See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 3, 1, 1], [1, 3, 2, 0, 1, 0, 2, 3, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 1, 5, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 0, 3, 0, 1, 0, 5], [0, 1, 3, 0, 5, 0, 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3]] \$$

$$[y_1, y_2, y_3, 0, y_4, 0, y_5, y_9, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}, \{9, 12\}\}$ order: 10
See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 1, 3, 3], [0, 0, 2, 3, 0, 2, 1, 0, 3, 0, 2, 3], [0, 0, 2, 2, 0, 3, 2, 0, 3, 0, 1, 3], [0, 0, 3, 1, 0, 2, 2, 0, 3, 0, 2, 3], [0, 0, 2, 2, 0, 1, 3, 0, 3, 0, 2, 3], [0, 0, 1, 2, 0, 2, 2, 0, 3, 0, 3, 3], [0, 0, 2, 3, 0, 2, 1, 0, 3, 0, 2, 3], [0, 0, 2, 2, 0, 3, 2, 0, 3, 0, 1, 3]] \$$

$$[0, 0, -3y_1 - 3y_2 - 3y_3 - 3y_5 + 10y_6, 3y_1, 0, 3y_2, 3y_3, 0, -3y_4 + 3y_6, 3y_4, 3y_5, 3y_6]$$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7$$

1034 . Coloring, $\{2, 3, 4, 5, 7, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 - 8s^5 + 32s^7$$

R: [7, 8, 8, 7, 3, A, A, C, B, C, 4, 5]

B: [6, 7, 7, 6, A, 3, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	8 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8
See Matrix

\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 0, 2, 1, 0, 2, 0, 5] , [0, 0, 3, 0, 5, 0, 1, 2, 0, 2, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 3, 0, 1, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$

$$[0, 0, y_1, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {9, 12}} order: 10
See Matrix

\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 1, 3, 1] , [3, 1, 2, 0, 0, 2, 3, 0, 1, 0, 2, 2] , [2, 0, 2, 0, 0, 3, 3, 0, 2, 0, 3, 1] , [3, 0, 3, 0, 0, 2, 2, 0, 1, 0, 3, 2] , [3, 0, 2, 0, 0, 3, 3, 0, 2, 0, 2, 1] , [2, 0, 3, 0, 0, 3, 2, 0, 1, 0, 3, 2] , [3, 0, 3, 0, 0, 2, 3, 0, 2, 0, 2, 1] , [2, 0, 2, 0, 0, 3, 3, 0, 1, 0, 3, 2] , [3, 0, 3, 0, 0, 2, 2, 0, 2, 0, 3, 1]] \$

$$[-3 y_1 - 3 y_2 - 3 y_6 - 3 y_7 + 13 y_8 - 3 y_5 - 3 y_4 + 13 y_3, 3 y_1, 3 y_2, 0, 0, 3 y_6, 3 y_7, 0, 3 y_8, 3 y_5, 3 y_4, 3 y_3]$$

$$p = -s^3 - s^4 + s^8 + s^9$$

1035 . Coloring, {2, 3, 4, 5, 7, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 - 32s^7$$

R: [7, 8, 8, 7, 3, A, A, C, B, C, 1, 9]

B: [6, 7, 7, 6, A, 3, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 1, 3, 2, 2, 5] , [2, 0, 0, 0, 0, 0, 1, 0, 5, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 3, 1, 5, 2] , [5, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 1] , [3, 0, 0, 0, 0, 0, 5, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 3, 0, 2, 5, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 5]] \$

$$[y_1, 0, y_2, 0, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 0, 0, 1, 3, 1], [0, 1, 2, 3, 1, 2, 3, 0, 0, 2, 2, 0], [0, 2, 2, 2, 0, 3, 3, 0, 0, 1, 3, 0], [0, 1, 3, 3, 0, 2, 4, 0, 0, 0, 3, 0], [0, 0, 2, 3, 0, 3, 4, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 3, 2, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 4, 3, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 3, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 2, 4, 0, 0, 0, 3, 0]] \$$$

$$[0, y_1, y_2, y_3, y_6, y_7, y_5, 0, 0, y_4, y_8, y_9]$$

1036 . Coloring, $\{2, 3, 4, 5, 8, 9\}$

$$\Omega p(\Delta)=0: \quad p = -s^2 - 4s^4 + 8s^5 + 16s^6 - 32s^7 + 64s^8 \quad p = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7$$

R: [7, 8, 8, 7, 3, A, B, B, C, C, 1, 5]

B: [6, 7, 7, 6, A, 3, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 2, 0, 1, 3, 3], [3, 0, 2, 0, 3, 0, 2, 1, 0, 0, 4, 1], [4, 0, 3, 0, 1, 0, 3, 2, 0, 0, 3, 0], [3, 0, 1, 0, 0, 0, 4, 3, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 3, 1, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0]] \$$$

$$[y_8, 0, y_7, 0, y_6, 0, y_5, y_4, 0, y_3, y_2, y_1]$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 9

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 3, 1, 1], [0, 3, 2, 1, 0, 2, 3, 0, 1, 2, 2, 0], [0, 2, 2, 2, 0, 1, 5, 0, 0, 3, 1, 0], [0, 3, 1, 1, 0, 2, 4, 0, 0, 5, 0, 0], [0, 5, 2, 0, 0, 1, 4, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 7, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0]] \$$$

$$[0, y_1, y_2, y_6, 0, y_5, y_3, 0, y_4, y_7, y_8, y_9]$$

1037 . Coloring, {2, 3, 4, 5, 8, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 16s^5 - 8s^6 + 16s^7 + 64s^8 \quad p' = s^3 + 4s^4 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, 3, A, B, B, B, 2, 1, 5]

B: [6, 7, 7, 6, A, 3, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 1, 4, 0], [4, 1, 2, 0, 0, 0, 2, 3, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 4, 3, 0, 0, 5, 0], [5, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$$$

$$[y_1, y_2, 2y_2 - 3y_5, 0, 2y_5, 0, y_3, y_4, 0, y_5, y_6, 0]$$

$$p' = s^4 - s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 3, 0, 4], [0, 0, 2, 0, 0, 2, 1, 0, 4, 2, 0, 5], [0, 0, 2, 0, 0, 0, 2, 0, 5, 1, 0, 6], [0, 0, 0, 0, 0, 2, 0, 6, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[0, 0, -y_1 + y_4 + y_5 - y_2 - y_3 + y_6, y_1, 0, y_4, y_5, 0, y_2, y_3, 0, y_6]$$

$$p = -s^6 + s^7$$

1038 . Coloring, {2, 3, 4, 5, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, A, B, B, B, C, 4, 5]

B: [6, 7, 7, 6, A, 3, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	6 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 0, 2, 1, 0, 0, 4, 1] , [0, 0, 2, 4, 1, 0, 4, 2, 0, 0, 3, 0] , [0, 0, 1, 3, 0, 0, 4, 2, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_1, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 3, 0, 2] , [0, 3, 2, 0, 0, 2, 3, 0, 2, 2, 0, 2] , [0, 2, 2, 0, 0, 0, 5, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 4, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 3, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 3, 0, 2, 4, 0, 2]] \$

$$[-y_1 - y_2 - y_4 - y_3 + 6y_6 - y_5, y_1, y_2, 0, 0, y_4, y_3, 0, y_6, y_5, 0, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1039 . Coloring, {2, 3, 4, 5, 8, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, B, B, B, C, 1, 9]

B: [6, 7, 7, 6, A, 3, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 1, 4, 2], [4, 0, 0, 0, 0, 0, 2, 1, 2, 0, 6, 1], [6, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$[y_1, 0, y_4, 0, 0, 0, y_2, y_6, y_3, y_4, y_5, y_6]$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 2, 0, 0, 3, 0, 2], [0, 3, 2, 0, 2, 2, 3, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$[0, y_1, y_2, y_6, y_4, y_4, y_3, 0, 0, y_5, 0, y_6]$

$$p = s^4 - s^7 \quad p' = -s^4 + s^7$$

1040 . Coloring, $\{2, 3, 4, 5, 9, 10\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 8s^5 - 8s^6 - 16s^7 \quad p' = s^3 - 8s^5 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, 3, A, B, C, C, 2, 1, 5]

B: [6, 7, 7, 6, A, 3, A, B, B, C, 4, 9]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{1, 7, 11\}\}$ order: 12

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 1, 2, 2], [2, 1, 2, 0, 2, 0, 2, 3, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 2, 3, 0, 0, 2, 3], [2, 0, 2, 0, 3, 0, 2, 2, 0, 0, 2, 3], [2, 0, 3, 0, 3, 0, 2, 2, 0, 0, 2, 2], [2, 0, 3, 0, 2, 0, 2, 3, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 2, 3, 0, 0, 2, 3], [2, 0, 2, 0, 3, 0, 2, 2, 0, 0, 2, 3], [2, 0, 3, 0, 3, 0, 2, 2, 0, 0, 2, 2]] \$$

$$[2y_4, 2y_3, 5y_4 - 2y_3 - 2y_5, 0, 2y_2, 0, 2y_4, 2y_1, 0, 5y_4 - 2y_2 - 2y_1, 2y_4, 2y_5]$$

$$p' = -s^4 + s^8 \quad p' = -s^3 + s^7 \quad p' = -s^3 + s^4 - s^5 + s^6 \quad p = s^3 - s^4 + s^5 - s^6$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 3, 2, 2], [0, 0, 2, 2, 0, 2, 1, 0, 2, 2, 2, 3], [0, 0, 2, 2, 0, 2, 2, 0, 3, 1, 2, 2], [0, 0, 2, 2, 0, 2, 2, 3, 1], [0, 0, 2, 3, 0, 2, 2, 0, 1, 2, 2, 2], [0, 0, 2, 2, 0, 3, 2, 0, 2, 2, 1, 2], [0, 0, 3, 1, 0, 2, 2, 0, 2, 2, 2, 2], [0, 0, 2, 2, 0, 1, 3, 0, 2, 2, 2, 2]] \$$

$$[0, 0, -y_1 + y_3 + y_2 - y_4 - y_5 + y_6 + y_7, y_1, 0, y_3, y_2, 0, y_4, y_5, y_6, y_7]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1041 . Coloring, $\{2, 3, 4, 5, 9, 11\}$

$$\Omega p(\Delta)=0: \quad p = -s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, B, C, C, C, 4, 5]

B: [6, 7, 7, 6, A, 3, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{4, 7, 11\}\}$ order: 12

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 1, 2, 4], [0, 0, 2, 2, 4, 0, 2, 1, 0, 0, 2, 3], [0, 0, 4, 2, 3, 0, 2, 2, 0, 0, 2, 1], [0, 0, 3, 2, 1, 0, 2, 4, 0, 0, 2, 2], [0, 0, 1, 2, 2, 0, 2, 3, 0, 0, 2, 4], [0, 0, 2, 2, 4, 0, 2, 1, 0, 0, 2, 3], [0, 0, 4, 2, 3, 0, 2, 2, 0, 0, 2, 1], [0, 0, 3, 2, 1, 0, 2, 4, 0, 0, 2, 2]] \$$

$$[0, 0, 5y_3 - 2y_4, 2y_3, 5y_3 - 2y_1 - 2y_2, 0, 2y_3, 2y_1, 0, 2y_2, 2y_3, 2y_4]$$

$$p = -s^2 + s^3 - s^4 + s^5 \quad p = -s^2 + s^6 \quad p = -s^2 - s^4 + s^5 + s^7 \quad p' = -s^3 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 3, 2, 0], [2, 3, 2, 0, 0, 2, 3, 0, 0, 2, 2, 0], [2, 2, 2, 0, 0, 2, 5, 0, 0, 3, 0, 0], [0, 3, 2, 0, 0, 2, 4, 0, 0, 5, 0, 0], [0, 5, 2, 0, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0]] \$$$

$$[y_3, y_2, y_1, 0, 0, y_6, y_7, 0, y_4, y_5, y_8, 0]$$

1042 . Coloring, {2, 3, 4, 5, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, B, C, C, C, 1, 9]

B: [6, 7, 7, 6, A, 3, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	3 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 1, 2, 4], [2, 0, 0, 0, 0, 0, 2, 1, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5]] \$$$

$$[2y_2, 0, 5y_2 - 2y_3, 0, 0, 0, 2y_2, -2y_1 + 2y_3, 2y_1, 5y_2 - 2y_3, 2y_2, 2y_3]$$

$$p = -s^3 + s^5 \quad p = -s^3 + s^6 \quad p = -s^3 + s^7 \quad p = -s^3 + s^8 \quad p = -s^3 + s^4$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 0, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 2, 5, 0, 0, 3, 0, 0] , [0, 3, 2, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[0, y_5, y_1, y_2, y_7, y_3, y_4, 0, 0, y_6, y_7, 0]$$

$$p = -s^5 + s^8$$

1043 . Coloring, {2, 3, 4, 5, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -6s^2 + s^3 + 8s^6 - 16s^7 + 64s^8 \quad p = 9s^2 + 2s^4 - 16s^6 + 16s^7 - 96s^8 \quad p = -27s^2 + 8s^5 + 48s^6 - 64s^7 + 256s^8$$

R: [7, 8, 8, 7, 3, A, B, C, B, 2, 4, 5]

B: [6, 7, 7, 6, A, 3, A, B, C, C, 1, 9]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 0, 2, 3, 0, 0, 2, 2] , [0, 0, 1, 2, 2, 0, 3, 3, 0, 0, 2, 3] , [0, 0, 2, 2, 3, 0, 2, 1, 0, 0, 3, 3] , [0, 0, 3, 3, 3, 0, 2, 2, 0, 0, 2, 1] , [0, 0, 3, 2, 1, 0, 3, 3, 0, 0, 2, 2] , [0, 0, 1, 2, 2, 0, 2, 3, 0, 0, 3, 3] , [0, 0, 2, 3, 3, 0, 2, 1, 0, 0, 2, 3] , [0, 0, 3, 2, 3, 0, 3, 2, 0, 0, 2, 1]] \$

$$[0, 7y_6, 7y_5, 7y_4, 7y_3, 0, 7y_2, 7y_1, 0, -7y_6 - 7y_5 + 9y_4 - 7y_3 + 9y_2 - 7y_1 + 9y_8 - 7y_7, 7y_8, 7y_7]$$

$$p = s^3 + s^4 + s^5 - s^7 - s^8 - s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 3, 1, 3] , [1, 0, 2, 0, 0, 2, 1, 0, 3, 2, 0, 5] , [0, 0, 2, 0, 0, 1, 2, 0, 5, 1, 0, 5] , [0, 0, 1, 0, 0, 0, 2, 0, 5, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 0] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_6, 0, y_5, 0, 0, y_4, y_3, 0, y_2, y_1, y_6 + y_5 - y_4 - y_3 + y_2 + y_1 - y_7, y_7]$$

$$p = s^7 - s^8$$

1044 . Coloring, {2, 3, 4, 5, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^2 + 2s^3 + 8s^5 + 32s^7 \quad p = 9s^2 + 2s^4 - 16s^5 - 80s^7 - 32s^8 \quad p = -27s^2 + 56s^5 + 16s^6 + 256s^7 + 128s^8$$

R: [7, 8, 8, 7, 3, A, B, C, B, 2, 1, 9]

B: [6, 7, 7, 6, A, 3, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	8 vs 9	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 2, 3, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 1, 2, 0, 3, 3], [3, 0, 0, 0, 0, 4, 0, 3, 0, 5, 1], [5, 0, 0, 0, 0, 0, 3, 0, 1, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$$$

$$[y_1, y_2, y_6, 0, 0, 0, y_3, y_5, y_4, y_6, y_8, y_7]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 2, 2, 0, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 1, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 1, 2, 0, 0, 4, 0, 4], [0, 0, 1, 0, 4, 0, 2, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 5, 0, 0, 0, 6, 0, 5]] \$$$

$$[0, 0, y_1, y_2, y_3, y_5, y_4, 0, 0, y_6, y_7, y_8]$$

1045 . Coloring, {2, 3, 4, 5, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -9s^2 + 4s^4 - 24s^5 + 16s^6 - 96s^7 + 64s^8 \quad p = 3s^2 + 2s^3 + 8s^5 + 32s^7$$

R: [7, 8, 8, 7, 3, A, B, C, B, C, 4, 9]

B: [6, 7, 7, 6, A, 3, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 1, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, 0, y_4, y_1, 0, 0, y_2, y_7, y_3, y_4, y_5, y_6]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 1, 5, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[y_6, y_1, y_2, 0, y_6, y_5, y_4, 0, 0, y_3, y_7, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

1046 . Coloring, {2, 3, 4, 6, 7, 8}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, A, B, B, C, 1, 5]

B: [6, 7, 7, 6, 3, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 3, 2, 2], [2, 0, 0, 0, 2, 0, 2, 1, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 2, 0, 0, 4, 1, 4], [1, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$

$$[y_1, 0, y_6, 0, y_2, 0, y_3, y_4, 0, y_5, y_8, y_7]$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 4, 6, 7, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 1, 2, 2], [0, 1, 0, 2, 0, 2, 3, 0, 2, 2, 2, 2], [0, 2, 0, 2, 0, 2, 1, 0, 2, 2, 3, 2], [0, 2, 0, 3, 0, 2, 2, 0, 2, 2, 1, 2], [0, 2, 0, 1, 0, 3, 2, 0, 2, 2, 2, 2], [0, 2, 0, 2, 0, 1, 2, 0, 2, 3, 2, 2], [0, 3, 0, 2, 0, 2, 2, 0, 2, 1, 2, 2], [0, 1, 0, 2, 0, 2, 3, 0, 2, 2, 2, 2], [0, 2, 0, 2, 0, 2, 1, 0, 2, 2, 3, 2]] \$$

$$[0, -y_1 - y_2 - y_3 - y_4 + 6y_7 - y_5 - y_6, y_1, y_2, 0, y_3, y_4, 0, y_7, y_5, y_6, y_7]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

1047 . Coloring, $\{2, 3, 4, 6, 7, 9\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, A, C, C, C, 1, 5]

B: [6, 7, 7, 6, 3, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 3, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 1, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[2y_3, 0, y_3, 0, y_2, 0, -2y_3 + 2y_1, y_1, 0, y_4, 0, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 1, 4, 0] , [0, 1, 0, 4, 0, 2, 3, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 4, 1, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 4, 2, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 3, 2, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 1, 4, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 4, 0, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 2, 3, 0, 0, 2, 4, 0]] \$

$$[0, y_1, y_4, y_5, 0, y_3, y_2, 0, 2y_4, y_6, y_7, 0]$$

$$p = s^2 - s^8$$

1048 . Coloring, {2, 3, 4, 6, 7, 10}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7 \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8$$

R: [7, 8, 8, 7, A, 3, A, C, B, 2, 1, 5]

B: [6, 7, 7, 6, 3, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 9	8 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 3, 1, 1] , [1, 3, 0, 0, 1, 0, 2, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 1, 3, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3]] \$

$$[y_1, y_2, y_7, 0, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 1, 3, 3], [0, 0, 0, 3, 0, 2, 1, 0, 3, 2, 2, 3], [0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 1, 5], [0, 0, 0, 1, 0, 2, 0, 0, 5, 3, 0, 5], [0, 0, 0, 0, 0, 1, 0, 0, 5, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[0, 0, y_1, y_4, 0, y_5, y_2, 0, y_3, y_8, y_6, y_7]$$

1049 . Coloring, {2, 3, 4, 6, 7, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 + 32s^7$$

R: [7, 8, 8, 7, A, 3, A, C, B, C, 4, 5]

B: [6, 7, 7, 6, 3, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 3, 1, 3], [0, 0, 0, 1, 3, 0, 2, 1, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$$

$$[0, 0, y_6, y_3, y_1, 0, y_2, y_3, 0, y_5, y_6, y_4]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 3, 0, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 3, 1, 0, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 2, 0, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 3, 2, 0, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 1, 3, 0, 1, 3, 2, 2] , [2, 3, 0, 0, 0, 2, 0, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 3, 0, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 3, 1, 0, 2, 2, 3, 1]] \$

[2 y₄, 2 y₅, 2 y₆, 0, 0, 2 y₇, 2 y₃, 0, 2 y₁, -2 y₄ + 11 y₅ + 11 y₆ + 11 y₇ - 2 y₃ - 39 y₁ + 11 y₂, 2 y₂, 3 y₅ + 3 y₆ + 3 y₇ - 11 y₁ + 3 y₂]

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

1050 . Coloring, {2, 3, 4, 6, 7, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 - 8s^5 - 32s^7$$

R: [7, 8, 8, 7, A, 3, A, C, B, C, 1, 9]

B: [6, 7, 7, 6, 3, A, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 1, 3, 2, 2, 5] , [2, 0, 0, 0, 0, 0, 1, 0, 5, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 3, 1, 5, 2] , [5, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 1] , [3, 0, 0, 0, 0, 0, 5, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 3, 0, 2, 5, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 5]] \$

$$[y_1, 0, y_2, 0, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 2, 0, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 3, 0, 0, 2, 2, 0] , [0, 2, 1, 2, 0, 3, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 2, 3, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 3, 2, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 3, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 2, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 2, 3, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 3, 0, 0, 2, 3, 0]] \$

$$[0, y_2, y_3, y_1, y_4, y_5, y_6, 0, 0, y_9, y_7, y_8]$$

1051 . Coloring, {2, 3, 4, 6, 8, 9}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7 \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8$$

R: [7, 8, 8, 7, A, 3, B, B, C, C, 1, 5]

B: [6, 7, 7, 6, 3, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 1, 3, 3], [3, 0, 0, 0, 3, 0, 2, 1, 0, 2, 4, 1], [4, 0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 3, 3], [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1], [4, 0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 0, 4, 0, 0, 1, 3, 3], [3, 0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1]] \$$$

$$[y_4, 0, y_3, 0, y_2, 0, y_1, 4y_4 + 4y_3 + 5y_2 - y_1 - 6y_5, 0, -2y_4 - 2y_3 - 4y_2 + 5y_5, y_5, 5y_4 + 5y_3 + 6y_2 - 8y_5]$$

$$p' = -s^4 + s^7 \quad p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 3, 0, 1, 4, 2, 0], [0, 4, 0, 2, 0, 1, 3, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 1, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 0, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$$$

$$[0, y_1, y_8, y_2, 0, y_3, y_4, 0, y_5, y_6, y_7, y_8]$$

$$p = -s^6 + s^9$$

1052 . Coloring, {2, 3, 4, 6, 8, 10}

$$\Omega p(\Delta)=0: \quad p' = s^3 - 8s^6 - 16s^7 \quad p = s^3 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, A, 3, B, B, B, 2, 1, 5]

B: [6, 7, 7, 6, 3, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	4 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 2, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 1, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 4, 2, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[y_4, y_3, y_2, 0, 2y_2, 0, y_1, y_7, 0, y_6, y_5, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 2, 1, 0, 4, 4, 0, 5] , [0, 0, 0, 0, 0, 0, 0, 0, 5, 3, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_1, 2y_1, 0, -2y_1 + 2y_2, y_2, 0, -5y_1 + 3y_2 - y_3 + y_4, y_3, 0, y_4]$$

$$p' = -s^4 + s^5 \quad p = s^4 - s^5 \quad p' = -s^4 + s^6$$

1053 . Coloring, {2, 3, 4, 6, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, B, B, B, C, 4, 5]

B: [6, 7, 7, 6, 3, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	5 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 1, 4, 2], [0, 0, 0, 4, 2, 0, 2, 1, 0, 2, 4, 1], [0, 0, 0, 4, 1, 0, 4, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 2, 4, 1], [0, 0, 0, 4, 1, 0, 4, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 2, 4, 1]] \$$

$[0, 0, -2y_1 - 2y_4 + 9y_2 + 9y_3 - 11y_5, 2y_1, 2y_4 - 2y_2 - 2y_3 + 2y_5, 0, 2y_2, 2y_3, 0, -2y_4 + 7y_2 + 7y_3 - 9y_5, 2y_4, 2y_5]$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 2, 3, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2]] \$$

$[2y_1, -3y_1 - y_2 - y_3 + 6y_5 - y_4, y_1, 0, 0, y_2, y_3, 0, y_5, y_4, 0, y_5]$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

1054 . Coloring, $\{2, 3, 4, 6, 8, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, 3, B, B, B, C, 1, 9]

B: [6, 7, 7, 6, 3, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 1, 4, 2], [4, 0, 0, 0, 0, 0, 2, 1, 2, 0, 6, 1], [6, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$

$[y_1, 0, y_3, 0, 0, 0, y_6, y_4, y_5, y_3, y_2, y_4]$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[0, 2, 1, 2, 2, 2, 0, 0, 3, 0, 2], [0, 3, 2, 0, 2, 2, 3, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$

$[0, y_1, y_2, y_6, y_5, y_5, y_3, 0, 0, y_4, 0, y_6]$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1055 . Coloring, $\{2, 3, 4, 6, 9, 10\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + s^4 + 4s^5 + 8s^7 - 16s^8 \quad p = -9s^3 - 8s^5 + 8s^6 - 16s^7 + 64s^8$$

R: [7, 8, 8, 7, A, 3, B, C, C, 2, 1, 5]

B: [6, 7, 7, 6, 3, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}, \{1, 7, 11\}\}$

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 1, 2, 2], [2, 1, 0, 0, 2, 0, 2, 3, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 2, 1, 0, 2, 2, 3], [2, 2, 0, 0, 3, 0, 2, 2, 0, 2, 2, 1], [2, 2, 0, 0, 1, 0, 2, 2, 0, 3, 2, 2], [2, 3, 0, 0, 2, 0, 2, 2, 0, 1, 2, 2], [2, 1, 0, 0, 2, 0, 2, 3, 0, 2, 2, 2], [2, 2, 0, 0, 2, 0, 2, 1, 0, 2, 2, 3], [2, 2, 0, 0, 3, 0, 2, 2, 0, 2, 2, 1]] \$$

$$[y_5, 5y_5 - y_1 - y_2 - y_3 - y_4 - y_6, y_1, 0, y_2, 0, y_5, y_3, 0, y_4, y_5, y_6]$$

$$p = s^2 - s^7 \quad p' = -s^2 + s^7 \quad p'' = -s^3 + s^8$$

Omega Rank for B : cycles: $\{\{4, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 3, 2, 2], [0, 0, 0, 2, 0, 2, 1, 0, 2, 4, 2, 3], [0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2, 4], [0, 0, 0, 2, 0, 0, 4, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 4, 2], [0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 3, 2], [0, 0, 0, 3, 0, 4, 0, 0, 2, 3, 2, 2], [0, 0, 0, 2, 0, 3, 0, 0, 2, 4, 2, 3]] \$$

$$[0, 0, -y_1 + y_2 + y_3 - y_4 - y_5 + y_6 + y_7, y_1, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1056 . Coloring, $\{2, 3, 4, 6, 9, 11\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, 3, B, C, C, C, 4, 5]

B: [6, 7, 7, 6, 3, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 1, 2, 4], [0, 0, 0, 2, 4, 0, 2, 1, 0, 2, 2, 3], [0, 0, 0, 2, 3, 0, 2, 0, 0, 4, 2, 3], [0, 0, 0, 2, 3, 0, 2, 0, 0, 3, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 2, 0, 0, 4, 2, 3], [0, 0, 0, 2, 3, 0, 2, 0, 0, 3, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 2, 3]] \$$

$$[0, 0, 5 y_4 - y_2 - y_1 - y_5 - y_3, y_4, y_2, 0, y_4, y_1, 0, y_5, y_4, y_3]$$

$$p' = s^3 - s^6 \quad p' = -s^4 + s^7 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 3, 2, 0], [2, 3, 0, 0, 0, 2, 3, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 3, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 2, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$$

$$[y_2, y_1, y_3, 0, 0, y_4, y_5, 0, 2 y_3, y_6, y_7, 0]$$

$$p = -s^5 + s^8$$

1057 . Coloring, {2, 3, 4, 6, 9, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, B, C, C, C, 1, 9]

B: [6, 7, 7, 6, 3, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	3 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 1, 2, 4], [2, 0, 0, 0, 0, 0, 2, 1, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5]] \$$$

$$[2 y_3, 0, 5 y_3 - 2 y_2 - 2 y_1, 0, 0, 0, 2 y_3, 2 y_2, 2 y_1, 5 y_3 - 2 y_2 - 2 y_1, 2 y_3, 2 y_2 + 2 y_1]$$

$$p' = s^4 - s^5 \quad p' = s^3 - s^5 \quad p = s^3 - s^6 \quad p' = -s^5 + s^7 \quad p' = -s^5 + s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 2, 0, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 2, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0]] \$

$$[0, y_3, y_1, y_2, -2y_1 + 2y_2, y_4, y_5, 0, 0, y_6, -2y_1 + 2y_2, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1058 . Coloring, {2, 3, 4, 6, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 + 8s^5 + 16s^6 \quad p' = s^2 + 8s^5 + 16s^6 \quad p'' = s^3 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, A, 3, B, C, B, 2, 4, 5]

B: [6, 7, 7, 6, 3, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	8 vs 9	5 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {2, 5, 8, 10, 12}}

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 1, 3, 1] , [0, 1, 0, 3, 1, 0, 2, 3, 0, 2, 2, 2] , [0, 2, 0, 2, 2, 0, 3, 1, 0, 1, 2, 3] , [0, 1, 0, 2, 3, 0, 2, 2, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 2, 1, 0, 3, 2, 2] , [0, 3, 0, 2, 2, 0, 3, 2, 0, 1, 2, 1] , [0, 1, 0, 2, 1, 0, 2, 3, 0, 2, 3, 2] , [0, 2, 0, 3, 2, 0, 2, 1, 0, 1, 2, 3] , [0, 1, 0, 2, 3, 0, 3, 2, 0, 2, 2, 1]] \$

$$[0, -7y_1 + 9y_2 - 7y_3 + 9y_8 - 7y_4 - 7y_5 + 9y_6 - 7y_7, 7y_1, 7y_2, 7y_3, 0, 7y_8, 7y_4, 0, 7y_5, 7y_6, 7y_7]$$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 2, 1, 0, 3, 4, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_1, 0, y_4, 0, 0, y_2 + y_3 - y_5, y_1, 0, y_2, y_3, y_4, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7 \quad p = -s^5 + s^8$$

1059 . Coloring, {2, 3, 4, 6, 10, 12}

$$\Omega p(\Delta)=0: \quad p' = s^3 - 8s^5 - 8s^6 - 16s^7 \quad p' = s^2 - 8s^4 - 8s^5 - 16s^6 \quad p = s^2 - 8s^5 - 80s^6 - 64s^7 - 128s^8$$

R: [7, 8, 8, 7, A, 3, B, C, B, 2, 1, 9]

B: [6, 7, 7, 6, 3, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	8 vs 9	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 2, 3, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 1, 2, 0, 3, 3], [3, 0, 0, 0, 0, 4, 0, 3, 0, 5, 1], [5, 0, 0, 0, 0, 0, 3, 0, 1, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$$$

$$[y_1, y_2, y_6, 0, 0, 0, y_5, y_3, y_4, y_6, y_7, y_8]$$

$$p = s^6 - s^9$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 1, 2, 2, 2, 2, 0, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 1, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 1, 2, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4]] \$$$

$$[0, 0, y_1, y_2, y_5, y_3, y_4, 0, 0, y_8, y_6, y_7]$$

1060 . Coloring, {2, 3, 4, 6, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 - 32s^7 \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 - 32s^7 + 64s^8$$

R: [7, 8, 8, 7, A, 3, B, C, B, C, 4, 9]

B: [6, 7, 7, 6, 3, A, A, B, C, 2, 1, 5]

' See graph

' ' See pair graph

'

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 1, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, 0, y_5, y_4, 0, 0, y_3, y_2, y_1, y_5, y_7, y_6]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_2, y_1, y_3 - y_6, 0, y_2, y_3, y_4, 0, 0, y_5, y_6, y_6]$$

$$p = -s^4 + s^7 \quad p' = s^4 - s^7 \quad p' = s^5 - s^8$$

1061 . Coloring, {2, 3, 4, 7, 8, 9}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, A, A, B, C, C, 1, 5]

B: [6, 7, 7, 6, 3, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 0, 2, 2, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 4] , [2, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_7, 0, 0, 0, y_6, 0, y_5, y_4, 0, y_3, y_2, y_1]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 0, 2, 2, 0, 2, 0, 3, 1] , [0, 0, 2, 3, 0, 2, 4, 0, 1, 0, 4, 0] , [0, 0, 2, 4, 0, 3, 2, 0, 0, 0, 5, 0] , [0, 0, 3, 5, 0, 4, 2, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 5, 3, 0, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 2, 4, 0, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 2, 5, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 3, 2, 0, 0, 0, 5, 0]] \$

$$[0, 2 y_7, y_6, y_5, 0, y_4, y_3, 0, y_2, 0, y_1, y_7]$$

$$p = s^3 - s^8$$

1062 . Coloring, {2, 3, 4, 7, 8, 10}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 + 32s^7$$

R: [7, 8, 8, 7, A, A, A, B, B, 2, 1, 5]

B: [6, 7, 7, 6, 3, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 7	2 vs 7

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 0, 2, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 2, 4, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 2, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 4, 2, 0, 4, 2, 0]] \$

$$[y_1 + y_2 + y_3 - y_4 - y_5 + y_6, y_1, 0, 0, y_2, 0, y_3, y_4, 0, y_5, y_6, 0]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[0, 0, 2, 2, 0, 2, 2, 0, 2, 0, 2, 4] , [0, 0, 2, 2, 0, 2, 2, 0, 4, 0, 2, 2] , [0, 0, 2, 2, 0, 2, 2, 0, 2, 0, 2, 4] , [0, 0, 2, 2, 0, 2, 2, 0, 4, 0, 2, 2] , [0, 0, 2, 2, 0, 2, 2, 0, 2, 0, 2, 4] , [0, 0, 2, 2, 0, 2, 2, 0, 4, 0, 2, 2] , [0, 0, 2, 2, 0, 2, 2, 0, 2, 0, 2, 4]] \$

$$[0, 0, y_2, y_2, 0, y_2, y_2, 0, 3y_2 - y_1, 0, y_2, y_1]$$

$$p' = s^4 - s^6 \quad p' = s^3 - s^5 \quad p' = s^2 - s^6 \quad p' = s - s^5 \quad p = s - s^7$$

1063 . Coloring, {2, 3, 4, 7, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 - 32s^7$$

R: [7, 8, 8, 7, A, A, A, B, B, C, 4, 5]

B: [6, 7, 7, 6, 3, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	6 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 0, 2, 2, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 0, 2, 0, 0, 4, 2, 4] , [0, 0, 0, 2, 4, 0, 2, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

$$[0, 0, 0, y_2, y_1, 0, y_5, y_6, 0, y_4, y_3, y_7]$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$$\$ [[2, 2, 2, 0, 0, 2, 2, 0, 2, 0, 2, 2], [2, 0, 2, 0, 0, 2, 4, 0, 2, 0, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 0, 4, 2], [4, 0, 2, 0, 0, 2, 2, 0, 2, 0, 2, 2], [2, 0, 2, 0, 0, 4, 2, 0, 2, 0, 2, 2], [2, 0, 4, 0, 0, 2, 2, 0, 2, 0, 2, 2], [2, 0, 2, 0, 0, 2, 4, 0, 2, 0, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 0, 4, 2]] \$$$

$$[y_6, y_5, y_4, 0, 0, y_3, y_2, 0, y_1, 0, -y_6 - y_5 - y_4 - y_3 - y_2 + 6y_1, y_1]$$

$$p' = -s^2 + s^7 \quad p = -s^2 + s^7$$

1064 . Coloring, $\{2, 3, 4, 7, 8, 12\}$

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^5 + 32s^7 \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 + 32s^7 - 64s^8$$

R: [7, 8, 8, 7, A, A, A, B, B, C, 1, 9]

B: [6, 7, 7, 6, 3, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 0, 2, 2, 2, 4, 2, 2], [2, 0, 0, 0, 0, 0, 2, 0, 2, 2, 4, 4], [4, 0, 0, 0, 0, 0, 2, 0, 4, 2, 2, 2], [2, 0, 0, 0, 0, 4, 0, 2, 2, 4, 2], [4, 0, 0, 0, 0, 0, 2, 0, 2, 4, 2, 2], [2, 0, 0, 0, 0, 0, 4, 0, 2, 2, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 4, 2, 2]] \$$$

$$[y_1, 0, 0, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$$\$ [[0, 2, 2, 2, 2, 2, 0, 0, 0, 2, 2], [0, 0, 4, 2, 2, 2, 4, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 2, 0, 0, 0, 4, 0], [0, 0, 4, 4, 0, 4, 2, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 4, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 4, 0, 0, 0, 4, 0]] \$$$

$$[0, y_6, y_1, y_2, y_3, y_7, y_4, 0, 0, 0, y_5, y_6]$$

$$p = -s^3 + s^8$$

1065 . Coloring, {2, 3, 4, 7, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7$$

R: [7, 8, 8, 7, A, A, A, C, C, 2, 1, 5]

B: [6, 7, 7, 6, 3, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	7 vs 7

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[2, 2, 0, 0, 2, 0, 2, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 2, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 4, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 2, 0, 4, 0, 4], [0, 4, 0, 0, 4, 0, 0, 2, 0, 4, 0, 2]] \$$$

$$[y_1, y_2, 0, 0, y_3, 0, y_4, y_5, 0, y_6, 0, y_7]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 0, 2, 2, 0, 2, 0, 4, 2], [0, 0, 2, 4, 0, 2, 2, 0, 2, 0, 4, 0], [0, 0, 2, 4, 0, 4, 2, 0, 0, 0, 4, 0], [0, 0, 4, 4, 0, 4, 2, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 4, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 4, 0, 0, 0, 4, 0]] \$$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, 0, y_5, 0, y_6, y_7]$$

1066 . Coloring, {2, 3, 4, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 - 32s^7 \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 - 32s^7 - 64s^8$$

R: [7, 8, 8, 7, A, A, A, C, C, C, 4, 5]

B: [6, 7, 7, 6, 3, 3, B, B, B, 2, 1, 9]

' See graph

' ' See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	6 vs 7

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 0, 2, 2, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

[0, 0, 0, y_5 , y_1 , 0, y_4 , y_5 , 0, y_2 , 0, y_3]

$$p = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 0, 2, 2, 0, 2, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 2, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 4, 2, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 4, 0, 0, 0, 4, 0]] \$

[y_1 , y_4 , y_2 , 0, 0, y_3 , y_5 , 0, y_4 , 0, y_6 , 0]

$$p = -s^2 + s^7$$

1067 . Coloring, {2, 3, 4, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 - 8s^5 + 32s^7$$

R: [7, 8, 8, 7, A, A, A, C, C, C, 1, 9]

B: [6, 7, 7, 6, 3, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	6 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 2, 2, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 0, 4, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$

$[y_2, 0, 0, 0, 0, 0, y_1, y_2, y_3, y_4, 0, y_5]$

$$p = s^4 - s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 2, 2, 2, 0, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 2, 4, 0, 0, 0, 2, 0] , [0, 0, 2, 2, 0, 4, 4, 0, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 2, 2, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 4, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 2, 0, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 2, 4, 0, 0, 0, 2, 0]] \$

$[0, y_3, y_1, y_2, y_3, y_4, y_6, 0, 0, 0, y_5, 0]$

$$p = s^2 - s^7$$

1068 . Coloring, {2, 3, 4, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, A, A, C, B, 2, 4, 5]

B: [6, 7, 7, 6, 3, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	6 vs 7

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 2, 0, 2, 2, 0, 2, 2, 0, 4, 1, 1], [0, 4, 0, 1, 1, 0, 2, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 1, 4, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2]] \$$

$$[0, y_1, 0, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$\$ [[2, 0, 2, 0, 0, 2, 2, 0, 2, 0, 3, 3], [3, 0, 2, 0, 0, 2, 2, 0, 3, 0, 2, 2], [2, 0, 2, 0, 0, 3, 2, 0, 2, 0, 2, 3], [2, 0, 3, 0, 0, 2, 2, 0, 3, 0, 2, 2], [2, 0, 2, 0, 0, 2, 3, 0, 2, 0, 2, 3], [2, 0, 2, 0, 0, 2, 2, 0, 3, 0, 3, 2], [3, 0, 2, 0, 0, 2, 0, 2, 0, 2, 0, 2, 3]] \$$

$$[-5 y_2 - 5 y_1 - 5 y_5 + 11 y_6 - 5 y_3 + 11 y_4, 0, 5 y_2, 0, 0, 5 y_1, 5 y_5, 0, 5 y_6, 0, 5 y_3, 5 y_4]$$

$$p = -s - s^2 + s^6 + s^7$$

1069 . Coloring, $\{2, 3, 4, 7, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, A, A, C, B, 2, 1, 9]

B: [6, 7, 7, 6, 3, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 7

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

\$ [[2, 2, 0, 0, 0, 0, 2, 2, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 0, 2, 2, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 1, 4, 2, 2, 1, 2] , [1, 2, 0, 0, 0, 0, 2, 2, 2, 1, 2, 4] , [2, 1, 0, 0, 0, 0, 1, 2, 4, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 2, 1, 2, 1, 4, 2] , [4, 1, 0, 0, 0, 0, 2, 2, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 0, 4, 1, 1, 2, 2, 2]] \$

$[y_8, y_7, 0, 0, 0, 0, y_6, y_5, y_4, y_3, y_2, y_1]$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 2, 0, 0, 0, 3, 3] , [0, 0, 4, 3, 3, 2, 2, 0, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 3, 4, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 2, 5, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 3, 0, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 5, 2, 0, 0, 0, 2, 0]] \$

$[0, 0, y_3, y_2, y_1, y_7, y_6, 0, 0, 0, y_5, y_4]$

1070 . Coloring, $\{2, 3, 4, 7, 11, 12\}$

$\Omega p(\Delta)=0: p = s^3 + 2s^4 - 8s^6 - 32s^8$

R: [7, 8, 8, 7, A, A, A, C, B, C, 4, 9]

B: [6, 7, 7, 6, 3, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 0, 2, 2, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 2, 2, 6] , [0, 0, 0, 2, 0, 0, 1, 0, 6, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 2, 0, 2, 1, 6, 2] , [0, 0, 0, 6, 0, 0, 3, 0, 2, 2, 2, 1] , [0, 0, 0, 2, 0, 0, 6, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 0, 2, 6, 1, 3]] \$

$[0, 0, 0, y_1, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 2, 0, 0, 0, 3, 1] , [3, 0, 4, 0, 1, 2, 4, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0]] \$

$$[y_1, 2y_7, y_2, 0, y_3, y_4, y_5, 0, 0, 0, y_6, y_7]$$

$$p = -s^3 + s^8$$

1071 . Coloring, {2, 3, 4, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 8s^5 - 24s^6 - 16s^7 - 64s^8 \quad p' = s^3 + 4s^4 + 8s^5 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, A, A, B, B, C, 2, 1, 5]

B: [6, 7, 7, 6, 3, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 0, 2, 2, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 0, 2, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 3, 2, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 4, 2, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_1, y_2, 0, 0, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 2, 2, 0, 2, 2, 0, 2, 2, 1, 3] , [0, 0, 2, 1, 0, 2, 2, 0, 3, 2, 2, 2] , [0, 0, 2, 2, 0, 1, 2, 0, 2, 2, 3, 2] , [0, 0, 1, 3, 0, 2, 2, 0, 2, 2, 2, 2] , [0, 0, 2, 2, 0, 3, 1, 0, 2, 2, 2, 2] , [0, 0, 3, 2, 0, 2, 2, 0, 2, 1, 2, 2] , [0, 0, 2, 2, 0, 2, 3, 0, 2, 2, 2, 1] , [0, 0, 2, 2, 0, 2, 2, 0, 1, 3, 2, 2]] \$

$$[0, 0, -y_7 + y_6 + y_5 - y_4 - y_3 + y_2 + y_1, y_7, 0, y_6, y_5, 0, y_4, y_3, y_2, y_1]$$

$$p = s - s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1072 . Coloring, {2, 3, 4, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, A, B, B, C, C, 4, 5]

B: [6, 7, 7, 6, 3, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\begin{aligned} \$ [& [0, 0, 0, 2, 2, 0, 2, 2, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 3, 2, 2], [0, 0, \\ & 0, 2, 2, 0, 4, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 3, 0, 0, 3, 2, 2], [0, 0, 0, 2, 2, 0, \\ & 4, 0, 0, 2, 3, 3]] \$ \end{aligned}$$

$$[0, 0, 0, 2 y_4, 2 y_3, 0, 2 y_2, 7 y_4 - 27 y_3 - 2 y_2 + 16 y_1, 0, 3 y_4 - 7 y_3 + 4 y_1, 2 y_1, 4 y_4 - 16 y_3 + 10 y_1]$$

$$p' = s^3 - s^6 \quad p' = s^2 - s^5 \quad p = s^2 - s^5$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

$$\begin{aligned} \$ [& [2, 2, 2, 0, 0, 2, 2, 0, 2, 2, 1, 1], [1, 2, 2, 0, 0, 2, 4, 0, 1, 2, 2, 0], [2, 2, 2, 0, 0, 1, 4, 0, 0, 4, 1, 0], [1, 4, \\ & 1, 0, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 1, 5, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, \\ & 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$ \end{aligned}$$

$$[y_5, y_6, y_4, 0, 0, y_3, y_2, 0, y_1, y_7, y_9, y_8]$$

1073 . Coloring, {2, 3, 4, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, A, B, B, C, C, 1, 9]

B: [6, 7, 7, 6, 3, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 2, 2, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 0, 4, 4], [4, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 3], [2, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 2, 4], [2, 0, 0, 0, 0, 0, 4, 0, 4, 0, 3, 3]] \$

[2 y₁, 0, 0, 0, 0, 0, 2 y₂, 7 y₁ + 7 y₂ - 9 y₃ + 7 y₄ - 9 y₅, 2 y₃, 7 y₁ + 7 y₂ - 9 y₃ + 7 y₄ - 9 y₅, 2 y₄, 2 y₅]

$$p' = -s^2 - s^3 + s^5 + s^6 \quad p = -s^2 + s^4 + s^5 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 2, 0, 0, 2, 1, 1], [0, 2, 4, 1, 1, 2, 4, 0, 0, 2, 0, 0], [0, 2, 3, 0, 0, 1, 6, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

[0, y₁, y₂, y₃, y₃, y₄, y₅, 0, 0, y₆, y₇, y₇]

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

1074 . Coloring, {2, 3, 4, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 8s^5 - 16s^6 \quad p' = s^2 - 8s^5 - 16s^6 \quad p' = s^3 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, A, A, B, B, B, 2, 4, 5]

B: [6, 7, 7, 6, 3, 3, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	7 vs 7	6 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 0, 2, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 4, 2, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 4, 2, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$$[0, y_1, 0, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, 0]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$\$ [[2, 0, 2, 0, 0, 2, 2, 0, 2, 2, 0, 4], [0, 0, 2, 0, 0, 2, 2, 0, 4, 2, 0, 4], [0, 0, 2, 0, 0, 0, 2, 0, 4, 2, 0, 6], [0, 0, 0, 0, 0, 2, 0, 6, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[-y_1 + y_2 + y_3 - y_4 - y_5 + y_6, 0, y_1, 0, 0, y_2, y_3, 0, y_4, y_5, 0, y_6]$$

$$p = -s^6 + s^7$$

1075 . Coloring, {2, 3, 4, 8, 10, 12}

$\Omega p(\Delta)=0: p' = s^2 + 8s^4 + 8s^5 + 16s^6 \quad p' = s^3 + 8s^5 + 8s^6 + 16s^7 \quad p = s^2 + 8s^5 - 48s^6 - 64s^7 - 128s^8$

R: [7, 8, 8, 7, A, A, B, B, B, 2, 1, 9]

B: [6, 7, 7, 6, 3, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	6 vs 7	7 vs 7

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 0, 2, 2, 2, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 2, 2, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 2, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$$[y_1, y_2, 0, 0, 0, 0, y_3, y_4, y_5, y_5, y_6, 0]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 2, 0, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 2, 2, 0, 0, 2, 0, 2] , [0, 0, 6, 0, 2, 0, 4, 0, 0, 2, 0, 2] , [0, 0, 2, 0, 2, 0, 6, 0, 0, 4, 0, 2] , [0, 0, 2, 0, 2, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 0, 0, 2, 0, 6] , [0, 0, 4, 0, 6, 0, 2, 0, 0, 2, 0, 2]] \$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, 0, 0, y_6, 0, y_7]$$

1076 . Coloring, $\{2, 3, 4, 8, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7$$

R: [7, 8, 8, 7, A, A, B, B, B, C, 4, 9]

B: [6, 7, 7, 6, 3, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 7	6 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 0, 2, 2, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 4, 0, 2, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

[0, 0, 0, y₁, 0, 0, y₄, y₃, y₂, y₃, y₆, y₅]

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 2, 0, 0, 2, 0, 2] , [0, 2, 4, 0, 2, 2, 4, 0, 0, 2, 0, 0] , [0, 2, 4, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

[y₂, y₁, y₆, 0, y₄, y₄, y₅, 0, 0, y₃, 0, y₂]

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

1077 . Coloring, {2, 3, 4, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p' = s^7 \quad p' = s^6 \quad p' = s^5 \quad p = s^2 \quad p' = s^2 \quad p' = s^3 \quad p' = s^4$$

R: [7, 8, 8, 7, A, A, B, C, C, 2, 4, 5]

B: [6, 7, 7, 6, 3, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
1 vs 8	1 vs 8	1 vs 8	1 vs 8	1 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}, {4, 7, 11}}

See Matrix

\$ [[0, 2, 0, 2, 2, 0, 2, 2, 0, 2, 2, 2] , [0, 2, 0, 2, 2, 0, 2, 2, 0, 2, 2, 2] , [0, 2, 0, 2, 2, 0, 2, 2, 0, 2, 2, 2] , [0, 2, 0, 2, 2, 0, 2, 2, 2, 0, 2, 2] , [0, 2, 0, 2, 2, 0, 2, 2, 0, 2, 2, 2] , [0, 2, 0, 2, 2, 0, 2, 2, 2, 0, 2, 2] , [0, 2, 0, 2, 2, 0, 2, 2, 2, 2, 0, 2] , [0, 2, 0, 2, 2, 2, 0, 2, 2, 0, 2, 2]] \$

$$[0, y_1, 0, y_1, y_1, 0, y_1, y_1, 0, y_1, y_1, y_1]$$

$$p = -s + s^2 \quad p = -s + s^3 \quad p = -s + s^4 \quad p = -s + s^8 \quad p = -s + s^5 \quad p = -s + s^6 \quad p = -s + s^7$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$$\$ [[2, 0, 2, 0, 0, 2, 2, 0, 2, 2, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 2, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 2, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 2, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 2, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 2, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 2, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 2, 2, 2]] \$$$

$$[y_1, 0, y_1, 0, 0, y_1, y_1, 0, y_1, y_1, y_1, y_1]$$

$$p' = s^2 - s^7 \quad p' = s^5 - s^7 \quad p' = s^3 - s^7 \quad p' = s^6 - s^7 \quad p' = s^4 - s^7 \quad p' = s - s^7 \quad p = s - s^8$$

‘ See 8-level graph

‘

$$M \quad \setminus ; \quad N$$

$$\$ [[0, 0, 1, 0, 0, 1, 1, 0, 1, 1, 1, 1], [0, 0, 0, 1, 1, 0, 1, 1, 0, 1, 1, 1], [1, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 1], [0, 1, 0, 0, 1, 0, 1, 1, 0, 1, 1, 1], [0, 1, 0, 1, 0, 0, 1, 1, 0, 1, 1, 1], [1, 0, 1, 0, 0, 0, 1, 0, 1, 1, 1, 1], [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1], [0, 1, 1, 2, 1, 1, 0, 2, 2], [0, 1, 0, 1, 1, 0, 1, 0, 0, 1, 1, 1], [1, 0, 1, 0, 0, 1, 1, 0, 0, 1, 1, 1], [1, 1, 1, 1, 1, 1, 2, 1, 1, 0, 2, 2], [1, 1, 1, 1, 1, 1, 2, 1, 1, 2, 2, 0]] \$ \quad \$ [[0, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1], [1, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1], [1, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1], [0, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1], [1, 1, 1, 0, 0, 1, 1, 1, 1, 1, 1, 1], [1, 1, 1, 1, 0, 0, 1, 1, 1, 1, 1, 1], [1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1], [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1], [1, 0, 0, 1, 1, 1, 1], [1, 1, 1, 1, 1, 1, 1, 0, 0, 1, 1, 1], [1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1], [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1], [0, 1], [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0]] \$$$

$$\tau = 20, r' = 7/8$$

$$\mathbf{R}: [7, 8, 8, 7, A, A, B, C, C, 2, 4, 5]$$

$$\mathbf{B}: [6, 7, 7, 6, 3, 3, A, B, B, C, 1, 9]$$

Ranges

Action of R on ranges, $[[2], [2]]$

Action of B on ranges, $[[1], [1]]$

Cycles: R , $\{\{2, 5, 8, 10, 12\}, \{4, 7, 11\}\}$, B , $\{\{1, 3, 6, 7, 9, 10, 11, 12\}\}$

$$\beta(\{1, 3, 6, 7, 9, 10, 11, 12\}) = 1/2$$

$$\beta(\{2, 4, 5, 7, 8, 10, 11, 12\}) = 1/2$$

Partitions

$$\alpha(\{\{10\}, \{11\}, \{2, 3\}, \{12\}, \{5, 6\}, \{1, 4\}, \{8, 9\}, \{7\}\}) = 1/1$$

$b_1 = \{10\}$, , $b_2 = \{11\}$, , $b_3 = \{2, 3\}$, , $b_4 = \{12\}$, , $b_5 = \{5, 6\}$, , $b_6 = \{1, 4\}$, , $b_7 = \{8, 9\}$, ,
 $b_8 = \{7\}$

Action of R and B on the blocks of the partitions: = [5, 8, 1, 7, 4, 2, 3, 6] [8, 7, 5, 1, 6, 2, 4, 3]
with invariant measure [1, 1, 1, 1, 1, 1, 1, 1]

N by blocks, check: true . ‘ See partition graph.

‘ ‘ See level-8 partition graph.

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1078 . Coloring, {2, 3, 4, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 9s^2 + 2s^4 - 16s^6 + 16s^7 - 96s^8 \quad p = -27s^2 + 8s^5 + 48s^6 - 64s^7 + 256s^8 \quad p = -6s^2 + s^3 + 8s^6 - 16s^7 + 64s^8$$

R: [7, 8, 8, 7, A, A, B, C, C, 2, 1, 9]

B: [6, 7, 7, 6, 3, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	5 vs 8	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 0, 2, 2, 2, 2, 2, 2], [2, 2, 0, 0, 0, 0, 2, 2, 2, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 2, 4, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6]] \$$$

$$[y_4, 5y_4 - y_1 - y_2 - y_3 - y_5, 0, 0, 0, 0, y_4, y_1, y_2, y_3, y_4, y_5]$$

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6 \quad p = -s^4 + s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 2, 2, 0, 0, 2, 2, 2], [0, 0, 4, 2, 2, 2, 2, 0, 0, 2, 0, 2], [0, 0, 4, 0, 2, 2, 4, 0, 0, 2, 0, 2], [0, 0, 4, 0, 2, 0, 4, 0, 0, 4, 0, 2], [0, 0, 2, 0, 2, 0, 4, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0, 2, 0, 0, 4, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 4, 0, 0, 2, 0, 2]] \$$$

$$[0, 0, y_5, y_3, y_4, y_2, y_1, 0, 0, y_8, y_6, y_7]$$

1079 . Coloring, {2, 3, 4, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = 3s^2 + 2s^3 - 8s^4 + 8s^5 - 32s^7 \quad p = 9s^2 - 28s^4 + 40s^5 - 16s^6 - 96s^7 + 64s^8$$

R: [7, 8, 8, 7, A, A, B, C, C, C, 4, 9]

B: [6, 7, 7, 6, 3, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	3 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 0, 2, 2, 2, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4]] \$

$$[0, 0, 0, y_2, 0, 0, y_2, y_1, -2y_1 + 5y_2 - y_3, y_1, y_2, y_3]$$

$$p' = -s^2 + s^6 \quad p' = -s^2 + s^4 \quad p = -s^2 + s^4 \quad p = -s^2 + s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 2, 0, 0, 2, 2, 0] , [2, 2, 4, 0, 0, 2, 4, 0, 0, 2, 0, 0] , [0, 2, 2, 0, 0, 2, 6, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$

$$[y_1, y_2, y_3, 0, y_7, y_4, y_5, 0, 0, y_6, y_7, 0]$$

$$p = -s^5 + s^8$$

1080 . Coloring, {2, 3, 4, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 8s^5 - 8s^6 - 16s^7 \quad p' = s^3 - 8s^5 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, A, A, B, C, B, 2, 4, 9]

B: [6, 7, 7, 6, 3, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 0, 2, 2, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 0, 2, 2, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 2, 2, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

[0, y₂, 0, y₁, 0, 0, y₈, y₇, y₆, y₅, y₄, y₃]

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 2, 0, 0, 2, 1, 3] , [1, 0, 4, 0, 3, 2, 2, 0, 0, 2, 0, 2] , [0, 0, 5, 0, 2, 1, 4, 0, 0, 2, 0, 2] , [0, 0, 3, 0, 2, 0, 5, 0, 0, 4, 0, 2] , [0, 0, 2, 0, 2, 0, 3, 0, 0, 5, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 0, 0, 3, 0, 5] , [0, 0, 4, 0, 5, 0, 2, 0, 0, 2, 0, 3] , [0, 0, 5, 0, 3, 0, 4, 0, 0, 2, 0, 2]] \$

[y₄, 0, y₃, 0, y₂, y₁, y₈, 0, 0, y₇, y₆, y₅]

1081 . Coloring, {2, 3, 5, 6, 7, 8}

$$\Omega p(\Delta)=0: \quad p = 6s^2 + 5s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, B, B, C, 1, 5]

B: [6, 7, 7, 7, A, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	9 vs 9	4 vs 8

Omega Rank for R : cycles: $\{\{1, 3, 5, 7, 8, 10, 11, 12\}\}$ order: 8
 See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 2, 2, 2] , [2, 0, 3, 0, 2, 0, 2, 2, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 3, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 0, 2, 2, 0, 2, 3, 2] , [3, 0, 1, 0, 2, 0, 2, 2, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 0, 3, 1, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 2, 0, 3, 1, 2] , [1, 0, 2, 0, 2, 0, 2, 2, 0, 2, 2, 3] , [2, 0, 2, 0, 3, 0, 1, 2, 0, 2, 2, 2]] \$$

$$[y_8, 0, y_9, 0, y_7, y_5, y_6, y_4, 0, y_3, y_2, y_1]$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}, \{9, 12\}\}$ order: 6
 See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 4, 0, 2, 1, 3, 2] , [0, 1, 0, 3, 0, 0, 4, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4, 2]] \$$

$$[0, -y_1 + 2y_4, 0, y_1, 0, -y_2 + 2y_4, y_2, 0, y_4, -y_3 + 2y_4, y_3, y_4]$$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6 \quad p = -s^4 + s^8 \quad p = -s^4 + s^7$$

1082 . Coloring, $\{2, 3, 5, 6, 7, 9\}$

$$\Omega p(\Delta)=0: \quad p = -2s^2 + s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, C, C, C, 1, 5]
B: [6, 7, 7, 7, A, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 7

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}\}$ order: 4
 See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 2, 2, 0, 1, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 2, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5]] \$$

$$[2 y_3, 0, y_1, 0, y_2, y_3, y_4, y_5, 0, y_6, 0, y_7]$$

$$p = -s^4 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 2, 4, 0], [0, 2, 0, 4, 0, 0, 4, 0, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$$$

$$[0, y_2, 0, y_1, 0, y_4, y_3, 0, 2 y_4, y_5, y_6, 0]$$

$$p = s^4 - s^7$$

1083 . Coloring, {2, 3, 5, 6, 7, 10}

R: [7, 8, 8, 6, 3, 3, A, C, B, 2, 1, 5]

B: [6, 7, 7, 7, A, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	5 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 2, 1, 1], [1, 2, 3, 0, 1, 0, 2, 4, 0, 1, 0, 2], [0, 1, 1, 0, 2, 0, 1, 5, 0, 2, 0, 4], [0, 2, 2, 0, 4, 0, 0, 2, 0, 1, 0, 5], [0, 1, 4, 0, 5, 0, 0, 4, 0, 0, 0, 2], [0, 0, 5, 0, 2, 0, 0, 5, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 5, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 2, 0, 0, 0, 5], [0, 0, 5, 0, 5, 0, 0, 4, 0, 0, 0, 2], [0, 0, 5, 0, 2, 0, 0, 5, 0, 0, 0, 4]] \$$$

$$[y_9, y_8, y_7, 0, y_6, y_5, y_4, y_3, 0, y_2, y_5, y_1]$$

$$p = -s^6 + s^{10}$$

Omega Rank for B : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4]] \$

$$[0, 0, 0, y_5, 0, y_4, y_3, 0, y_2, y_1, -y_5 - y_3 + 2y_2 + 2y_1, -y_4 + y_2 + y_1]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

1084 . Coloring, {2, 3, 5, 6, 7, 11}

R: [7, 8, 8, 6, 3, 3, A, C, B, C, 4, 5]

B: [6, 7, 7, 7, A, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 2, 0, 2, 0, 1, 0, 4] , [0, 0, 5, 0, 4, 1, 0, 3, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 5, 0, 0, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 5, 0, 5, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 5, 0, 0, 0, 5]] \$

$$[0, 0, y_6, y_5, y_4, y_3, y_2, y_1, 0, y_5, y_2, -y_6 + y_4 + y_3 + y_1]$$

$$p' = -s^4 + s^8 \quad p' = -s^4 + s^5 - s^6 + s^7 \quad p = s^4 - s^5 + s^6 - s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 2, 0, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 3, 2, 0, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 3, 1, 0, 1, 3, 2, 2] , [2, 3, 0, 0, 0, 2, 2, 0, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 2, 3, 0, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 1, 3, 0, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 2, 0, 1, 1, 3, 2]] \$

$$[3y_6, 3y_5, 0, 0, 0, 3y_4, 3y_3, 0, 3y_2, -3y_6 - 3y_3 + 8y_2 + 5y_1, -3y_5 - 3y_4 + 5y_2 + 8y_1, 3y_1]$$

$$p' = -s + s^7 \quad p = -s + s^7$$

1085 . Coloring, {2, 3, 5, 6, 7, 12}

R: [7, 8, 8, 6, 3, 3, A, C, B, C, 1, 9]

B: [6, 7, 7, 7, A, A, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 2, 1, 3] , [1, 0, 1, 0, 0, 0, 2, 2, 3, 1, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 1, 4, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 3, 1, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 2, 3, 1] , [3, 0, 0, 0, 0, 0, 4, 0, 1, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 0, 4, 3, 3, 3]] \$

$$[y_1, 0, y_9, 0, 0, y_8, y_7, y_6, y_5, y_4, y_3, y_2]$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 4, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 5, 0, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, y_4, 0, y_3, y_2, y_6, y_1, 0, 0, y_5, y_7, y_6]$$

$$p = s^5 - s^8$$

1086 . Coloring, {2, 3, 5, 6, 8, 9}

R: [7, 8, 8, 6, 3, 3, B, B, C, C, 1, 5]

B: [6, 7, 7, 7, A, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 0, 3, 3], [3, 0, 3, 0, 3, 0, 2, 2, 0, 0, 3, 0], [3, 0, 3, 0, 0, 0, 3, 3, 0, 0, 4, 0], [4, 0, 0, 0, 0, 3, 3, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, 0, 0, y_7, 3y_4]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 4, 0, 1, 4, 2, 0], [0, 4, 0, 2, 0, 0, 5, 0, 0, 4, 1, 0], [0, 4, 0, 1, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$

$$[0, y_7, 0, y_6, 0, y_5, y_4, 0, y_3, y_2, y_1, y_5]$$

$$p = s^5 - s^8$$

1087 . Coloring, $\{2, 3, 5, 6, 8, 10\}$

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 + 2s^4 - 16s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, B, B, 2, 1, 5]

B: [6, 7, 7, 7, A, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 8	4 vs 6

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 0, 4, 0], [4, 0, 3, 0, 0, 0, 2, 4, 0, 0, 3, 0], [3, 0, 0, 0, 0, 0, 4, 3, 0, 0, 6, 0], [6, 0, 0, 0, 0, 3, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 6, 0, 0, 0, 3, 0], [3, 0, 0, 0, 0, 0, 7, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 3, 0, 0, 0, 7, 0], [7, 0, 0, 0, 0, 0, 6, 0, 0, 0, 3, 0]] \$$

$$[y_1, 2y_3, y_2, 0, 2y_3, y_3, y_4, y_5, 0, 0, y_6, 0]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 4
See Matrix

$\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 4, 0, 4], [0, 0, 0, 0, 0, 0, 2, 0, 4, 4, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[0, 0, 0, 2y_4, 0, y_4, y_3, 0, y_2, y_1, 0, y_4 - y_3 + y_2 + y_1]$$

$$p' = s^4 - s^5 \quad p = s^4 - s^6$$

Â» SYNC'D !RANK'D

1088 . Coloring, $\{2, 3, 5, 6, 8, 11\}$

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 3s^3 + 2s^4 + 16s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, B, B, C, 4, 5]

B: [6, 7, 7, 7, A, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	3 vs 7

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 0, 4, 2] , [0, 0, 3, 4, 2, 2, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 0, 3, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 3, 0, 4, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 2, 0, 4, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 3, 0, 3, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 0, 3, 0, 0, 2, 0]] \$

[0, 0, y₂, y₃, y₄, y₁, y₅, y₆, 0, 0, y₇, 2 y₅]

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 2, 2, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 4, 0, 2, 4, 0, 2]] \$

[y₁, -y₁ + 2 y₃, 0, 0, 0, y₂, -y₂ + 2 y₃, 0, y₃, 2 y₃, 0, y₃]

$$p' = s^5 - s^6 \quad p' = s^4 - s^6 \quad p' = s^3 - s^6 \quad p = s^3 - s^7$$

1089 . Coloring, {2, 3, 5, 6, 8, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, B, B, C, 1, 9]

B: [6, 7, 7, 7, A, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 0, 4, 2] , [4, 0, 1, 0, 0, 0, 2, 2, 2, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_1, 0, y_2, 0, 0, y_3, y_5, y_4, 2y_2 - 2y_3, 0, y_6, 2y_3]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 3

See Matrix

$$\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$$$

$$[0, y_3, 0, 2y_5, y_4, y_5, y_2, 0, 0, y_1, 0, 2y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

1090 . Coloring, {2, 3, 5, 6, 9, 10}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + 5s^3 + 2s^4 + 16s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, C, C, 2, 1, 5]

B: [6, 7, 7, 7, A, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 9	6 vs 7

Omega Rank for R : cycles: {{1, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 0, 2, 2], [2, 0, 3, 0, 2, 0, 2, 4, 0, 0, 1, 2], [1, 0, 2, 0, 2, 0, 2, 3, 0, 0, 2, 4], [2, 0, 2, 0, 4, 0, 1, 2, 0, 0, 2, 3], [2, 0, 4, 0, 3, 0, 2, 2, 0, 0, 1, 2], [1, 0, 3, 0, 2, 0, 2, 4, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 1, 3, 0, 0, 2, 4], [2, 0, 2, 0, 4, 0, 2, 2, 0, 0, 1, 3], [1, 0, 4, 0, 3, 0, 2, 2, 0, 0, 2, 2]] \$$$

$$[5y_7, 10y_4, 5y_6, 0, 5y_5, 5y_4, 5y_3, 5y_2, 0, 0, 5y_1, 11y_7 - 5y_6 - 5y_5 - 15y_4 + 11y_3 - 5y_2 + 11y_1]$$

$$p = -s^2 - s^3 - s^4 + s^6 + s^7 + s^8 \quad p = s^2 - s^5 - s^6 + s^9$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 0, 2, 4, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 2, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 0, 2, 4, 2, 2]] \$

$$[0, 0, 0, y_5, 0, y_3, y_4, 0, y_1, y_2, y_5 - y_3 - y_4 + y_1 + y_2 - y_6, y_6]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

1091 . Coloring, {2, 3, 5, 6, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 5s^3 - 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, C, C, C, 4, 5]

B: [6, 7, 7, 7, A, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	8 vs 8	7 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 0, 2, 4] , [0, 0, 3, 2, 4, 2, 0, 2, 0, 0, 1, 2] , [0, 0, 6, 1, 2, 2, 0, 3, 0, 0, 0, 2] , [0, 0, 4, 0, 2, 1, 0, 6, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 4, 0, 0, 0, 6] , [0, 0, 3, 0, 6, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 6, 0, 4, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 6, 0, 0, 0, 3]] \$

$$[0, 0, y_1, y_2, y_3, y_8, y_4, y_5, 0, 0, y_6, y_7]$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 2, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 4, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 2, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[y_4, y_3, 0, 0, 0, y_2, y_1, 0, y_7, y_6, y_5, 0]$$

1092 . Coloring, {2, 3, 5, 6, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, C, C, C, 1, 9]

B: [6, 7, 7, 7, A, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 8	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 0, 2, 4], [2, 0, 1, 0, 0, 0, 2, 2, 4, 0, 1, 4], [1, 0, 0, 0, 0, 0, 2, 1, 4, 0, 2, 6], [2, 0, \\ 0, 0, 0, 0, 1, 0, 6, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 1, 6], [1, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 5], [2, 0, 0, 0, 0, 0, \\ 1, 0, 5, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 1, 5]] \$ \end{aligned}$$

$$[5y_7, 0, 5y_6, 0, 0, 5y_5, 5y_4, 5y_2, 5y_3, 0, 5y_1, 11y_7 - 5y_6 - 5y_5 + 11y_4 - 5y_2 - 5y_3 + 11y_1]$$

$$p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 3

See Matrix

$$\begin{aligned} \$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, \\ 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, \\ 6, 0, 0, 6, 0, 0]] \$ \end{aligned}$$

$$[0, y_1, 0, y_2, 2y_3, y_3, y_4, 0, 0, y_5, 2y_3, 0]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Â» SYNC'D !RANK'D

1093 . Coloring, {2, 3, 5, 6, 10, 11}

R: [7, 8, 8, 6, 3, 3, B, C, B, 2, 4, 5]

B: [6, 7, 7, 7, A, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 0, 3, 1] , [0, 0, 3, 3, 1, 2, 0, 4, 0, 0, 1, 2] , [0, 0, 3, 1, 2, 3, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 1, 0, 3, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 5, 0, 0, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 5, 0, 5, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 5, 0, 0, 0, 3]] \$

$$[0, 2y_4, -y_1 + y_2 + y_3 - 3y_4 + y_5 + y_6 - y_7, y_1, y_2, y_3, y_4, y_5, 0, 0, y_6, y_7]$$

$$p = -s^5 + s^6 - s^7 + s^8 \quad p = -s^5 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 4, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_1 - y_2 - y_3 + 4y_4 + y_5, 0, 0, 0, 0, y_1, 3y_4, 0, y_2, y_3, y_4, y_5]$$

$$p = -s^5 + s^7 \quad p = -s^5 + s^6$$

1094 . Coloring, {2, 3, 5, 6, 10, 12}

R: [7, 8, 8, 6, 3, 3, B, C, B, 2, 1, 9]

B: [6, 7, 7, 7, A, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 0, 3, 1] , [3, 0, 1, 0, 0, 0, 2, 4, 1, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 1, 2, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 3, 0, 1, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0]] \$

$$[y_8, 2y_6, y_7, 0, 0, y_6, y_4, y_5, y_3, 0, y_2, y_1]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[0, 0, 0, y_1, y_2, y_5, y_3, 0, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7$$

1095 . Coloring, {2, 3, 5, 6, 11, 12}

R: [7, 8, 8, 6, 3, 3, B, C, B, C, 4, 9]

B: [6, 7, 7, 7, A, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	6 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 0, 3, 3] , [0, 0, 1, 3, 0, 2, 0, 2, 3, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 0, 1, 2, 0, 3, 2] , [0, 0, 3, 3, 0, 3, 0, 2, 2, 0, 2, 1] , [0, 0, 3, 2, 0, 3, 0, 3, 1, 0, 2, 2] , [0, 0, 3, 2, 0, 2, 0, 3, 2, 0, 1, 3] , [0, 0, 2, 1, 0, 2, 0, 3, 3, 0, 2, 3] , [0, 0, 2, 2, 0, 1, 0, 2, 3, 0, 3, 3]] \$

[0, 0, y₅, y₄, 0, y₁, y₂, y₃, y₆, 0, y₇, y₈]

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 2, 2, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

[y₂, y₁, 0, 0, y₂, y₃, y₄, 0, 0, y₅, y₆, y₆]

$$p' = -s^4 + s^7 \quad p = s^4 - s^7$$

1096 . Coloring, {2, 3, 5, 7, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, A, B, C, C, 1, 5]

B: [6, 7, 7, 7, A, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 10	9 vs 10	9 vs 9	5 vs 9

Omega Rank for R : cycles: {{1, 3, 5, 7, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 0, 2, 1, 0, 2, 2, 3] , [2, 0, 3, 0, 3, 0, 1, 2, 0, 2, 1, 2] , [1, 0, 3, 0, 2, 0, 2, 3, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 0, 1, 3, 0, 2, 3, 1] , [3, 0, 2, 0, 1, 0, 2, 2, 0, 1, 3, 2] , [3, 0, 1, 0, 2, 0, 3, 2, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 0, 3, 1, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 0, 2, 2, 0, 3, 1, 3]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, y_6, y_5, 0, y_8, y_9, y_7]$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 3, 1], [0, 1, 1, 3, 0, 0, 5, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[0, y_1, -y_5 + y_1, y_3, 0, y_5, y_2, 0, y_1, y_5, y_4, y_5]$$

$$p' = s^3 - s^6 \quad p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^3 - s^9$$

1097 . Coloring, {2, 3, 5, 7, 8, 10}

R: [7, 8, 8, 6, 3, A, A, B, B, 2, 1, 5]

B: [6, 7, 7, 7, A, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	4 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 2, 0], [2, 3, 2, 0, 0, 0, 2, 3, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 2, 5, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 2, 2, 0, 2, 5, 0], [5, 2, 0, 0, 0, 0, 3, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 5, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 2, 0, 5, 2, 0], [2, 5, 0, 0, 0, 0, 2, 3, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 2, 5, 0, 2, 3, 0]] \$$$

$$[y_2, y_1, y_3, 0, 2y_4, y_4, y_5, y_6, 0, y_7, y_8, 0]$$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 2, 4], [0, 0, 1, 2, 0, 0, 3, 0, 4, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3, 3]] \$$$

$$[0, 0, 3y_4, 3y_3, 0, 3y_2, 3y_4 + 3y_3, 0, 3y_1, 3y_2, -3y_2 + 3y_4 + 3y_3, -3y_2 + 7y_4 + 7y_3 - 3y_1]$$

$$p' = s^5 - s^7 \quad p' = s^4 - s^6 \quad p' = s^3 - s^7 \quad p = s^3 - s^7$$

1098 . Coloring, {2, 3, 5, 7, 8, 11}

R: [7, 8, 8, 6, 3, A, A, B, B, C, 4, 5]

B: [6, 7, 7, 7, A, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 9

Omega Rank for R : cycles: {{3, 4, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 2, 2], [0, 0, 2, 2, 2, 2, 0, 1, 0, 2, 2, 3], [0, 0, 2, 2, 3, 2, 0, 2, 0, 2, 1, 2], [0, 0, 3, 1, 2, 2, 0, 2, 0, 2, 2, 2], [0, 0, 2, 2, 2, 1, 0, 3, 0, 2, 2, 2], [0, 0, 2, 2, 2, 2, 0, 2, 0, 1, 3, 2], [0, 0, 2, 3, 2, 2, 0, 2, 0, 2, 2, 1], [0, 0, 2, 2, 1, 3, 0, 2, 0, 2, 2, 2], [0, 0, 1, 2, 2, 2, 0, 2, 0, 3, 2, 2]] \$$$

$$[0, 0, y_1, y_2, y_7, y_3, y_4, y_5, 0, y_6, y_8, y_9]$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 7, 11}} order: 10

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 2, 2], [2, 1, 1, 0, 0, 2, 3, 0, 2, 0, 3, 2], [3, 0, 2, 0, 0, 2, 2, 0, 2, 0, 3, 2], [3, 0, 2, 0, 0, 3, 2, 0, 2, 0, 2, 2], [2, 0, 3, 0, 0, 3, 2, 0, 2, 0, 2, 2], [2, 0, 3, 0, 0, 2, 3, 0, 2, 0, 2, 2], [2, 0, 2, 0, 0, 2, 3, 0, 2, 0, 3, 2], [3, 0, 2, 0, 0, 2, 2, 0, 2, 0, 3, 2], [3, 0, 2, 0, 0, 3, 2, 0, 2, 0, 2, 2]] \$$$

$$[y_1, y_2, -y_1 - y_2 - y_3 - y_4 + 6y_5 - y_6 - y_7, 0, 0, y_3, y_4, 0, y_5, y_6, y_7, y_5]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

1099 . Coloring, {2, 3, 5, 7, 8, 12}

R: [7, 8, 8, 6, 3, A, A, B, B, C, 1, 9]

B: [6, 7, 7, 7, A, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 1, 2, 2, 4, 3] , [4, 0, 0, 0, 0, 0, 2, 0, 3, 2, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 2, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 0, 3, 0, 2, 3, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 3, 2, 3] , [2, 0, 0, 0, 0, 0, 2, 0, 3, 2, 4, 3] , [4, 0, 0, 0, 0, 0, 2, 0, 3, 2, 3, 2]] \$

$[y_1, 0, y_2, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7, y_8]$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 2, 2] , [0, 1, 1, 2, 2, 0, 5, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 0, 0, 2, 5, 0] , [0, 2, 0, 5, 0, 0, 5, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0]] \$

$[0, y_6, y_5, y_4, 2y_5, y_3, y_2, 0, 0, y_1, y_7, 2y_3]$

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

1100 . Coloring, {2, 3, 5, 7, 9, 10}

R: [7, 8, 8, 6, 3, A, A, C, C, 2, 1, 5]

B: [6, 7, 7, 7, A, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8
See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 2, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 0, 5, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4]] \$$

$$[2 y_5, y_8, y_7, 0, y_6, y_5, y_4, y_3, 0, y_2, 0, y_1]$$

$$p = s^5 - s^9$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 6
See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 4, 2], [0, 0, 1, 4, 0, 0, 3, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$$[0, 0, -y_4 + y_6, y_1, 0, y_4, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

1101 . Coloring, $\{2, 3, 5, 7, 9, 11\}$

R: [7, 8, 8, 6, 3, A, A, C, C, C, 4, 5]

B: [6, 7, 7, 7, A, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 2, 0, 1, 0, 2, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 2, 0, 2, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$

[0, 0, y₃, 2 y₇, y₂, y₁, y₇, y₆, 0, y₅, 0, y₄]

$$p = s^4 - s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 4, 0] , [4, 1, 1, 0, 0, 2, 3, 0, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 2, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 5, 2, 0, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 3, 4, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 2, 5, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 3, 0, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 2, 0, 0, 0, 3, 0]] \$

[y₃, y₁, y₂, 0, 0, y₇, y₆, 0, 2 y₅, y₅, y₄, 0]

$$p = -s^3 + s^8$$

1102 . Coloring, {2, 3, 5, 7, 9, 12}

R: [7, 8, 8, 6, 3, A, A, C, C, C, 1, 9]

B: [6, 7, 7, 7, A, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	6 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 1, 4, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[2y_1, 0, y_1, 0, 0, y_1, -3y_1 + 2y_2, y_2, y_5, y_4, 0, y_3]$$

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6 \quad p = -s^4 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 4, 0], [0, 1, 1, 4, 0, 0, 5, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[0, y_2, y_1, y_3, 4y_1 - 2y_5, 2y_1 - y_5, y_4, 0, 0, y_5, y_6, 0]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

1103 . Coloring, {2, 3, 5, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, A, C, B, 2, 4, 5]

B: [6, 7, 7, 7, A, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 10	6 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 0, 3, 0, 2, 0, 2], [0, 2, 1, 0, 2, 1, 0, 5, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 0, 3, 0, 1, 0, 5], [0, 1, 3, 0, 5, 0, 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$$$

$$[0, y_6, y_5, y_4, y_3, y_2, y_8, y_1, 0, y_9, y_8, y_7]$$

$$p = -s^6 + s^{10}$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}, \{9, 12\}\}$ order: 10
See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 3, 3], [3, 0, 1, 0, 0, 2, 1, 0, 3, 0, 3, 3], [3, 0, 2, 0, 0, 3, 1, 0, 3, 0, 1, 3], [1, 0, 3, 0, 0, 3, 2, 0, 3, 0, 1, 3], [1, 0, 3, 0, 0, 1, 3, 0, 3, 0, 2, 3], [2, 0, 1, 0, 0, 1, 3, 0, 3, 0, 3, 3], [3, 0, 1, 0, 0, 2, 1, 0, 3, 0, 3, 3], [3, 0, 2, 0, 0, 3, 1, 0, 3, 0, 1, 3]] \$$

$[3 y_3, 0, 3 y_2, 0, 0, 3 y_1, -3 y_3 - 3 y_2 - 3 y_1 + 10 y_6 + 10 y_5 - 3 y_4, 0, 3 y_6, 3 y_5, 3 y_4, 3 y_6 + 3 y_5]$

$$p' = s^2 - s^7 \quad p = s^2 - s^7$$

1104 . Coloring, $\{2, 3, 5, 7, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 + 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, A, C, B, 2, 1, 9]

B: [6, 7, 7, 7, A, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 10	5 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 9, 10, 11, 12\}\}$ order: 8
See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 2, 3, 1, 2, 2, 2], [2, 2, 0, 0, 0, 0, 1, 3, 2, 2, 1, 3], [1, 2, 0, 0, 0, 0, 2, 2, 3, 1, 2, 3], [2, 1, 0, 0, 0, 0, 1, 2, 3, 2, 3, 2], [3, 2, 0, 0, 0, 0, 2, 1, 2, 1, 3, 2], [3, 1, 0, 0, 0, 0, 3, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 0, 3, 1, 1, 3, 2, 2], [2, 3, 0, 0, 0, 0, 2, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 2, 3, 1, 2, 2, 2]] \$$

$[y_1, y_2, y_3, 0, 0, y_3, y_4, y_5, y_6, y_9, y_7, y_8]$

$$p = -s^2 + s^{10}$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3
See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 3, 3], [0, 0, 1, 3, 3, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 4, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 4, 3], [0, 0, 0, 4, 3, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 4, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 4, 3], [0, 0, 0, 4, 3, 0, 3, 0, 0, 2, 3, 1]] \$$

$$[0, 0, y_1, y_2, -2y_1 - 2y_2 + 5y_3 + 5y_4 - 4y_5, y_3, 4y_1 + 4y_2 - 6y_3 - 6y_4 + 5y_5, 0, 0, 5y_1 + 5y_2 - 8y_3 - 8y_4 + 6y_5, y_4, y_5]$$

$$p' = -s^4 + s^7 \quad p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

1105 . Coloring, {2, 3, 5, 7, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 3s^3 + 2s^4 - 16s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, A, C, B, C, 4, 9]

B: [6, 7, 7, 7, A, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 1, 3], [0, 0, 0, 1, 0, 2, 0, 1, 3, 2, 2, 5], [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 5, 2], [0, 0, 0, 5, 0, 3, 0, 0, 2, 2, 3, 1], [0, 0, 0, 3, 0, 5, 0, 0, 1, 3, 2, 2], [0, 0, 0, 2, 0, 3, 0, 0, 2, 5, 1, 3], [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 2, 5], [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 3, 3]] \$$$

$$[0, 0, y_2, y_1, 0, y_6, y_2, y_3, y_7, y_4, y_8, y_5]$$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 3, 1], [3, 1, 1, 0, 1, 2, 3, 0, 0, 2, 3, 0], [3, 2, 2, 0, 0, 3, 2, 0, 0, 1, 3, 0], [3, 1, 3, 0, 0, 3, 4, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0]] \$$$

$$[y_9, y_8, y_7, 0, y_6, y_5, y_4, 0, 0, y_3, y_2, y_1]$$

1106 . Coloring, {2, 3, 5, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 16s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, B, B, C, 2, 1, 5]

B: [6, 7, 7, 7, A, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 10	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 0, 2, 3, 0, 1, 3, 0] , [3, 1, 1, 0, 0, 0, 3, 3, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 3, 2, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_7, y_6, y_5, 0, -y_6 + y_5 + 3y_4, y_4, y_3, y_2, 0, -y_6 + y_5 + 2y_4, y_1, y_4]$$

$$p = s^5 - s^8 \quad p' = s^6 - s^9 \quad p'' = s^5 - s^8$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 1, 3] , [0, 0, 1, 1, 0, 0, 3, 0, 3, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 3, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 3, 2, 3]] \$

$$[0, 0, y_1, -y_1 + y_7 + y_6 - y_5 - y_4 + y_3 + y_2, 0, y_7, y_6, 0, y_5, y_4, y_3, y_2]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1107 . Coloring, {2, 3, 5, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, B, B, C, C, 4, 5]

B: [6, 7, 7, 7, A, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: {{3, 4, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 2, 0, 1, 0, 1, 3, 1] , [0, 0, 3, 3, 1, 3, 0, 2, 0, 2, 1, 1] , [0, 0, 1, 1, 1, 3, 0, 3, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 1, 0, 1, 0, 3, 3, 3] , [0, 0, 2, 3, 3, 2, 0, 1, 0, 1, 1, 3] , [0, 0, 3, 1, 3, 3, 0, 2, 0, 2, 1, 1] , [0, 0, 3, 1, 1, 1, 0, 3, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 1, 0, 3, 0, 1, 3, 3]] \$

$$[0, 0, y_1, y_1 - y_2 + y_8 - y_7 - y_6 - y_5 + y_4 + y_3, y_2, y_8, y_7, y_6, 0, y_5, y_4, y_3]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 1, 1] , [1, 3, 1, 0, 0, 2, 3, 0, 1, 3, 2, 0] , [2, 3, 2, 0, 0, 1, 4, 0, 0, 3, 1, 0] , [1, 3, 1, 0, 0, 2, 5, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 1, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$

$$[y_1, y_9, y_8, 0, 0, y_6, y_7, 0, y_5, y_4, y_3, y_2]$$

1108 . Coloring, {2, 3, 5, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + s^3 - 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, B, B, C, C, 1, 9]

B: [6, 7, 7, 7, A, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	8 vs 10	4 vs 9	5 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 2, 1, 3, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 4]] \$$

$[3y_2 - 3y_4 + 3y_3, 0, 3y_4, 0, 0, 3y_4, 3y_2, 3y_3, 3y_1, -3y_4 + 3y_3, 3y_2 + 3y_3, 7y_2 - 3y_1 + 4y_3]$

$p' = s^4 - s^6 \quad p' = s^5 - s^7 \quad p' = s^3 - s^7 \quad p = s^3 - s^7 \quad p' = -s^6 + s^8$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 3

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 1, 1], [0, 3, 1, 1, 1, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$

$[0, y_2, y_1, y_1 + y_5, y_1 + y_5, y_5, y_4, 0, 0, y_3, y_5, y_5]$

$p' = -s^5 + s^8 \quad p = s^3 - s^6 \quad p' = s^4 - s^7 \quad p' = s^3 - s^6$

Â» SYNC'D !RANK'D

1109 . Coloring, $\{2, 3, 5, 8, 10, 11\}$

R: [7, 8, 8, 6, 3, A, B, B, B, 2, 4, 5]

B: [6, 7, 7, 7, A, 3, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 7

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 4, 0], [0, 1, 2, 4, 0, 2, 0, 3, 0, 1, 3, 0], [0, 1, 0, 3, 0, 4, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 1, 0, 4, 3, 0], [0, 4, 0, 3, 0, 3, 0, 2, 0, 3, 1, 0], [0, 3, 0, 1, 0, 3, 0, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 1, 0, 3, 0, 3, 4, 0], [0, 3, 0, 4, 0, 2, 0, 3, 0, 1, 3, 0], [0, 1, 0, 3, 0, 4, 0, 3, 0, 2, 3, 0]] \$$

$$[0, -y_1 + y_2 - y_3 + 3y_4 + y_5 + y_6 - y_7, y_1, y_2, 2y_4, y_3, y_4, y_5, 0, y_6, y_7, 0]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 0, 4], [0, 0, 1, 0, 0, 2, 1, 0, 4, 3, 0, 5], [0, 0, 2, 0, 0, 0, 1, 0, 5, 1, 0, 7], [0, 0, 0, 0, 0, 2, 0, 7, 1, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[-y_1 + y_4 + y_5 - y_6 - y_3 + y_2, 0, y_1, 0, 0, y_4, y_5, 0, y_6, y_3, 0, y_2]$$

$$p = -s^6 + s^7$$

1110 . Coloring, $\{2, 3, 5, 8, 10, 12\}$

R: [7, 8, 8, 6, 3, A, B, B, B, 2, 1, 9]

B: [6, 7, 7, 7, A, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 7

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 4, 0], [4, 1, 0, 0, 0, 0, 2, 3, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 4, 1, 0, 0, 5, 0], [5, 0, 0, 0, 0, 5, 1, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$$[y_6, y_7, y_5, 0, 0, y_5, y_3, y_4, 2y_5, y_1, y_2, 0]$$

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 0, 4], [0, 0, 1, 0, 4, 0, 3, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 0, 1, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 4, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$$$

$$[0, 0, y_1, 2y_3, y_2, y_3, y_4, 0, 0, y_5, 0, y_6]$$

$$p = -s^4 + s^7$$

1111 . Coloring, {2, 3, 5, 8, 11, 12}

R: [7, 8, 8, 6, 3, A, B, B, B, C, 4, 9]

B: [6, 7, 7, 7, A, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 8

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 4, 2], [0, 0, 0, 4, 0, 2, 0, 1, 2, 1, 5, 1], [0, 0, 0, 5, 0, 4, 0, 0, 1, 2, 3, 1], [0, 0, 0, 3, 0, 5, 0, 0, 1, 4, 1, 2], [0, 0, 0, 1, 0, 3, 0, 0, 2, 5, 1, 4], [0, 0, 0, 1, 0, 1, 0, 0, 4, 3, 2, 5], [0, 0, 0, 2, 0, 1, 0, 0, 5, 1, 4, 3], [0, 0, 0, 4, 0, 2, 0, 0, 3, 1, 5, 1], [0, 0, 0, 5, 0, 4, 0, 0, 1, 2, 3, 1]] \$$$

$$[0, 0, y_7, y_6, 0, y_5, y_7, y_4, y_2, y_3, y_1, y_6 - y_5 + y_4 + y_2 + y_3 - y_1]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 2, 3, 0, 0, 5, 0, 0] , [0, 5, 2, 0, 0, 0, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0]] \$

$$[2y_3 - 2y_1, y_4, y_5, 0, y_3, y_1, y_2, 0, 0, y_6, 0, 2y_3 - 2y_1]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

1112 . Coloring, {2, 3, 5, 9, 10, 11}

R: [7, 8, 8, 6, 3, A, B, C, C, 2, 4, 5]

B: [6, 7, 7, 7, A, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 2, 2] , [0, 1, 2, 2, 2, 2, 0, 3, 0, 1, 1, 2] , [0, 1, 2, 1, 2, 2, 0, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 1, 0, 3, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 0, 4, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4]] \$

$$[0, -y_1 + y_2 + y_3 - y_4 + y_5 + y_6 + y_7 - y_8 - y_9, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

$$p = s^7 - s^8 + s^9 - s^{10}$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 2, 2] , [2, 0, 1, 0, 0, 2, 1, 0, 2, 3, 2, 3] , [2, 0, 2, 0, 0, 2, 1, 0, 3, 1, 2, 3] , [2, 0, 2, 0, 0, 2, 2, 0, 3, 1, 3, 1] , [3, 0, 2, 0, 0, 2, 2, 0, 1, 2, 3, 1] , [3, 0, 2, 0, 0, 3, 2, 0, 1, 2, 1, 2] , [1, 0, 3, 0, 0, 3, 2, 0, 2, 2, 1, 2] , [1, 0, 3, 0, 0, 1, 3, 0, 2, 2, 2, 2]] \$

$$[-y_1 + y_2 + y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, 0, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1113 . Coloring, {2, 3, 5, 9, 10, 12}

R: [7, 8, 8, 6, 3, A, B, C, C, 2, 1, 9]

B: [6, 7, 7, 7, A, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	6 vs 8

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 2, 2], [2, 1, 0, 0, 0, 0, 2, 3, 2, 1, 1, 4], [1, 1, 0, 0, 0, 0, 2, 1, 4, 0, 2, 5], [2, 0, 0, 0, 0, 1, 1, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 1, 6], [1, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 5], [2, 0, 0, 0, 0, 0, 1, 0, 5, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 1, 5], [1, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 6], [2, 0, 0, 0, 0, 0, 1, 0, 6, 0, 2, 5]] \$$$

$$[5y_1, 11y_1 - 10y_2 + 11y_3 - 5y_4 - 5y_7 - 5y_5 + 11y_6 - 5y_8, 5y_2, 0, 0, 5y_2, 5y_3, 5y_4, 5y_7, 5y_5, 5y_6, 5y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9 \quad p = s^5 - s^7 - s^8 + s^{10}$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 2, 2], [0, 0, 1, 2, 2, 0, 3, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 0, 3, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$$

$$[0, 0, y_1, 2y_1, y_2, y_3, y_4, 0, 0, y_5, 2y_3, y_6]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

1114 . Coloring, {2, 3, 5, 9, 11, 12}

R: [7, 8, 8, 6, 3, A, B, C, C, C, 4, 9]

B: [6, 7, 7, 7, A, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 1, 4, 1, 1, 5] , [0, 0, 0, 1, 0, 2, 0, 0, 5, 2, 0, 6] , [0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_6, y_4, 0, y_5, y_6, y_3, y_1, y_2, y_3, y_4 - y_5 + y_1 + y_2]$$

$$p = -s^6 + s^7 \quad p = -s^6 + s^8 \quad p = -s^6 + s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 2, 0] , [2, 3, 1, 0, 0, 2, 3, 0, 0, 5, 0, 0] , [0, 5, 2, 0, 0, 2, 4, 0, 0, 3, 0, 0] , [0, 3, 2, 0, 0, 0, 7, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0]] \$

$$[y_1, y_2, y_3, 0, y_7, y_4, y_5, 0, 0, y_6, y_7, 0]$$

$$p = s^5 - s^8$$

1115 . Coloring, {2, 3, 5, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 6s^2 - 5s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, B, C, B, 2, 4, 9]

B: [6, 7, 7, 7, A, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 10	8 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 0, 3, 1, 1, 3, 2], [0, 1, 0, 3, 0, 3, 0, 1, 2, 2, 1, 3], [0, 2, 0, 1, 0, 3, 0, 1, 3, 3, 2, 1], [0, 3, 0, 2, 0, 1, 0, 2, 1, 3, 3, 1], [0, 3, 0, 3, 0, 2, 0, 3, 1, 1, 1, 2], [0, 1, 0, 1, 0, 3, 0, 3, 2, 2, 1, 3], [0, 2, 0, 1, 0, 1, 0, 1, 3, 3, 2, 3], [0, 3, 0, 2, 0, 1, 0, 2, 3, 1, 3, 1], [0, 1, 0, 3, 0, 2, 0, 3, 1, 1, 3, 2]] \$$

$$[0, y_8, y_7, y_6, 0, y_5, y_7, y_4, y_3, y_2, y_1, -y_8 + y_6 - y_5 + y_4 + y_3 + y_2 - y_1]$$

$$p' = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9 \quad p = s^2 - s^{10}$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 1, 3], [1, 0, 1, 0, 3, 2, 1, 0, 0, 5, 0, 3], [0, 0, 2, 0, 3, 1, 1, 0, 0, 4, 0, 5], [0, 0, 1, 0, 5, 0, 2, 0, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 7, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4]] \$$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, 0, 0, y_7, y_6, y_8]$$

1116 . Coloring, $\{2, 3, 6, 7, 8, 9\}$

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, A, B, C, C, 1, 5]

B: [6, 7, 7, 7, 3, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 9

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 1, 3], [1, 0, 1, 0, 3, 0, 2, 1, 0, 3, 2, 3], [2, 0, 0, 0, 3, 0, 1, 1, 0, 5, 1, 3], [1, 0, 0, 0, 3, 0, 2, 0, 0, 4, 1, 5], [1, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$

$[y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 5, 0, 1, 1, 5, 0], [0, 1, 0, 5, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$$

$[0, y_1, y_6, y_2, 0, y_6, y_3, 0, y_6 + y_4, y_4, y_5, y_6]$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

1117 . Coloring, $\{2, 3, 6, 7, 8, 10\}$

$$\Omega p(\Delta)=0: \quad p = s^2 + 3s^3 - 6s^4 + 8s^5 - 24s^6 + 32s^7 - 32s^8$$

R: [7, 8, 8, 6, A, 3, A, B, B, 2, 1, 5]

B: [6, 7, 7, 7, 3, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	7 vs 9	6 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 2, 0] , [2, 3, 1, 0, 0, 0, 2, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 2, 4, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 3, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 4, 2, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 3, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 2, 4, 0, 2, 3, 0]] \$

$$[y_4 + y_3 + y_1 + y_2 - y_7 - y_6 + y_5, y_4, y_3, 0, 2y_1, y_1, y_2, y_7, 0, y_6, y_5, 0]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 0, 3, 5] , [0, 0, 0, 3, 0, 0, 3, 0, 5, 0, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 0, 3, 5] , [0, 0, 0, 3, 0, 0, 2, 0, 5, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 3, 0, 5, 0, 3, 3]] \$

$$[0, 0, y_1, -y_2 + y_3 + y_4 - y_5 + y_6, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = s^3 + s^4 - s^6 - s^7 \quad p = -s^3 + s^5 + s^6 - s^8$$

M \; N

\$ [[0, 352, 168, 0, 402, 0, 270, 0, 0, 0, 540, 0] , [352, 0, 0, 0, 0, 84, 0, 624, 0, 672, 0, 0] , [168, 0, 0, 0, 0, 336, 0, 210, 0, 576, 0, 442] , [0, 0, 0, 0, 0, 270, 0, 0, 402, 168, 0, 892] , [402, 0, 0, 0, 0, 446, 0, 221, 0, 663, 0, 0] , [0, 84, 336, 270, 446, 0, 260, 0, 0, 0, 336, 0] , [270, 0, 0, 0, 0, 260, 0, 260, 667, 681, 0, 1326] , [0, 624, 210, 0, 221, 0, 260, 0, 0, 0, 417, 0] , [0, 0, 0, 402, 0, 0, 667, 0, 0, 0, 663, 0] , [0, 672, 576, 168, 663, 0, 681, 0, 0, 0, 704, 0] , [540, 0, 0, 0, 0, 336, 0, 417, 663, 704, 0, 804] , [0, 0, 442, 892, 0, 0, 1326, 0, 0, 0, 804, 0]] \$
 \$ [[0, 1, 1, 1, 1, 0, 1, 0, 0, 0, 1, 0] , [1, 0, 0, 0, 0, 1, 0, 1, 1, 1, 0, 1] , [1, 0, 0, 0, 0, 1, 0, 1, 1, 1, 0, 1] , [1, 0, 0, 0, 0, 1, 0, 1, 1, 1, 0, 1] , [1, 0, 0, 0, 0, 1, 0, 1, 1, 1, 0, 1] , [0, 1, 1, 1, 1, 0, 1, 0, 0, 0, 1, 0] , [1, 0, 0, 0, 0, 1, 0, 1, 1, 1, 0, 1] , [0, 1, 1, 1, 1, 0, 1, 0, 0, 0, 1, 0] , [0, 1, 1, 1, 1, 0, 1, 0, 0, 0, 1, 0] , [0, 1, 1, 1, 1, 0, 1, 0, 0, 0, 1, 0]] \$

$$\tau = 72, r' = 1/2$$

R: [7, 8, 8, 6, A, 3, A, B, B, 2, 1, 5]

B: [6, 7, 7, 7, 3, A, B, C, C, C, 4, 9]

Ranges

Action of R on ranges, [[22], [22], [24], [24], [4], [10], [26], [7], [10], [26], [7], [18], [9], [21], [6], [17], [11], [28], [8], [11], [2], [28], [28], [8], [19], [5], [5], [1], [3]]

Action of B on ranges, [[20], [20], [9], [21], [13], [24], [25], [25], [24], [25], [25], [23], [24], [25], [25], [23], [11], [12], [12], [28], [15], [29], [29], [29], [27], [16], [16], [16], [14]]

Cycles: R , {{1, 2, 7, 8, 10, 11}}, B , {{4, 7, 11}, {9, 12}}

$\beta(\{1, 2\}) = 11/433$
 $\beta(\{1, 3\}) = 21/1732$
 $\beta(\{1, 5\}) = 201/6928$
 $\beta(\{1, 7\}) = 135/6928$
 $\beta(\{1, 11\}) = 135/3464$
 $\beta(\{2, 6\}) = 21/3464$
 $\beta(\{2, 8\}) = 39/866$
 $\beta(\{2, 10\}) = 21/433$
 $\beta(\{3, 6\}) = 21/866$
 $\beta(\{3, 8\}) = 105/6928$
 $\beta(\{3, 10\}) = 18/433$
 $\beta(\{3, 12\}) = 221/6928$
 $\beta(\{4, 6\}) = 135/6928$
 $\beta(\{4, 9\}) = 201/6928$
 $\beta(\{4, 10\}) = 21/1732$
 $\beta(\{4, 12\}) = 223/3464$
 $\beta(\{5, 6\}) = 223/6928$
 $\beta(\{5, 8\}) = 221/13856$
 $\beta(\{5, 10\}) = 663/13856$
 $\beta(\{6, 7\}) = 65/3464$
 $\beta(\{6, 11\}) = 21/866$
 $\beta(\{7, 8\}) = 65/3464$
 $\beta(\{7, 9\}) = 667/13856$
 $\beta(\{7, 10\}) = 681/13856$
 $\beta(\{7, 12\}) = 663/6928$
 $\beta(\{8, 11\}) = 417/13856$
 $\beta(\{9, 11\}) = 663/13856$
 $\beta(\{10, 11\}) = 22/433$
 $\beta(\{11, 12\}) = 201/3464$

Partitions

$\alpha(\{\{2, 3, 4, 5, 7, 11\}, \{1, 6, 8, 9, 10, 12\}\}) = 1/1$

$b_1 = \{2, 3, 4, 5, 7, 11\}$, , $b_2 = \{1, 6, 8, 9, 10, 12\}$

Action of R and B on the blocks of the partitions: = [2, 1] [1, 2]
with invariant measure [1, 1]

N by blocks, check: true . ‘ See partition graph.

‘ ‘ See level-2 partition graph.

‘

Omega Rank for B : cycles: $\{\{1, 2, 6, 7, 10, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 2, 2], [2, 1, 0, 0, 0, 2, 3, 0, 2, 1, 3, 2], [3, 1, 0, 0, 0, 2, 1, 0, 2, 2, 3, 2], [3, 2, 0, 0, 0, 3, 1, 0, 2, 2, 1, 2], [1, 2, 0, 0, 0, 3, 2, 0, 2, 3, 1, 2], [1, 3, 0, 0, 0, 1, 2, 0, 2, 3, 2, 2], [2, 3, 0, 0, 0, 1, 3, 0, 2, 1, 2, 2], [2, 1, 0, 0, 0, 2, 3, 0, 2, 1, 3, 2], [3, 1, 0, 0, 0, 2, 1, 0, 2, 2, 3, 2]] \$$

$$[-y_3 + 3y_6 - y_4, -y_1 - y_2 + 3y_6 - y_5, y_1, 0, 0, y_2, y_3, 0, y_6, y_4, y_5, y_6]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 \quad p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

M \; N

$\$ [[0, 152, 52, 0, 0, 78, 0, 0, 168, 0, 156, 0], [152, 0, 0, 0, 0, 0, 0, 208, 0, 0, 81, 0, 165], [52, 0, 0, 0, 94, 0, 170, 0, 0, 127, 0, 163], [0, 0, 0, 0, 168, 0, 78, 0, 0, 208, 0, 152], [0, 0, 94, 168, 0, 76, 0, 164, 0, 0, 104, 0], [78, 0, 0, 0, 76, 0, 102, 0, 0, 162, 0, 188], [0, 208, 170, 78, 0, 102, 0, 102, 240, 0, 312, 0], [0, 0, 0, 0, 164, 0, 102, 0, 0, 236, 0, 104], [168, 0, 0, 0, 0, 0, 240, 0, 0, 94, 0, 104], [0, 81, 127, 208, 0, 162, 0, 236, 94, 0, 304, 0], [156, 0, 0, 0, 104, 0, 312, 0, 0, 304, 0, 336], [0, 165, 163, 152, 0, 188, 0, 104, 104, 0, 336, 0]] \$$
 $\$ [[0, 1, 1, 1, 0, 1, 0, 1, 1, 0, 1, 0], [1, 0, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1], [1, 0, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1], [1, 0, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1], [0, 1, 1, 1, 0, 1, 0, 1, 1, 0, 1, 0], [1, 0, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1], [0, 1, 1, 1, 0, 1, 0, 1, 1, 0, 1, 0], [1, 0, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1], [0, 1, 1, 1, 0, 1, 0, 1, 1, 0, 1, 0], [0, 1, 1, 1, 0, 1, 0, 1, 1, 0, 1, 0]] \$$

$$\tau = 74, r' = 1/2$$

R: [7, 8, 8, 6, A, 3, A, B, B, C, 4, 5]

B: [6, 7, 7, 7, 3, A, B, C, C, 2, 1, 9]

Ranges

Action of R on ranges, [[23], [23], [10], [25], [14], [26], [27], [18], [26], [26], [27], [18], [21], [21], [22], [17], [11], [30], [15], [11], [12], [9], [30], [30], [15], [31], [19], [31], [19], [16], [13]]

Action of B on ranges, [[20], [20], [21], [22], [3], [25], [6], [24], [10], [25], [6], [24], [10], [25], [6], [24], [11], [12], [2], [30], [7], [28], [31], [31], [5], [8], [29], [8], [29], [1], [4]]

Cycles: R, $\{\{5, 10, 12\}, \{3, 4, 6, 8, 11\}\}$, B, $\{\{1, 2, 6, 7, 10, 11\}, \{9, 12\}\}$

$$\beta(\{1, 2\}) = 19/606$$

$$\beta(\{1, 3\}) = 13/1212$$

$$\beta(\{1, 6\}) = 13/808$$

$$\beta(\{1, 9\}) = 7/202$$

$$\beta(\{1, 11\}) = 13/404$$

$$\beta(\{2, 7\}) = 13/303$$

$$\beta(\{2, 10\}) = 27/1616$$

$$\beta(\{2, 12\}) = 55/1616$$

$$\beta(\{3, 5\}) = 47/2424$$

$$\beta(\{3, 7\}) = 85/2424$$

$$\beta(\{3, 10\}) = 127/4848$$

$$\beta(\{3, 12\}) = 163/4848$$

$$\beta(\{4, 5\}) = 7/202$$

$$\beta(\{4, 7\}) = 13/808$$

$$\beta(\{4, 10\}) = 13/303$$

$$\beta(\{4, 12\}) = 19/606$$

$$\beta(\{5, 6\}) = 19/1212$$

$$\beta(\{5, 8\}) = 41/1212$$

$$\beta(\{5, 11\}) = 13/606$$

$$\beta(\{6, 7\}) = 17/808$$

$$\beta(\{6, 10\}) = 27/808$$

$$\beta(\{6, 12\}) = 47/1212$$

$$\beta(\{7, 8\}) = 17/808$$

$$\beta(\{7, 9\}) = 5/101$$

$$\beta(\{7, 11\}) = 13/202$$

$$\beta(\{8, 10\}) = 59/1212$$

$$\beta(\{8, 12\}) = 13/606$$

$$\beta(\{9, 10\}) = 47/2424$$

$$\beta(\{9, 12\}) = 13/606$$

$$\beta(\{10, 11\}) = 19/303$$

$$\beta(\{11, 12\}) = 7/101$$

Partitions

$$\alpha(\{\{1, 5, 7, 10, 12\}, \{2, 3, 4, 6, 8, 9, 11\}\}) = 1/1$$

$$b_1 = \{1, 5, 7, 10, 12\} \text{ , , } b_2 = \{2, 3, 4, 6, 8, 9, 11\}$$

Action of R and B on the blocks of the partitions: = [1, 2] [2, 1]
with invariant measure [1, 1]

N by blocks, check: true . ‘ See partition graph.

‘ ‘ See level-2 partition graph.

‘

Right Group	
Coloring	{2, 3, 6, 7, 8, 11}
Rank	2
R,B	[7, 8, 8, 6, A, 3, A, B, B, C, 4, 5], [6, 7, 7, 7, 3, A, B, C, C, 2, 1, 9]
π_2	[152, 52, 0, 0, 78, 0, 0, 168, 0, 156, 0, 0, 0, 0, 208, 0, 0, 81, 0, 165, 0, 94, 0, 170, 0, 0, 127, 0, 163, 168, 0, 78, 0, 0, 208, 0, 152, 76, 0, 164, 0, 0, 104, 0, 102, 0, 0, 162, 0, 188, 102, 240, 0, 312, 0, 0, 236, 0, 104, 94, 0, 104, 304, 0, 336]
u_2	[1, 1, 1, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 1, 0, 0, 1, 0, 1, 1, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1, 1, 0, 1, 1, 0, 1] (dim 1)
wpp	[5, 7, 7, 7, 5, 7, 5, 7, 7, 5, 7, 5]

1119 . Coloring, {2, 3, 6, 7, 8, 12}

R: [7, 8, 8, 6, A, 3, A, B, B, C, 1, 9]

B: [6, 7, 7, 7, 3, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 2, 2], [2, 0, 1, 0, 0, 0, 2, 1, 2, 1, 4, 3], [4, 0, 0, 0, 0, 0, 2, 1, 3, 2, 3, 1], [3, 0, 0, 0, 0, 0, 4, 0, 1, 2, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 4, 1, 2], [1, 0, 0, 0, 0, 0, 4, 0, 2, 3, 2, 4], [2, 0, 0, 0, 0, 0, 1, 0, 4, 4, 2, 3], [2, 0, 0, 0, 0, 0, 2, 0, 3, 1, 4, 4], [4, 0, 0, 0, 0, 0, 2, 0, 4, 2, 3, 1]] \$

[y₁, 0, y₂, 0, 0, y₃, y₄, y₅, y₆, y₇, y₈, y₉]

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 2, 2] , [0, 1, 2, 2, 2, 0, 5, 0, 0, 1, 3, 0] , [0, 1, 2, 3, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, y_1, 2y_1 - 3y_3, y_2, 2y_5, y_3, y_4, 0, 0, y_5, y_6, 2y_3]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

1120 . Coloring, {2, 3, 6, 7, 9, 10}

R: [7, 8, 8, 6, A, 3, A, C, C, 2, 1, 5]

B: [6, 7, 7, 7, 3, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 2, 3, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 3, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 4, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 2, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 3, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 3, 0, 2, 0, 4]] \$

$$[4y_4 - 2y_2, y_5, y_4, 0, y_1, 2y_4 - y_2, y_2, y_3, 0, y_6, 0, y_7]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 1, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_2, y_1, 0, y_2, y_6, 0, y_7, y_3, y_4, y_5]$$

$$p = -s^5 + s^8$$

1121 . Coloring, {2, 3, 6, 7, 9, 11}

R: [7, 8, 8, 6, A, 3, A, C, C, C, 4, 5]

B: [6, 7, 7, 7, 3, A, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 2, 0, 1, 0, 3, 0, 5] , [0, 0, 2, 0, 5, 0, 0, 1, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 2, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$

$$[0, 0, y_7, 2y_4, y_6, y_5, y_4, y_3, 0, y_2, 0, y_1]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 4, 0] , [4, 1, 0, 0, 0, 2, 3, 0, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 4, 1, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 5, 1, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 3, 2, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 1, 4, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 1, 5, 0, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 2, 3, 0, 0, 1, 5, 0]] \$

$$[y_1 - y_3 + y_2 - y_4 - y_5 + y_6, y_1, y_3, 0, 0, y_2, y_4, 0, 2y_3, y_5, y_6, 0]$$

$$p = -s^2 + s^8 \quad p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1122 . Coloring, {2, 3, 6, 7, 9, 12}

R: [7, 8, 8, 6, A, 3, A, C, C, C, 1, 9]

B: [6, 7, 7, 7, 3, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	6 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 0, 4], [0, 0, 1, 0, 0, 0, 2, 1, 4, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 1, 7, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$$

$$[2y_4, 0, y_5, 0, 0, y_4, 2y_5 - y_4, y_3, y_2, -y_5 + 2y_3, 0, y_1]$$

$$p' = s^5 - s^7 \quad p' = s^4 - s^6 \quad p = s^4 - s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 4, 0], [0, 1, 2, 4, 0, 0, 5, 0, 0, 1, 3, 0], [0, 1, 0, 3, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$$

$$[0, y_1, -y_3 + 2y_5, y_2, 2y_3, y_3, y_4, 0, 0, y_5, y_6, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1123 . Coloring, {2, 3, 6, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, A, C, B, 2, 4, 5]

B: [6, 7, 7, 7, 3, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	9 vs 10	7 vs 8

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5
See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 1, 1], [0, 3, 1, 1, 1, 2, 0, 3, 0, 3, 0, 2], [0, 3, 2, 0, 2, 1, 0, 4, 0, 1, 0, 3], [0, 1, 1, 0, 3, 0, 0, 5, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 2, 0, 3, 0, 5], [0, 3, 0, 0, 5, 0, 0, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2], [0, 5, 0, 0, 2, 0, 0, 4, 0, 2, 0, 3], [0, 2, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 2, 0, 3, 0, 5]] \$$

$[0, y_1, y_5, y_4, y_3, y_2, y_8, y_6, 0, y_9, y_8, y_7]$

$$p = -s^5 + s^{10}$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8
See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 3, 3], [3, 0, 0, 0, 0, 2, 1, 0, 3, 1, 3, 3], [3, 0, 0, 0, 0, 3, 0, 0, 3, 2, 1, 4], [1, 0, 0, 0, 0, 3, 0, 0, 4, 3, 0, 5], [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$[y_1 + y_2 - y_3 - y_4 - y_7 + y_5 + y_6, 0, y_1, 0, 0, y_2, y_3, 0, y_4, y_7, y_5, y_6]$

$$p = -s^7 + s^8$$

$\hat{A} \gg \text{SYNC'D !RANK'D}$

1124 . Coloring, $\{2, 3, 6, 7, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, A, C, B, 2, 1, 9]

B: [6, 7, 7, 7, 3, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	10 vs 10	8 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 1, 1], [1, 3, 1, 0, 0, 0, 2, 3, 1, 1, 2, 2], [2, 1, 0, 0, 0, 0, 1, 4, 2, 2, 1, 3], [1, 2, 0, 0, 0, 2, 1, 3, 1, 2, 4], [2, 1, 0, 0, 0, 0, 1, 2, 4, 2, 3, 1], [3, 2, 0, 0, 0, 0, 2, 1, 1, 1, 4, 2], [4, 1, 0, 0, 0, 0, 3, 2, 2, 2, 1, 1], [1, 2, 0, 0, 0, 0, 4, 1, 1, 3, 2, 2], [2, 3, 0, 0, 0, 0, 1, 2, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 2, 3, 1, 1, 2, 2]] \$$

$[y_1, y_2, y_3, 0, 0, y_4, y_{10}, y_5, y_6, y_7, y_8, y_9]$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 3, 3], [0, 0, 2, 3, 3, 0, 3, 0, 0, 1, 3, 1], [0, 0, 3, 3, 1, 0, 5, 0, 0, 0, 3, 1], [0, 0, 1, 3, 1, 0, 6, 0, 0, 0, 5, 0], [0, 0, 1, 5, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$$

$[0, 0, y_8, y_7, y_6, y_5, y_4, 0, 0, y_3, y_2, y_1]$

1125 . Coloring, $\{2, 3, 6, 7, 11, 12\}$

$\Omega p(\Delta)=0: p = 2s^2 - 3s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$

R: [7, 8, 8, 6, A, 3, A, C, B, C, 4, 9]

B: [6, 7, 7, 7, 3, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 1, 3], [0, 0, 1, 1, 0, 2, 0, 1, 3, 1, 2, 5], [0, 0, 2, 2, 0, 1, 0, 1, 5, 0, 3, 2], [0, 0, 1, 3, 0, 2, 0, 2, 2, 0, 5, 1], [0, 0, 2, 5, 0, 3, 0, 1, 1, 0, 2, 2], [0, 0, 3, 2, 0, 5, 0, 2, 2, 0, 1, 1], [0, 0, 5, 1, 0, 2,$

0, 3, 1, 0, 2, 2] , [0, 0, 2, 2, 0, 1, 0, 5, 2, 0, 1, 3] , [0, 0, 1, 1, 0, 2, 0, 2, 3, 0, 2, 5]] \$

[0, 0, y₄, y₅, 0, y₁, y₂, y₃, y₇, y₈, y₉, y₆]

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 3, 0, 0, 1, 3, 0] , [3, 1, 1, 0, 0, 3, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 3, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 3, 0, 0, 2, 3, 0]] \$

[y₁ + y₂ - y₃ + y₄ - y₅ - y₆ + y₇ + y₈, y₁, y₂, 0, y₃, y₄, y₅, 0, 0, y₆, y₇, y₈]

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

1126 . Coloring, {2, 3, 6, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, B, B, C, 2, 1, 5]

B: [6, 7, 7, 7, 3, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 10	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 0, 2, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 3, 2, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 3, 2, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 1, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$

[y₄, y₃, y₂, 0, y₂ + y₆, y₆, y₁, y₈, 0, y₇, y₅, y₆]

$$p' = -s^6 + s^9 \quad p = -s^6 + s^9$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 4, 2, 3] , [0, 0, 0, 2, 0, 0, 1, 0, 3, 3, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 2, 4, 1] , [0, 0, 0, 4, 0, 0, 3, 0, 1, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 4, 2, 3]] \$

$$[0, 0, y_1, y_2 - y_3 - y_4 + y_5 + y_6, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p' = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 \quad p = s^2 - s^8$$

1127 . Coloring, {2, 3, 6, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, B, B, C, C, 4, 5]

B: [6, 7, 7, 7, 3, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}, {5, 10, 12}}

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 3, 3] , [0, 0, 1, 3, 3, 2, 0, 1, 0, 2, 3, 1] , [0, 0, 2, 3, 1, 3, 0, 1, 0, 3, 1, 2] , [0, 0, 3, 1, 2, 3, 0, 2, 0, 1, 1, 3] , [0, 0, 3, 1, 3, 1, 0, 3, 0, 2, 2, 1] , [0, 0, 1, 2, 1, 1, 0, 3, 0, 3, 3, 2] , [0, 0, 1, 3, 2, 2, 0, 1, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 3, 0, 1, 0, 2, 1, 1] , [0, 0, 3, 1, 1, 3, 0, 2, 0, 3, 1, 2]] \$

$$[0, 0, -3y_6 + 5y_5 - 3y_2 - 3y_3 - 3y_4 + 5y_1 - 3y_7 + 5y_8, 3y_6, 3y_5, 3y_2, 3y_3, 3y_4, 0, 3y_1, 3y_7, 3y_8]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 2, 3, 0, 1, 4, 2, 0] , [2, 4, 0, 0, 0, 1, 3, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 2, 4, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 1, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]] \$

$6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$$

$[y_1, y_4, y_5, 0, 0, y_3, y_2, 0, y_8, y_7, y_6, y_5]$

$$p = -s^6 + s^9$$

1128 . Coloring, {2, 3, 6, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, B, B, C, C, 1, 9]

B: [6, 7, 7, 7, 3, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 3, 3], [3, 0, 1, 0, 0, 0, 2, 1, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 1, 3, 0, 3, 3], [3, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3]] \$$

$[3y_1, 0, -3y_1 + 7y_6 - 3y_5 - 3y_4 + 10y_3 - 3y_2, 0, 0, 3y_6, 3y_5, 3y_4, 3y_3, 3y_6, 3y_2, 3y_6 + 3y_3]$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 1, 1], [0, 3, 2, 1, 1, 0, 5, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$[0, y_2, y_1, y_3, y_3, y_6, y_5, 0, 0, y_4, y_6, y_6]$

$$p' = -s^4 + s^7 \quad p = s^4 - s^7 \quad p' = -s^5 + s^8$$

1129 . Coloring, {2, 3, 6, 8, 10, 11}

R: [7, 8, 8, 6, A, 3, B, B, B, 2, 4, 5]

B: [6, 7, 7, 7, 3, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	4 vs 7

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 4, 0] , [0, 1, 1, 4, 0, 2, 0, 3, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 0, 4, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 0, 3, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 0, 4, 0, 0, 2, 0]] \$

$$[0, y_8, y_7, y_6, 2y_4, y_5, y_4, y_3, 0, y_2, y_1, 0]$$

$$p = s^4 - s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 2, 1, 0, 4, 4, 0, 5] , [0, 0, 0, 0, 0, 0, 0, 0, 5, 3, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[2y_4, 0, y_4, 0, 0, -5y_4 + 2y_1, y_1, 0, -8y_4 + 3y_1 - y_3 + y_2, y_3, 0, y_2]$$

$$p' = s^4 - s^6 \quad p' = s^5 - s^6 \quad p = s^4 - s^7$$

1130 . Coloring, {2, 3, 6, 8, 10, 12}

R: [7, 8, 8, 6, A, 3, B, B, B, 2, 1, 9]

B: [6, 7, 7, 7, 3, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 4, 0] , [4, 1, 1, 0, 0, 0, 2, 3, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 2, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_1, y_2 + y_5, y_2, 0, 0, y_5, y_3, y_4, 2y_5, y_5, y_6, 0]$$

$$p' = -s^4 + s^7 \quad p' = -s^5 + s^8 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 4, 0, 3, 0, 2, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 2] , [0, 0, 3, 0, 2, 0, 4, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 4, 0, 3]] \$

$$[0, 0, y_6, 2y_4, y_5, y_4, y_3, 0, 0, y_2, 0, y_1]$$

$$p = -s^2 + s^7$$

1131 . Coloring, {2, 3, 6, 8, 11, 12}

R: [7, 8, 8, 6, A, 3, B, B, B, C, 4, 9]

B: [6, 7, 7, 7, 3, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 4, 2] , [0, 0, 1, 4, 0, 2, 0, 1, 2, 0, 5, 1] , [0, 0, 2, 5, 0, 4, 0, 1, 1, 0, 3, 0] , [0, 0, 4, 3, 0, 5, 0, 2, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 3, 0, 4, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 2, 0, 5, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 0, 3, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 5, 0, 2, 0, 0, 2, 0]] \$

[0, 0, y₂, y₃, 0, y₁, y₈, y₆, y₇, y₈, y₄, y₅]

$$p = s^4 - s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

[2 y₃ - 2 y₄, y₁, y₂, 0, y₃, y₄, y₅, 0, 0, y₆, 0, 2 y₃ - 2 y₄]

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

1132 . Coloring, {2, 3, 6, 9, 10, 11}

R: [7, 8, 8, 6, A, 3, B, C, C, 2, 4, 5]

B: [6, 7, 7, 7, 3, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	7 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 2, 2] , [0, 1, 1, 2, 2, 2, 0, 3, 0, 2, 1, 2] , [0, 2, 2, 1, 2, 2, 0, 2, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 1, 0, 4, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 0, 4, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4]] \$

$$[0, y_1, y_5, y_6, y_7, y_2, y_3, y_4, 0, y_8, y_9, y_{10}]$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 2, 2], [2, 0, 0, 0, 0, 2, 1, 0, 2, 4, 2, 3], [2, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 4, 2], [4, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 2], [3, 0, 0, 0, 0, 4, 0, 0, 2, 3, 2, 2], [2, 0, 0, 0, 0, 3, 0, 0, 2, 4, 2, 3]] \$$$

$$[-y_1 + y_2 + y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, 0, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1133 . Coloring, {2, 3, 6, 9, 10, 12}

R: [7, 8, 8, 6, A, 3, B, C, C, 2, 1, 9]

B: [6, 7, 7, 7, 3, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 2, 2], [2, 1, 1, 0, 0, 0, 2, 3, 2, 0, 1, 4], [1, 0, 0, 0, 0, 0, 2, 2, 4, 0, 2, 5], [2, 0, 0, 0, 0, 0, 1, 0, 5, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 1, 5], [1, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 6], [2, 0, 0, 0, 0, 0, 1, 0, 6, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 1, 6], [1, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 5], [2, 0, 0, 0, 0, 0, 1, 0, 5, 0, 2, 6]] \$$$

$$[5y_1, 5y_7 + 5y_3, 5y_7, 0, 0, 5y_3, 5y_4, 5y_5, 5y_6, 5y_3, 5y_2, 11y_1 - 10y_7 - 15y_3 + 11y_4 - 5y_5 - 5y_6 + 11y_2]$$

$$p = -s^4 - s^5 + s^7 + s^8 \quad p = s^4 - s^6 - s^7 + s^9 \quad p = -s^4 + s^{10}$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 2, 2] , [0, 0, 2, 2, 2, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 2, 0, 0, 4, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2] , [0, 0, 4, 0, 2, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4]] \$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, 0, 0, y_6, 2y_4, y_7]$$

$$p = -s^3 + s^8$$

1134 . Coloring, {2, 3, 6, 9, 11, 12}

R: [7, 8, 8, 6, A, 3, B, C, C, C, 4, 9]

B: [6, 7, 7, 7, 3, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 2, 4] , [0, 0, 1, 2, 0, 2, 0, 1, 4, 0, 1, 5] , [0, 0, 2, 1, 0, 2, 0, 1, 5, 0, 0, 5] , [0, 0, 2, 0, 0, 1, 0, 2, 5, 0, 0, 6] , [0, 0, 1, 0, 0, 0, 0, 2, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_6, y_7, 0, y_3, y_4, y_5, y_1, y_4, y_2, -y_6 - y_7 + y_3 + y_5 + y_1 + y_2]$$

$$p = s^7 - s^8 \quad p' = -s^7 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 2, 0] , [2, 3, 2, 0, 0, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 2, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0]] \$

$$[y_6, y_5, y_4, 0, 2y_6 - 2y_4, y_3, y_2, 0, 0, y_1, 2y_6 - 2y_4, 0]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

1135 . Coloring, {2, 3, 6, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 7s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, B, C, B, 2, 4, 9]

B: [6, 7, 7, 7, 3, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	9 vs 10	8 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 3, 1] , [0, 1, 1, 3, 0, 2, 0, 3, 1, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 0, 2, 2, 0, 1, 3] , [0, 0, 3, 1, 0, 3, 0, 2, 3, 0, 2, 2] , [0, 0, 3, 2, 0, 1, 0, 3, 2, 0, 3, 2] , [0, 0, 1, 3, 0, 2, 0, 3, 2, 0, 2, 3] , [0, 0, 2, 2, 0, 3, 0, 1, 3, 0, 2, 3] , [0, 0, 3, 2, 0, 2, 0, 2, 3, 0, 3, 1] , [0, 0, 2, 3, 0, 2, 0, 3, 1, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 0, 2, 2, 0, 1, 3]] \$

$$[0, y_1, y_4, y_2, 0, y_3, y_7, y_5, y_6, y_7, y_8, y_9]$$

$$p = -s^3 + s^{10}$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 1, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 1, 2, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4]] \$

$$[y_8, 0, y_7, 0, y_6, y_5, y_4, 0, 0, y_3, y_2, y_1]$$

1136 . Coloring, {2, 3, 7, 8, 9, 10}

R: [7, 8, 8, 6, A, A, A, B, C, 2, 1, 5]

B: [6, 7, 7, 7, 3, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	5 vs 7

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 4, 1, 1], [1, 4, 0, 0, 1, 0, 2, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 1, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 4, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 2, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 4, 1, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 4, 2, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 3, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 1, 4, 0, 3, 2, 0]] \$

$$[y_2, y_1, 0, 0, y_3, y_6, y_4, y_5, 0, y_7, y_8, y_6]$$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 3

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 0, 3, 3], [0, 0, 1, 3, 0, 0, 4, 0, 3, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$

$$[0, 0, y_2, y_1, 0, y_5, y_4, 0, 3y_2 - 4y_5, 0, y_3, 3y_5]$$

$$p = s^3 - s^6 \quad p' = s^3 - s^6$$

1137 . Coloring, {2, 3, 7, 8, 9, 11}

R: [7, 8, 8, 6, A, A, A, B, C, C, 4, 5]

B: [6, 7, 7, 7, 3, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 6
See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 4, 1, 3], [0, 0, 0, 1, 3, 2, 0, 0, 0, 4, 2, 4], [0, 0, 0, 2, 4, 1, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$

$[0, 0, 0, y_1, y_2, y_3, y_4, 2y_4, 0, y_5, y_6, y_7]$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5
See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 0, 3, 1], [3, 0, 1, 0, 0, 2, 4, 0, 1, 0, 5, 0], [5, 0, 2, 0, 0, 3, 1, 0, 0, 0, 5, 0], [5, 0, 3, 0, 0, 5, 2, 0, 0, 0, 1, 0], [1, 0, 5, 0, 0, 5, 3, 0, 0, 0, 2, 0], [2, 0, 5, 0, 0, 1, 5, 0, 0, 0, 3, 0], [3, 0, 1, 0, 0, 2, 5, 0, 0, 0, 5, 0], [5, 0, 2, 0, 0, 3, 1, 0, 0, 0, 5, 0]] \$$

$[y_1, 2y_6, y_2, 0, 0, y_3, y_4, 0, y_5, 0, y_7, y_6]$

$$p = -s^3 + s^8$$

1138 . Coloring, $\{2, 3, 7, 8, 9, 12\}$

R: [7, 8, 8, 6, A, A, A, B, C, C, 1, 9]

B: [6, 7, 7, 7, 3, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 2, 2, 6] , [2, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 5] , [0, 0, 0, 0, 0, 2, 0, 5, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$

$$[y_1, 0, 0, 0, 0, y_2, y_3, 2y_2, y_4, y_5, y_6, y_7]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 0, 3, 1] , [0, 0, 3, 3, 1, 0, 6, 0, 0, 0, 3, 0] , [0, 0, 1, 3, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$$[0, 2y_5, y_3, y_2, y_1, y_5, y_4, 0, 0, 0, y_6, y_5]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

1139 . Coloring, {2, 3, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 7s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, A, B, B, 2, 4, 5]

B: [6, 7, 7, 7, 3, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 8	6 vs 7

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 4, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 2, 0, 4, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 4, 0, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 0, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 2, 0, 4, 2, 0]] \$

$$[0, y_3, 0, y_4, 2y_1, -y_3 + y_4 - 3y_1 + y_2 + y_5 - y_6, y_1, y_2, 0, y_5, y_6, 0]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {9, 12}} order: 10

See Matrix

$$\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 0, 2, 4], [2, 0, 1, 0, 0, 2, 2, 0, 4, 0, 3, 2], [3, 0, 2, 0, 0, 2, 1, 0, 2, 0, 2, 4], [2, 0, 2, 0, 0, 3, 2, 0, 4, 0, 1, 2], [1, 0, 3, 0, 0, 2, 2, 0, 2, 0, 2, 4], [2, 0, 2, 0, 0, 1, 3, 0, 4, 0, 2, 2], [2, 0, 1, 0, 0, 2, 2, 0, 2, 0, 3, 4]] \$$$

$$[-3y_1 - 3y_5 - 3y_4 + 5y_3 - 3y_2 + 5y_6, 0, 3y_1, 0, 0, 3y_5, 3y_4, 0, 3y_3, 0, 3y_2, 3y_6]$$

$$p = -s - s^2 + s^6 + s^7$$

Â» SYNC'D !RANK'D

1140 . Coloring, {2, 3, 7, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, A, B, B, 2, 1, 9]

B: [6, 7, 7, 7, 3, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 8	6 vs 7

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 4, 2, 0], [2, 4, 0, 0, 0, 0, 2, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 4, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 4, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 4, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 2, 4, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 2, 2, 0, 2, 4, 0]] \$$$

$$[y_2, y_3, 0, 0, 0, y_1, y_6, y_7, 2y_1, y_4, y_5, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 0, 2, 4] , [0, 0, 3, 2, 4, 0, 4, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0]] \$

$$[0, 0, y_1, y_2, y_3, y_4, y_6, 0, 0, 0, y_5, 4y_4]$$

$$p = -s^4 + s^7$$

Â» SYNC'D !RANK'D

1141 . Coloring, {2, 3, 7, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, A, B, B, C, 4, 9]

B: [6, 7, 7, 7, 3, 3, B, C, C, 2, 1, 5]

' See graph

' ' See pair graph

'

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 2, 4, 4] , [0, 0, 0, 4, 0, 2, 0, 0, 4, 2, 2, 2] , [0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 4, 0, 0, 2, 2, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 2, 4, 4]] \$

$$[0, 0, 0, y_3, 0, y_2, y_1, 2y_1, y_4, y_5, y_6, y_7]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5
See Matrix

\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 2, 4, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 2, 3, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 4, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 4, 2, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 3, 3, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 4, 4, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 2, 3, 0, 0, 0, 4, 0]] \$

$$[y_1, y_7, y_2, 0, y_3, y_4, y_5, 0, 0, 0, y_6, y_7]$$

$$p = -s^3 + s^8$$

1142 . Coloring, {2, 3, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -2s^2 - s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, A, C, C, 2, 4, 5]

B: [6, 7, 7, 7, 3, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 7

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 2, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2]] \$

$$[0, y_1, 0, 2 y_6, y_4, y_5, y_6, y_2, 0, y_3, 0, y_7]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 0, 4, 2] , [4, 0, 1, 0, 0, 2, 2, 0, 2, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 1, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 5, 2, 0, 0, 0, 1, 0] , [1, 0, 5, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 1, 5, 0, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 2, 4, 0, 0, 0, 5, 0]] \$

$$[y_2, 0, y_3, 0, 0, y_1, y_6, 0, y_7, 0, y_4, y_5]$$

1143 . Coloring, {2, 3, 7, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, A, C, C, 2, 1, 9]

B: [6, 7, 7, 7, 3, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 2, 2, 2, 2, 0, 4], [0, 2, 0, 0, 0, 0, 0, 4, 4, 2, 0, 4], [0, 2, \\ 0, 0, 0, 0, 0, 2, 4, 0, 0, 8], [0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, \\ 0, 0, 0, 10, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$ \end{aligned}$$

$$[2 y_2, y_1, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, 0, y_7]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 0, 4, 2], [0, 0, 3, 4, 2, 0, 4, 0, 0, 0, 3, 0], [0, 0, 2, 3, 0, 0, 7, 0, 0, 0, 4, 0], [0, 0, \\ 0, 4, 0, 0, 5, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, \\ 5, 0, 0, 0, 7, 0]] \$ \end{aligned}$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, 0, 0, 0, y_6, 2 y_4]$$

$$p = -s^4 + s^7$$

1144 . Coloring, {2, 3, 7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 - 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, A, C, C, C, 4, 9]

B: [6, 7, 7, 7, 3, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	5 vs 7	6 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 0, 4, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$

$$[0, 0, 0, 2y_2, 0, y_1, y_2, 2y_2, y_3, y_4, 0, y_5]$$

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 4, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 4, 3, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 3, 2, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 3, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 4, 0, 0, 0, 3, 0]] \$

$$[y_1, y_3, y_2, 0, y_3, y_4, y_5, 0, 0, 0, y_6, 0]$$

$$p = -s^2 + s^7$$

Â» SYNC'D !RANK'D

1145 . Coloring, {2, 3, 7, 10, 11, 12}

R: [7, 8, 8, 6, A, A, A, C, B, 2, 4, 9]

B: [6, 7, 7, 7, 3, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 7

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 4, 1, 1], [0, 4, 0, 1, 0, 2, 0, 2, 1, 2, 2, 2], [0, 2, 0, 2, 0, 1, 0, 4, 2, 2, 1, 2], [0, 2, 0, 1, 0, 2, 0, 2, 2, 1, 2, 4], [0, 1, 0, 2, 0, 1, 0, 2, 4, 2, 2, 2], [0, 2, 0, 2, 0, 2, 0, 1, 2, 1, 4, 2], [0, 1, 0, 4, 0, 2, 0, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 4, 0, 1, 1, 2, 2, 2], [0, 2, 0, 2, 0, 2, 0, 2, 2, 4, 1, 1]] \$$

$[0, y_4, 0, y_3, 0, y_2, y_1, y_6, y_5, y_9, y_8, y_7]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 0, 3, 3], [3, 0, 3, 0, 3, 2, 2, 0, 0, 0, 3, 0], [3, 0, 5, 0, 0, 3, 3, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 5, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 2, 3, 0, 0, 0, 5, 0], [5, 0, 2, 0, 0, 3, 3, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 5, 2, 0, 0, 0, 3, 0]] \$$

$[y_7, 0, y_6, 0, y_5, y_4, y_3, 0, 0, 0, y_2, y_1]$

1146 . Coloring, $\{2, 3, 8, 9, 10, 11\}$

R: [7, 8, 8, 6, A, A, B, B, C, 2, 4, 5]

B: [6, 7, 7, 7, 3, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 2, 3, 1], [0, 2, 0, 3, 1, 2, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 0, 2, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 0, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 3, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 0, 2, 0, 3, 2, 0]] \$$

$$[0, y_1 - y_2 - y_3 + 2y_7 + y_4 + y_5 - y_6, 0, y_1, y_2, y_3, y_7, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^3 + s^9 \quad p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 2, 1, 3], [1, 0, 1, 0, 0, 2, 2, 0, 3, 3, 2, 2], [2, 0, 2, 0, 0, 1, 1, 0, 2, 2, 3, 3], [3, 0, 1, 0, 0, 2, 2, 0, 3, 1, 2, 2], [2, 0, 2, 0, 0, 3, 1, 0, 2, 2, 3, 1], [3, 0, 3, 0, 0, 2, 2, 0, 1, 1, 2, 2], [2, 0, 2, 0, 0, 3, 3, 0, 2, 2, 1, 1], [1, 0, 3, 0, 0, 2, 2, 0, 1, 3, 2, 2]] \$$

$$[y_1, 0, y_1 - y_5 + y_4, 0, 0, y_1 + y_4 - y_2, y_1 + y_4 - y_3, 0, y_5, y_4, y_3, y_2]$$

$$p' = -s + s^2 - s^5 + s^6 \quad p' = -s + s^3 - s^5 + s^7 \quad p = s - s^2 + s^5 - s^6$$

1147 . Coloring, $\{2, 3, 8, 9, 10, 12\}$

R: [7, 8, 8, 6, A, A, B, B, C, 2, 1, 9]

B: [6, 7, 7, 7, 3, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 2, 2, 1, 1, 3, 2], [3, 1, 0, 0, 0, 0, 3, 2, 2, 0, 4, 1], [4, 0, 0, 0, 0, 3, 1, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1]] \$$

$$[-3 y_1 - 3 y_2 - 3 y_3 - 3 y_4 + 13 y_5 - 3 y_6 - 3 y_7 + 13 y_8, 3 y_1, 0, 0, 0, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7, 3 y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 2, 1, 3], [0, 0, 3, 1, 3, 0, 4, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 3, 0, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3]] \$$$

$$[0, 0, y_1, y_2, y_3, y_6, y_4, 0, 0, y_5, y_6, y_7]$$

$$p = -s^3 + s^8$$

1148 . Coloring, {2, 3, 8, 9, 11, 12}

R: [7, 8, 8, 6, A, A, B, B, C, C, 4, 9]

B: [6, 7, 7, 7, 3, 3, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 3, 4], [0, 0, 0, 3, 0, 3, 0, 0, 4, 2, 0, 4], [0, 0, 0, 0, 3, 0, 0, 4, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[0, 0, 0, y_1, 0, y_2, y_3, 2 y_3, y_6, y_5, y_4, y_7]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 2, 1, 1] , [1, 2, 3, 0, 1, 2, 4, 0, 0, 3, 0, 0] , [0, 3, 3, 0, 0, 1, 5, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[y_3, y_1, y_2, 0, y_3, y_4, y_5, 0, 0, y_6, y_7, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

1149 . Coloring, {2, 3, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, B, B, B, 2, 4, 9]

B: [6, 7, 7, 7, 3, 3, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 7

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 4, 0, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 5, 0, 1, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 2, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 2, 0, 4, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 1, 0, 5, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 1, 5, 0]] \$

$$[0, y_1, 0, y_2, 0, y_3, y_4, y_5, 2y_4, y_7, y_6, 0]$$

$$p = s^2 - s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 2, 2, 0, 0, 3, 0, 2] , [0, 0, 6, 0, 2, 0, 3, 0, 0, 2, 0, 3] , [0, 0, 2, 0, 3, 0, 6, 0, 0, 3, 0, 2] , [0, 0, 3, 0, 2, 0, 2, 0, 0, 6, 0, 3] , [0, 0, 2, 0, 3, 0, 3, 0, 0, 2, 0, 6] , [0, 0, 3, 0, 6, 0, 2, 0, 0, 3, 0, 2]] \$

$$[y_1, 0, y_2, 0, y_4, y_5, y_3, 0, 0, y_6, 0, y_7]$$

1150 . Coloring, {2, 3, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, A, B, C, C, 2, 4, 9]

B: [6, 7, 7, 7, 3, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	9 vs 9	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [0, 2, 0, 2, 0, 1, 1, 2, 2, 2, 2, 2], [0, 2, 0, 2, 0, 2, 0, 2, 2, 1, 1, 4], [0, 1, 0, 1, 0, 2, 0, 2, 4, 2, 0, 4], [0, 2, \\ & 0, 0, 0, 1, 0, 1, 4, 2, 0, 6], [0, 2, 0, 0, 0, 0, 2, 6, 1, 0, 5], [0, 1, 0, 0, 0, 0, 2, 5, 0, 0, 8], [0, 0, 0, 0, 0, 0, \\ & 0, 1, 8, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$ \end{aligned}$$

$$[0, y_4, 0, y_3, 0, y_1, y_2, y_8, y_7, y_5, y_6, y_9]$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\begin{aligned} \$ [& [2, 0, 2, 0, 2, 1, 3, 0, 0, 2, 2, 2], [2, 0, 3, 0, 2, 2, 2, 0, 0, 3, 0, 2], [0, 0, 4, 0, 2, 2, 3, 0, 0, 2, 0, 3], [0, 0, \\ & 4, 0, 3, 0, 4, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 4], [0, 0, 3, 0, 4, 0, \\ & 2, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 3, 0, 0, 2, 0, 3]] \$ \end{aligned}$$

$$[y_5, 0, y_4, 0, y_3, y_2, y_1, 0, 0, y_6, y_7, y_8]$$

1151 . Coloring, {2, 4, 5, 6, 7, 8}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, B, B, C, 1, 5]

B: [6, 7, 8, 6, A, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 2, 2, 2], [2, 0, 2, 0, 2, 0, 4, 0, 0, 3, 1, 2], [1, 0, 2, 0, 2, 0, 4, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 3, 0, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3]] \$$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 7, 10, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 2, 2, 2], [0, 2, 0, 2, 0, 2, 2, 0, 2, 2, 1, 3], [0, 2, 0, 1, 0, 2, 2, 0, 3, 2, 2, 2], [0, 2, 0, 2, 0, 1, 2, 0, 2, 2, 2, 3], [0, 2, 0, 2, 0, 2, 2, 0, 3, 1, 2, 2], [0, 1, 0, 2, 0, 2, 2, 0, 2, 2, 2, 3], [0, 2, 0, 2, 0, 2, 1, 0, 3, 2, 2, 2], [0, 2, 0, 2, 0, 2, 2, 0, 2, 2, 1, 3], [0, 2, 0, 1, 0, 2, 2, 0, 3, 2, 2, 2]] \$$

$$[0, 3 y_6, 0, 3 y_5, 0, 3 y_4, 3 y_3, 3 y_2, 3 y_1, 8 y_6 - 3 y_5 + 8 y_4 - 3 y_3 - 11 y_2 - 11 y_1 + 8 y_7, 3 y_7, 5 y_6 + 5 y_4 - 8 y_2 - 8 y_1 + 5 y_7]$$

$$p' = s^2 - s^8 \quad p = s^2 - s^8$$

1152 . Coloring, $\{2, 4, 5, 6, 7, 9\}$

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, C, C, C, 1, 5]

B: [6, 7, 8, 6, A, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	6 vs 7	6 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 2, 0, 4] , [0, 0, 2, 0, 4, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 2, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 4, 0, 2] , [0, 0, 4, 0, 2, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 4, 0, 0, 3, 0, 3]] \$$

$$[2 y_6, 0, y_1, 0, y_3, 0, y_2, y_6, 0, y_5, 0, y_4]$$

$$p = -s^2 + s^7$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 7, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 2, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 4, 2, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 2, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 2, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 4, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 2, 4, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 2, 0, 0, 2, 4, 0]] \$$

$$[0, y_5 - y_1 + y_2 + 3 y_3 + y_4 - y_6, 0, y_5, 0, y_1, y_2, y_3, 2 y_3, y_4, y_6, 0]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 \quad p = -s^2 + s^8$$

1153 . Coloring, $\{2, 4, 5, 6, 7, 10\}$

R: [7, 8, 7, 7, 3, 3, A, C, B, 2, 1, 5]

B: [6, 7, 8, 6, A, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 8

Omega Rank for R : cycles: $\{\{2, 3, 5, 7, 8, 10, 12\}\}$ order: 7

See Matrix

\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 2, 1, 1] , [1, 2, 2, 0, 1, 0, 4, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 3, 2, 0, 4, 0, 2] , [0, 4, 1, 0, 2, 0, 1, 3, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 1, 4, 0, 1, 0, 3] , [0, 1, 2, 0, 3, 0, 2, 3, 0, 1, 0, 4] , [0, 1, 3, 0, 4, 0, 2, 1, 0, 2, 0, 3] , [0, 2, 4, 0, 3, 0, 3, 1, 0, 2, 0, 1] , [0, 2, 3, 0, 1, 0, 4, 2, 0, 3, 0, 1]] \$

$$[y_1, y_2, y_3, 0, y_4, 0, y_5, y_9, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 2, 4] , [0, 0, 0, 2, 0, 3, 0, 0, 4, 2, 0, 5] , [0, 0, 0, 0, 2, 0, 0, 5, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, 0, y_6 - 2y_5 - y_4 - y_3 + y_2 + y_1, 0, y_6, y_5, y_5, y_4, y_3, y_2, y_1]$$

$$p = s^6 - s^7 \quad p' = -s^6 + s^7$$

1154 . Coloring, {2, 4, 5, 6, 7, 11}

R: [7, 8, 7, 7, 3, 3, A, C, B, C, 4, 5]

B: [6, 7, 8, 6, A, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 2, 1, 3] , [0, 0, 2, 1, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3]] \$

$$[0, 0, y_1, y_2, y_3, 0, y_4, y_6, 0, y_5, y_6, y_7]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 7, 10, 11\}, \{9, 12\}\}$ order: 6
 See Matrix

$\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 2, 0, 1, 2, 2, 2], [2, 2, 0, 0, 0, 3, 2, 0, 2, 2, 2, 1], [2, 2, 0, 0, 0, 2, 2, 0, 1, 3, 2, 2], [2, 3, 0, 0, 0, 2, 2, 0, 2, 2, 2, 1], [2, 2, 0, 0, 0, 2, 3, 0, 1, 2, 2, 2], [2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 2, 0, 1, 2, 2, 2], [2, 2, 0, 0, 0, 3, 2, 0, 2, 2, 2, 1]] \$$

$[-3y_1 - 3y_2 + 5y_4 - 3y_5 + 8y_7, -3y_3 + 8y_4 - 3y_6 + 5y_7, 0, 0, 0, 3y_3, 3y_1, 3y_2, 3y_4, 3y_5, 3y_6, 3y_7]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

1155 . Coloring, $\{2, 4, 5, 6, 7, 12\}$

R: $[7, 8, 7, 7, 3, 3, A, C, B, C, 1, 9]$

B: $[6, 7, 8, 6, A, A, B, B, C, 2, 4, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6
 See Matrix

$\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 2, 1, 3], [1, 0, 0, 0, 0, 0, 4, 0, 3, 3, 2, 3], [2, 0, 0, 0, 0, 0, 1, 0, 3, 4, 3, 3], [3, 0, 0, 0, 0, 2, 0, 3, 1, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 2, 3, 1], [3, 0, 0, 0, 0, 0, 3, 0, 1, 3, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 3, 1, 3], [1, 0, 0, 0, 0, 0, 4, 0, 3, 3, 2, 3]] \$$

$[y_1, 0, 2y_3, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 7, 10, 11\}\}$ order: 6
 See Matrix

$\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 2, 3, 1], [0, 2, 0, 3, 1, 2, 2, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 3, 2, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 4, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 3, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 3, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 4, 2, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 2, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 3, 2, 0, 0, 3, 2, 0]] \$$

$$[0, y_1, 0, y_2, y_3, y_4, y_5, y_7, 0, y_8, y_6, y_7]$$

$$p = -s^3 + s^9$$

1156 . Coloring, {2, 4, 5, 6, 8, 9}

R: [7, 8, 7, 7, 3, 3, B, B, C, C, 1, 5]

B: [6, 7, 8, 6, A, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 0, 3, 3] , [3, 0, 2, 0, 3, 0, 4, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0]] \$

$$[y_6, 0, y_5, 0, y_4, 0, y_3, y_2, 0, 0, y_1, 3y_2]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 2, 0, 1, 3, 2, 1] , [0, 3, 0, 2, 0, 1, 4, 0, 1, 4, 1, 0] , [0, 4, 0, 1, 0, 2, 3, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[0, y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

1157 . Coloring, {2, 4, 5, 6, 8, 10}

$$\Omega p(\Delta)=0: p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, B, B, 2, 1, 5]
B: [6, 7, 8, 6, A, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 3
 See Matrix

\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 0, 4, 2, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[y_1, 2y_2 - 2y_4, y_2, 0, 2y_2 - 2y_4, 0, y_3, y_4, 0, 0, y_5, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 4
 See Matrix

\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 0, 4, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, 0, 2y_3, 0, y_1, y_3, y_3, y_4, y_2, 0, y_5]$$

$$p = s^4 - s^6 \quad p' = s^4 - s^6$$

1158 . Coloring, {2, 4, 5, 6, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, B, B, C, 4, 5]
B: [6, 7, 8, 6, A, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	6 vs 7	6 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6
See Matrix

$\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 0, 4, 2], [0, 0, 2, 4, 2, 0, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$$[0, 0, y_1, y_2, y_3, 0, y_4, y_5, 0, 0, y_6, 2 y_5]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 4, 0, 2], [0, 4, 0, 0, 0, 2, 2, 0, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 4, 0, 2], [0, 4, 0, 0, 0, 3, 0, 2, 4, 0, 3], [0, 4, 0, 0, 0, 0, 4, 0, 3, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 0, 2, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 3, 0, 3]] \$$

$$[10 y_1 + 10 y_2 + 10 y_3 - 22 y_4 + 10 y_5 - 22 y_6, y_1, 0, 0, 0, y_2, y_3, 5 y_1 + 5 y_2 + 5 y_3 - 11 y_4 + 5 y_5 - 11 y_6, y_4, y_5, 0, y_6]$$

$$p = s^3 + s^4 - s^6 - s^7 \quad p' = -s^3 - s^4 + s^6 + s^7$$

1159 . Coloring, $\{2, 4, 5, 6, 8, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, B, B, C, 1, 9]

B: [6, 7, 8, 6, A, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	5 vs 7	6 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 3
See Matrix

$\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$$

$$[y_1, 0, 2y_2, 0, 0, 0, y_3, y_2, y_4, 0, y_5, 2y_2]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 4, 0, 2], [0, 4, 0, 0, 2, 2, 2, 0, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$$[0, y_3, 0, 2y_6, y_2, -2y_6 + 2y_4, y_1, y_6, 0, y_5, 0, y_4]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

1160 . Coloring, $\{2, 4, 5, 6, 9, 10\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, C, C, 2, 1, 5]

B: [6, 7, 8, 6, A, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
 See Matrix

$\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 4, 2, 0, 0, 3, 1], [3, 0, 2, 0, 1, 0, 4, 0, 0, 0, 4, 2], [4, 0, 1, 0, 2, 0, 5, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$[y_1, y_2, y_5, 0, y_3, 0, y_4, y_6, 0, 0, y_7, y_8]$

Omega Rank for B : cycles: $\{\{4, 6, 9, 10, 11, 12\}\}$ order: 6
 See Matrix

$\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 4, 2, 2], [0, 0, 0, 2, 0, 2, 0, 0, 2, 3, 3, 4], [0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 2, 3], [0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 4, 2], [0, 0, 0, 4, 0, 2, 0, 0, 2, 3, 3, 2], [0, 0, 0, 3, 0, 4, 0, 0, 2, 2, 2, 3], [0, 0, 0, 2, 0, 3, 0, 0, 3, 4, 2, 2], [0, 0, 0, 2, 0, 2, 0, 0, 2, 3, 3, 4]] \$$

$[0, 0, 0, y_1, 0, y_2, y_3, y_3, y_4, y_5, y_6, y_7]$

$$p = -s^2 + s^8$$

1161 . Coloring, $\{2, 4, 5, 6, 9, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, C, C, C, 4, 5]
B: [6, 7, 8, 6, A, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6
 See Matrix

$\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 0, 2, 4], [0, 0, 2, 2, 4, 0, 4, 0, 0, 0, 3, 1], [0, 0, 4, 3, 1, 0, 4, 0, 0, 0, 4, 0], [0, 0, 1, 4, 0, 0, 7, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0]] \$$

$$[0, 0, y_1, y_3, y_2, 0, y_6, y_7, 0, 0, y_4, y_5]$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 4, 2, 0], [2, 4, 0, 0, 0, 2, 2, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 3, 3, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$$$

$$[y_1, y_2, 0, 0, 0, y_3, y_4, y_5, 2y_5, y_6, y_7, 0]$$

$$p = -s^5 + s^8$$

1162 . Coloring, {2, 4, 5, 6, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, C, C, C, 1, 9]

B: [6, 7, 8, 6, A, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 0, 2, 4], [2, 0, 0, 0, 0, 0, 4, 0, 4, 0, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 0, 4, 4], [4, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 3], [2, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 2, 4]] \$$$

$$[5y_1, 0, -14y_1 - 14y_4 + 18y_3 - 14y_2 + 18y_5, 0, 0, 0, 5y_4, -7y_1 - 7y_4 + 9y_3 - 7y_2 + 9y_5, 5y_3, 0, 5y_2, 5y_5]$$

$$p = -s^2 - s^3 + s^5 + s^6 \quad p = s^2 - s^4 - s^5 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 2, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 2, 4, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 1, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

$$[0, y_5, 0, y_4, 2y_3, y_1, y_2, y_3, 0, y_7, y_6, 0]$$

$$p = s^5 - s^8$$

1163 . Coloring, {2, 4, 5, 6, 10, 11}

R: [7, 8, 7, 7, 3, 3, B, C, B, 2, 4, 5]

B: [6, 7, 8, 6, A, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 0, 3, 1] , [0, 0, 2, 3, 1, 0, 4, 2, 0, 0, 3, 1] , [0, 0, 1, 3, 1, 0, 5, 0, 0, 0, 4, 2] , [0, 0, 1, 4, 2, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$

$$[0, y_1, y_2, y_3, y_4, 0, y_7, y_8, 0, 0, y_5, y_6]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 1, 6] , [1, 0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[y_1, 0, 0, 0, 0, y_2, y_7, y_7, y_3, y_4, y_5, y_6]$$

$$p = -s^6 + s^8$$

1164 . Coloring, {2, 4, 5, 6, 10, 12}

R: [7, 8, 7, 7, 3, 3, B, C, B, 2, 1, 9]

B: [6, 7, 8, 6, A, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 0, 3, 1] , [3, 0, 0, 0, 0, 0, 4, 2, 1, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 3, 0, 1, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0]] \$

$[y_1, y_2, y_2, 0, 0, 0, y_6, y_7, y_4, 0, y_5, y_3]$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 2, 0, 0, 0, 5, 1, 4] , [0, 0, 0, 1, 4, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$[0, 0, 0, y_4, y_2, y_1, y_3, y_3, 0, y_5, y_6, y_7]$

$$p = -s^5 + s^8$$

1165 . Coloring, {2, 4, 5, 6, 11, 12}

R: [7, 8, 7, 7, 3, 3, B, C, B, C, 4, 9]

B: [6, 7, 8, 6, A, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$

$$[0, 0, 2y_5, y_1, 0, 0, y_6, y_5, y_4, 0, y_3, y_2]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 1, 1, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 2, 2, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, 0, 0, y_6 + y_7, y_4, y_3, y_7, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

1166 . Coloring, {2, 4, 5, 7, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, A, B, C, C, 1, 5]

B: [6, 7, 8, 6, A, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
See Matrix

$\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 0, 3, 0, 0, 3, 1, 3], [1, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3]] \$$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_5, 0, y_8, y_6, y_7]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 9, 11, 12\}\}$ order: 7
See Matrix

$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 3, 1], [0, 1, 2, 3, 0, 2, 2, 1, 1, 0, 3, 1], [0, 0, 2, 3, 0, 3, 1, 2, 1, 0, 3, 1], [0, 0, 3, 3, 0, 3, 0, 2, 1, 0, 2, 2], [0, 0, 3, 2, 0, 3, 0, 3, 2, 0, 1, 2], [0, 0, 3, 1, 0, 2, 0, 3, 2, 0, 2, 3], [0, 0, 2, 2, 0, 1, 0, 3, 3, 0, 2, 3], [0, 0, 1, 2, 0, 2, 0, 2, 3, 0, 3, 3], [0, 0, 2, 3, 0, 2, 0, 1, 3, 0, 3, 2], [0, 0, 2, 3, 0, 3, 0, 2, 2, 0, 3, 1]] \$$

$$[0, y_4, y_3, y_2, 0, y_1, y_6, y_7, y_5, y_9, y_{10}, y_8]$$

1167 . Coloring, $\{2, 4, 5, 7, 8, 10\}$

R: [7, 8, 7, 7, 3, A, A, B, B, 2, 1, 5]

B: [6, 7, 8, 6, A, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 2, 0], [2, 3, 2, 0, 0, 0, 3, 2, 0, 3, 1, 0], [1, 3, 0, 0, 0, 0, 4, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 1, 3, 0, 4, 3, 0], [3, 4, 0, 0, 0, 0, 2, 3, 0, 1, 3, 0], [3, 1, 0, 0, 0, 0, 3, 4, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0,$

3, 1, 0, 3, 4, 0], [4, 3, 0, 0, 0, 0, 3, 2, 0, 3, 1, 0]] \$

[y₁, y₂, y₃, 0, y₄, 0, y₅, y₆, 0, y₇, y₈, 0]

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 2, 4], [0, 0, 2, 2, 0, 2, 0, 1, 4, 0, 1, 4], [0, 0, 2, 1, 0, 2, 0, 2, 4, 0, 0, 5], [0, 0, 2, 0, 0, 1, 0, 2, 5, 0, 0, 6], [0, 0, 1, 0, 0, 0, 0, 2, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

[0, 0, y₇, y₆, 0, y₅, y₄, y₃, y₂, y₄, y₁, -y₇ - y₆ + y₅ + y₃ + y₂ + y₁]

$$p' = s^7 - s^8 \quad p = s^7 - s^9$$

1168 . Coloring, {2, 4, 5, 7, 8, 11}

R: [7, 8, 7, 7, 3, A, A, B, B, C, 4, 5]

B: [6, 7, 8, 6, A, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	10 vs 10

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 2, 2], [0, 0, 2, 2, 2, 0, 3, 0, 0, 3, 1, 3], [0, 0, 2, 1, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3]] \$

[0, 0, y₃, y₁, y₂, 0, y₄, y₅, 0, y₆, y₇, y₈]

Omega Rank for B : cycles: {{9, 12}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 2, 2], [2, 1, 2, 0, 0, 2, 2, 1, 2, 0, 1, 3], [1, 0, 2, 0, 0, 2, 1, 2, 3, 0, 2, 3], [2, 0, 2, 0, 0, 1, 0, 2, 3, 0, 1, 5], [1, 0, 1, 0, 0, 2, 0, 2, 5, 0, 0, 5], [0, 0, 2, 0, 0, 1, 0, 1, 5, 0, 0, 7], [0, 0, 1, 0, 0, 0,

0, 2, 7, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 1, 6, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[y₂, y₃, y₁, 0, 0, y₄, y₅, y₆, y₇, y₈, y₉, y₁₀]

1169 . Coloring, {2, 4, 5, 7, 8, 12}

R: [7, 8, 7, 7, 3, A, A, B, B, C, 1, 9]

B: [6, 7, 8, 6, A, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 3, 0, 2, 3, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 3] , [2, 0, 0, 0, 0, 3, 0, 3, 2, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 0, 3, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 3, 0, 2, 3, 3, 3]] \$

[y₁, 0, y₃, 0, 0, 0, y₂, y₃, y₇, y₅, y₆, y₄]

$$p = s^2 - s^8$$

Omega Rank for B : cycles: {{2, 3, 4, 5, 6, 7, 8, 10, 11, 12}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 2, 2] , [0, 1, 2, 2, 2, 2, 2, 1, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 2, 1, 2, 0, 2, 2, 1] , [0, 2, 2, 2, 1, 1, 2, 2, 0, 1, 1, 2] , [0, 1, 1, 1, 2, 2, 2, 0, 1, 2, 2] , [0, 1, 2, 2, 2, 1, 1, 1, 0, 2, 2, 2] , [0, 2, 1, 2, 2, 2, 1, 2, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 2, 2, 1, 0, 2, 1, 2] , [0, 2, 2, 1, 2, 1, 2, 2, 0, 1, 2, 1] , [0, 1, 1, 2, 1, 1, 2, 2, 0, 2, 2, 2]] \$

[0, y₁, y₃, y₂, y₇, y₆, y₅, y₄, 0, y₉, y₈, y₁₀]

1170 . Coloring, {2, 4, 5, 7, 9, 10}

R: [7, 8, 7, 7, 3, A, A, C, C, 2, 1, 5]

B: [6, 7, 8, 6, A, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{2, 3, 5, 7, 8, 10, 12\}\}$ order: 7

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 3, 2, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 2, 3, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 2, 3, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 1, 3, 0, 2, 0, 3], [0, 2, 3, 0, 3, 0, 2, 2, 0, 1, 0, 3], [0, 1, 3, 0, 3, 0, 3, 2, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 3, 1, 0, 3, 0, 2]] \$$

$$[y_1, y_2, y_3, 0, y_4, 0, y_5, y_6, 0, y_7, 0, y_8]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 4, 2], [0, 0, 2, 4, 0, 2, 0, 1, 2, 0, 4, 1], [0, 0, 2, 4, 0, 4, 0, 2, 1, 0, 3, 0], [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0], [0, 0, 4, 3, 0, 3, 0, 4, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 0, 3, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0]] \$$

$$[0, 0, y_1, y_2, 0, y_3, y_6, y_4, y_5, y_6, y_7, y_8]$$

$$p = -s^4 + s^9$$

1171 . Coloring, $\{2, 4, 5, 7, 9, 11\}$

R: [7, 8, 7, 7, 3, A, A, C, C, C, 4, 5]

B: [6, 7, 8, 6, A, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	8 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2] , [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4]] \$$

$$[0, 0, y_1, 2y_4, y_6, 0, y_5, y_4, 0, y_3, 0, y_2]$$

$$p = -s^2 + s^7$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 4, 0] , [4, 1, 2, 0, 0, 2, 2, 1, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 1, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 0, 3, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0]] \$$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, 2y_7, y_7, y_8, 0]$$

$$p = -s^4 + s^9$$

1172 . Coloring, $\{2, 4, 5, 7, 9, 12\}$

R: [7, 8, 7, 7, 3, A, A, C, C, C, 1, 9]

B: [6, 7, 8, 6, A, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 4

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 3, 0, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[2 y₂, 0, y₂, 0, 0, 0, y₁, y₂, y₃, y₄, 0, y₅]

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 4, 0] , [0, 1, 2, 4, 0, 2, 2, 1, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 4, 1, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 2, 2, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 3, 0, 4, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 3, 0, 2, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 4, 0, 3, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 0, 3, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 2, 0, 4, 0, 0, 3, 0]] \$

[0, y₁, y₂, y₃, y₄, y₅, y₆, y₇, 0, y₈, y₉, 0]

1173 . Coloring, {2, 4, 5, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, A, C, B, 2, 4, 5]

B: [6, 7, 8, 6, A, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 9

Omega Rank for R : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 0, 3, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 3, 3, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 1, 3, 0, 3, 0, 3] , [0, 3, 2, 0, 3, 0, 1, 3, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 2, 3, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 3, 1, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 3, 1, 0, 3, 0, 1] , [0, 3, 3, 0, 1, 0, 3, 2, 0, 3, 0, 1]] \$

[0, y₁, y₂, y₃, y₄, 0, y₅, y₆, 0, y₇, y₈, y₉]

Omega Rank for B : cycles: $\{\{9, 12\}, \{1, 3, 6, 8, 11\}\}$ order: 10

See Matrix

$\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 3, 3], [3, 0, 2, 0, 0, 2, 0, 1, 3, 0, 2, 3], [2, 0, 2, 0, 0, 3, 0, 2, 3, 0, 1, 3], [1, 0, 3, 0, 0, 2, 0, 2, 3, 0, 2, 3], [2, 0, 2, 0, 0, 1, 0, 3, 3, 0, 2, 3], [2, 0, 1, 0, 0, 2, 0, 2, 3, 0, 3, 3], [3, 0, 2, 0, 0, 2, 0, 1, 3, 0, 2, 3], [2, 0, 2, 0, 0, 3, 0, 2, 3, 0, 1, 3], [1, 0, 3, 0, 0, 2, 0, 2, 3, 0, 2, 3]] \$$

$[-3 y_1 - 3 y_2 - 3 y_4 - 3 y_3 - 3 y_6 + 10 y_5, 0, 3 y_1, 0, 0, 3 y_2, 3 y_3, 3 y_4, -3 y_3 + 3 y_5, 3 y_3, 3 y_6, 3 y_5]$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7 \quad p'' = -s^3 + s^8$$

1174 . Coloring, $\{2, 4, 5, 7, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, A, C, B, 2, 1, 9]

B: [6, 7, 8, 6, A, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 3, 2, 1, 3, 2, 1], [2, 3, 0, 0, 0, 0, 1, 3, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 2, 3, 2, 1, 1, 3], [1, 1, 0, 0, 0, 0, 1, 3, 3, 2, 2, 3], [2, 2, 0, 0, 0, 0, 1, 1, 3, 1, 3, 3], [3, 1, 0, 0, 0, 0, 2, 2, 3, 1, 3, 1], [3, 1, 0, 0, 0, 0, 3, 1, 1, 2, 3, 2], [3, 2, 0, 0, 0, 0, 3, 1, 2, 3, 1, 1]] \$$

$[y_2, y_1, y_7, 0, 0, 0, y_6, y_3, y_4, y_5, y_9, y_8]$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}, \{5, 10, 12\}\}$

See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 0, 1, 0, 2, 2, 1], [0, 0, 2, 2, 1, 3, 0, 2, 0, 3, 1, 2], [0, 0, 3, 1, 2, 2, 0, 2, 0, 1, 2, 3], [0, 0, 2, 2, 3, 1, 0, 3, 0, 2, 2, 1], [0, 0, 1, 2, 1, 2, 0, 2, 0, 3, 3, 2], [0, 0, 2, 3, 2, 2, 0, 1, 0, 1, 2, 3], [0, 0, 2, 2, 3, 3, 0, 2, 0, 2, 1, 1], [0, 0, 3, 1, 1, 2, 0, 2, 0, 3, 2, 2]] \$$

$$[0, 0, -3y_3 + 5y_4 - 3y_1 - 3y_2 - 3y_6 + 5y_5 - 3y_7 + 5y_8, 3y_3, 3y_4, 3y_1, 3y_2, 3y_6, 0, 3y_5, 3y_7, 3y_8]$$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

1175 . Coloring, {2, 4, 5, 7, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, A, C, B, C, 4, 9]

B: [6, 7, 8, 6, A, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6
See Matrix

$$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 1, 3], [0, 0, 0, 1, 0, 0, 3, 0, 3, 3, 2, 4], [0, 0, 0, 2, 0, 0, 1, 0, 4, 3, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 2, 3, 1], [0, 0, 0, 3, 0, 0, 4, 0, 1, 3, 3, 2], [0, 0, 0, 3, 0, 0, 3, 0, 2, 4, 1, 3], [0, 0, 0, 1, 0, 0, 3, 0, 3, 3, 2, 4]] \$$$

$$[0, 0, y_7, y_6, 0, 0, y_5, y_7, y_4, y_3, y_2, y_1]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 10
See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 3, 1], [3, 1, 2, 0, 1, 2, 2, 1, 0, 2, 2, 0], [2, 2, 2, 0, 0, 3, 1, 2, 0, 1, 3, 0], [3, 1, 3, 0, 0, 2, 2, 0, 0, 3, 0], [3, 0, 2, 0, 0, 3, 1, 3, 0, 0, 4, 0], [4, 0, 3, 0, 0, 3, 0, 2, 0, 0, 4, 0], [4, 0, 3, 0, 0, 4, 0, 3, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 0, 3, 0, 0, 3, 0], [3, 0, 4, 0, 0, 2, 0, 4, 0, 0, 3, 0], [3, 0, 2, 0, 0, 3, 0, 4, 0, 0, 4, 0]] \$$$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9, y_{10}]$$

1176 . Coloring, {2, 4, 5, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, B, B, C, 2, 1, 5]

B: [6, 7, 8, 6, A, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 3, 1], [3, 1, 2, 0, 1, 0, 3, 2, 0, 0, 4, 0], [4, 0, 1, 0, 0, 0, 5, 1, 0, 0, 5, 0], [5, 0, \\ & 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, \\ & 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$ \end{aligned}$$

$$[y_1, y_2, y_4, 0, y_2, 0, y_3, y_4, 0, y_6, y_5, y_6]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 1, 3], [0, 0, 2, 1, 0, 2, 0, 1, 3, 1, 2, 4], [0, 0, 2, 2, 0, 1, 0, 2, 4, 0, 3, 2], [0, 0, \\ & 1, 3, 0, 2, 0, 2, 2, 0, 4, 2], [0, 0, 2, 4, 0, 3, 0, 1, 2, 0, 2, 2], [0, 0, 3, 2, 0, 4, 0, 2, 2, 0, 2, 1], [0, 0, 4, 2, 0, 2, \\ & 0, 3, 1, 0, 2, 2], [0, 0, 2, 2, 0, 2, 0, 4, 2, 0, 1, 3], [0, 0, 2, 1, 0, 2, 0, 2, 3, 0, 2, 4]] \$ \end{aligned}$$

$$[0, 0, y_4, y_3, 0, y_2, y_1, y_9, y_8, y_7, y_6, y_5]$$

1177 . Coloring, {2, 4, 5, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, B, B, C, C, 4, 5]

B: [6, 7, 8, 6, A, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 3, 3], [0, 0, 2, 3, 3, 0, 3, 0, 0, 0, 4, 1], [0, 0, 3, 4, 1, 0, 5, 0, 0, 0, 3, 0], [0, 0, 1, 3, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0]] \$$$

$$[0, 0, y_1, y_2, y_3, 0, y_4, y_5, 0, y_5, y_6, y_7]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}, {2, 7, 10}}

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 1, 1], [1, 3, 2, 0, 0, 2, 2, 1, 1, 1, 2, 1], [2, 1, 2, 0, 0, 1, 3, 2, 1, 2, 1, 1], [1, 2, 1, 0, 0, 2, 1, 2, 1, 3, 1, 2], [1, 3, 2, 0, 0, 1, 2, 1, 2, 1, 1, 2], [1, 1, 1, 0, 0, 1, 3, 2, 2, 2, 2, 1], [2, 2, 1, 0, 0, 1, 1, 1, 1, 3, 2, 2], [2, 3, 1, 0, 0, 2, 2, 1, 2, 1, 1, 1], [1, 1, 2, 0, 0, 2, 3, 1, 1, 2, 2, 1], [2, 2, 2, 0, 0, 1, 1, 2, 1, 3, 1, 1]] \$$$

$$[5y_1 - 3y_2 - 3y_3 + 5y_7 - 3y_6 - 3y_5 + 5y_4 - 3y_8 - 3y_9, 3y_1, 3y_2, 0, 0, 3y_3, 3y_7, 3y_6, 3y_5, 3y_4, 3y_8, 3y_9]$$

$$p = -s - s^2 - s^3 + s^8 + s^9 + s^{10}$$

1178 . Coloring, {2, 4, 5, 8, 9, 12}

$$\Omega p(\Delta)=0: p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, B, B, C, C, 1, 9]

B: [6, 7, 8, 6, A, 3, A, C, B, 2, 4, 5]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	4 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3]] \$$

$$[-6y_2 - 3y_1 + 10y_4 - 3y_3, 0, 3y_2, 0, 0, 0, 3y_1, 3y_2, -3y_2 + 3y_4, 3y_2, 3y_3, 3y_4]$$

$$p' = -s^2 + s^5 \quad p' = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p = s^2 - s^5$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 9

See Matrix

$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 2, 1, 0, 3, 0, 1], [0, 3, 2, 0, 1, 1, 3, 2, 0, 3, 0, 1], [0, 3, 1, 0, 1, 0, 3, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 3, 1, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 4, 0, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$

$$[0, y_{10}, y_9, y_8, y_7, y_6, y_5, y_4, 0, y_3, y_2, y_1]$$

1179 . Coloring, $\{2, 4, 5, 8, 10, 11\}$

R: [7, 8, 7, 7, 3, A, B, B, B, 2, 4, 5]

B: [6, 7, 8, 6, A, 3, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	5 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 4, 0] , [0, 1, 2, 4, 0, 0, 3, 2, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$

$$[0, y_2, 2y_2 - 3y_4, y_1, 2y_4, 0, y_6, y_5, 0, y_4, y_3, 0]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 0, 4] , [0, 0, 2, 0, 0, 2, 0, 1, 4, 1, 0, 6] , [0, 0, 2, 0, 0, 0, 0, 2, 6, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[2y_1, 0, -7y_1 + y_2 + y_3 + 3y_4 - y_5, 0, 0, -4y_1 + 2y_4, y_1, y_2, y_3, y_4, 0, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7 \quad p = -s^5 + s^8$$

1180 . Coloring, {2, 4, 5, 8, 10, 12}

R: [7, 8, 7, 7, 3, A, B, B, B, 2, 1, 9]

B: [6, 7, 8, 6, A, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 3, 2, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 1, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_1, y_2, y_5, 0, 0, 0, y_3, y_6, 2y_5, y_5, y_4, 0]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 0, 4], [0, 0, 2, 0, 4, 2, 0, 1, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 0, 2, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 0, 2, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$$$

$$[0, 0, y_3, 2y_4, y_1, y_2, y_4, y_5, 0, y_6, 0, y_7]$$

$$p = s^5 - s^8$$

1181 . Coloring, {2, 4, 5, 8, 11, 12}

R: [7, 8, 7, 7, 3, A, B, B, B, C, 4, 9]

B: [6, 7, 8, 6, A, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 6, 1], [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[0, 0, y_3, y_1, 0, 0, y_6, y_3, y_2, y_3, y_4, y_5]$$

$$p = s^4 - s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 2, 2, 1, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 3, 2, 0, 4, 0, 1] , [0, 4, 0, 0, 1, 0, 3, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 4, 0, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 0, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, 0, y_9]$$

1182 . Coloring, {2, 4, 5, 9, 10, 11}

R: [7, 8, 7, 7, 3, A, B, C, C, 2, 4, 5]

B: [6, 7, 8, 6, A, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 9

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 2, 2] , [0, 1, 2, 2, 2, 0, 3, 2, 0, 0, 3, 1] , [0, 0, 2, 3, 1, 0, 4, 1, 0, 0, 3, 2] , [0, 0, 1, 3, 2, 0, 5, 0, 0, 0, 4, 1] , [0, 0, 2, 4, 1, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 1, 5, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$$[0, y_1, y_2, y_3, y_4, 0, y_5, y_6, 0, y_9, y_7, y_8]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 2, 2] , [2, 0, 2, 0, 0, 2, 0, 1, 2, 1, 3, 3] , [3, 0, 2, 0, 0, 2, 0, 2, 3, 0, 3, 1] , [3, 0, 2, 0, 0, 3, 0, 2, 1, 0, 5, 0] , [5, 0, 3, 0, 0, 3, 0, 2, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 5, 0, 3, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 3, 0, 3, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 2, 0, 5, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 3, 0, 3, 0, 0, 5, 0]] \$

$$[y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

1183 . Coloring, {2, 4, 5, 9, 10, 12}

R: [7, 8, 7, 7, 3, A, B, C, C, 2, 1, 9]
B: [6, 7, 8, 6, A, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6
 See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 2, 2] , [2, 1, 0, 0, 0, 0, 3, 2, 2, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 1, 3, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0] , [3, 0, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4]] \$

$$[y_4 - y_1 + 2y_2 + 2y_3 - y_5, y_4 + y_2 + y_3 - y_6, y_4, 0, 0, 0, y_1, y_2, y_3, y_4, y_5, y_6]$$

$$p' = s^5 - s^8 \quad p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}, {5, 10, 12}}
 See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 2, 2] , [0, 0, 2, 2, 2, 2, 0, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 2, 0, 2, 0, 2, 1, 3] , [0, 0, 2, 1, 3, 1, 0, 2, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 1, 0, 2, 0, 3, 2, 3] , [0, 0, 1, 2, 3, 2, 0, 1, 0, 2, 2, 3] , [0, 0, 2, 2, 3, 2, 0, 1, 0, 3, 1, 2] , [0, 0, 2, 1, 2, 2, 0, 2, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 1, 0, 2, 0, 2, 2, 3]] \$

$$[0, 0, -y_1 + y_2 - y_3 + y_4 - y_5 + y_6 - y_7 + y_8, y_1, y_2, y_3, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

1184 . Coloring, {2, 4, 5, 9, 11, 12}

R: [7, 8, 7, 7, 3, A, B, C, C, C, 4, 9]
B: [6, 7, 8, 6, A, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{9, 12\}\}$ order: 6
See Matrix

$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4]] \$$

$$[0, 0, y_2, -y_2 - y_1 + 2y_4 - y_3, 0, 0, y_1, y_2, -2y_2 + y_4, y_2, y_3, y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^3 + s^6 \quad p = -s^2 + s^8 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}, \{2, 7, 10\}\}$
See Matrix

$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 2, 0], [2, 3, 2, 0, 0, 2, 2, 1, 0, 3, 1, 0], [1, 3, 2, 0, 0, 2, 3, 2, 0, 2, 1, 0], [1, 2, 2, 0, 0, 1, 3, 2, 0, 3, 2, 0], [2, 3, 1, 0, 0, 1, 2, 2, 0, 3, 2, 0], [2, 3, 1, 0, 0, 2, 3, 1, 0, 2, 2, 0], [2, 2, 2, 0, 0, 2, 3, 1, 0, 3, 1, 0], [1, 3, 2, 0, 0, 2, 2, 2, 0, 3, 1, 0], [1, 3, 2, 0, 0, 1, 3, 2, 0, 2, 2, 0]] \$$

$$[y_1 - y_2 + y_5 - y_6 + y_4 - y_3 + y_7 - y_8, y_1, y_2, 0, y_5, y_6, y_4, y_3, 0, y_7, y_8, 0]$$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

1185 . Coloring, $\{2, 4, 5, 10, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, B, C, B, 2, 4, 9]

B: [6, 7, 8, 6, A, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 3, 2, 1, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 3, 1, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0]] \$

[0, y₂, y₆, y₁, 0, 0, y₃, y₄, y₅, y₆, y₈, y₇]

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {5, 10, 12}}
See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 1, 0, 2, 0, 3, 1, 3] , [1, 0, 1, 0, 3, 1, 0, 2, 0, 3, 2, 3] , [2, 0, 1, 0, 3, 1, 0, 1, 0, 3, 2, 3] , [2, 0, 1, 0, 3, 2, 0, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 1, 0, 2, 0, 3, 1, 3] , [1, 0, 1, 0, 3, 1, 0, 2, 0, 3, 2, 3]] \$

[3 y₆, 0, 3 y₅, 0, 3 y₄, 3 y₃, 3 y₂, 3 y₁, 0, 3 y₄ + 3 y₂, -3 y₆ - 3 y₅ + 7 y₄ - 3 y₃ + 7 y₂ - 3 y₁, 3 y₄ + 3 y₂]

$$p' = s^2 - s^7 \quad p = s^2 - s^7 \quad p' = s^3 - s^8$$

1186 . Coloring, {2, 4, 6, 7, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, 3, A, B, C, C, 1, 5]

B: [6, 7, 8, 6, 3, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 1, 3] , [1, 0, 0, 0, 3, 0, 3, 0, 0, 5, 1, 3] , [1, 0, 0, 0, 3, 0, 1, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 0]] \$

0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

[y₂, 0, y₄, 0, y₁, 0, y₃, y₄, 0, y₅, y₆, y₇]

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 2, 2, 1, 1, 2, 3, 1] , [0, 2, 0, 3, 0, 3, 1, 0, 1, 2, 3, 1] , [0, 2, 0, 3, 0, 3, 2, 0, 1, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 2, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 2, 3, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 2, 3, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 3, 2, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 3, 0, 0, 3, 2, 0]] \$

[0, y₃, y₁, y₂, 0, y₉, y₁₀, y₈, y₆, y₇, y₅, y₄]

1187 . Coloring, {2, 4, 6, 7, 8, 10}

R: [7, 8, 7, 7, A, 3, A, B, B, 2, 1, 5]

B: [6, 7, 8, 6, 3, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 3, 2, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 2, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 1, 5, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 2, 3, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 3, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 5, 1, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 3, 2, 0, 5, 1, 0]] \$

[y₁, y₃, y₂, 0, 2 y₂, 0, y₆, y₇, 0, y₄, y₅, 0]

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 1, 4, 2, 1, 4] , [0, 0, 0, 1, 0, 2, 0, 0, 4, 2, 0, 7] , [0, 0, 0, 0, 1, 0, 0, 7, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, 0, -y_1 + y_4, y_6, 0, y_7, -y_1 + y_4, y_1, y_2, y_3, y_4, y_5]$$

$$p' = s^6 - s^8 \quad p = -s^6 + s^8$$

1188 . Coloring, {2, 4, 6, 7, 8, 11}

R: [7, 8, 7, 7, A, 3, A, B, B, C, 4, 5]

B: [6, 7, 8, 6, 3, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 2, 2] , [0, 0, 0, 2, 2, 0, 3, 0, 0, 5, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[0, 0, y_4, y_1, y_2, 0, y_3, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 2, 2] , [2, 1, 0, 0, 0, 2, 2, 1, 2, 2, 1, 3] , [1, 2, 0, 0, 0, 2, 1, 0, 3, 2, 2, 3] , [2, 2, 0, 0, 0, 1, 2, 0, 3, 2, 1, 3] , [1, 2, 0, 0, 0, 2, 2, 0, 3, 1, 2, 3] , [2, 1, 0, 0, 0, 1, 2, 0, 3, 2, 2, 3] , [2, 2, 0, 0, 0, 2, 1, 0, 3, 1, 2, 3] , [2, 1, 0, 0, 0, 2, 2, 0, 3, 2, 1, 3] , [1, 2, 0, 0, 0, 2, 1, 0, 3, 2, 2, 3] , [2, 2, 0, 0, 0, 1, 2, 0, 3, 2, 1, 3]] \$

$$[3 y_3, 3 y_2, 3 y_8 + 3 y_7 - 3 y_4, 0, 0, 3 y_1, -3 y_3 - 3 y_2 - 3 y_1 + 10 y_8 + 10 y_7 - 3 y_6 - 3 y_5, 3 y_8, 3 y_7, 3 y_6, 3 y_5, 3 y_4]$$

$$p' = s^3 - s^9 \quad p = s^3 - s^9$$

1189 . Coloring, {2, 4, 6, 7, 8, 12}

R: [7, 8, 7, 7, A, 3, A, B, B, C, 1, 9]

B: [6, 7, 8, 6, 3, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 10

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 2, 2], [2, 0, 0, 0, 0, 0, 3, 0, 2, 3, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 3], [2, 0, 0, 0, 0, 0, 3, 0, 3, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 3, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 2], [2, 0, 0, 0, 0, 0, 3, 0, 2, 3, 3, 3]] \$$$

$$[y_1, 0, y_2, 0, 0, 0, y_3, y_2, y_7, y_6, y_5, y_4]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}, {3, 5, 8, 12}} order: 12

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 2, 2], [0, 1, 2, 2, 2, 2, 2, 1, 0, 2, 1, 1], [0, 2, 2, 1, 1, 2, 1, 2, 0, 2, 2, 1], [0, 2, 1, 2, 1, 2, 2, 0, 2, 1, 2], [0, 2, 1, 1, 2, 2, 2, 1, 0, 1, 2, 2], [0, 1, 2, 2, 2, 1, 2, 1, 0, 2, 2, 1], [0, 2, 2, 2, 1, 2, 1, 2, 0, 1, 2, 1], [0, 1, 1, 2, 1, 2, 2, 2, 0, 2, 1, 2], [0, 2, 1, 1, 2, 2, 1, 1, 0, 2, 2, 2], [0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 1, 1]] \$$$

$$[0, 3 y_1, 3 y_2 + 3 y_4 - 3 y_8, -3 y_1 + 10 y_2 - 3 y_5 - 3 y_3 + 10 y_4 - 3 y_6 - 3 y_7, 3 y_2, 3 y_5, 3 y_3, 3 y_4, 0, 3 y_6, 3 y_7, 3 y_8]$$

$$p = -s - s^3 + s^7 + s^9 \quad p' = -s - s^3 + s^7 + s^9$$

1190 . Coloring, {2, 4, 6, 7, 9, 10}

R: [7, 8, 7, 7, A, 3, A, C, C, 2, 1, 5]

B: [6, 7, 8, 6, 3, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 3, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 3, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 5, 0, 1, 0, 3] , [0, 1, 0, 0, 3, 0, 0, 5, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 1, 0, 3, 0, 5] , [0, 3, 0, 0, 5, 0, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 3, 0, 5, 0, 2]] \$

[2 y₃, y₂, y₃, 0, y₁, 0, y₆, y₇, 0, y₅, 0, y₄]

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 1, 2, 2, 4, 1] , [0, 0, 0, 4, 0, 4, 0, 0, 1, 2, 3, 2] , [0, 0, 0, 3, 0, 4, 0, 0, 2, 4, 1, 2] , [0, 0, 0, 1, 0, 3, 0, 0, 2, 4, 2, 4] , [0, 0, 0, 2, 0, 1, 0, 0, 4, 3, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 1, 4, 3] , [0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 4, 1] , [0, 0, 0, 4, 0, 4, 0, 0, 1, 2, 3, 2]] \$

[0, 0, y₃, y₁, 0, y₂, y₃, y₄, y₅, y₆, y₇, y₈]

$$p = -s^3 + s^9$$

1191 . Coloring, {2, 4, 6, 7, 9, 11}

R: [7, 8, 7, 7, A, 3, A, C, C, C, 4, 5]

B: [6, 7, 8, 6, 3, A, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	8 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 0, 4] , [0, 0, 0, 0, 4, 0, 3, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$$

$[0, 0, y_3, 2 y_3, y_1, 0, y_2, y_3, 0, y_4, 0, y_5]$

$$p = s^3 - s^6 \quad p' = s^3 - s^6$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 7, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 4, 0] , [4, 1, 0, 0, 0, 2, 2, 1, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 4, 1, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 4, 2, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 3, 2, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 1, 4, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 4, 0, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 2, 3, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 4, 1, 0, 0, 2, 3, 0]] \$$

$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, 2 y_3, y_7, y_8, 0]$

$$p = -s^3 + s^9$$

1192 . Coloring, $\{2, 4, 6, 7, 9, 12\}$

R: [7, 8, 7, 7, A, 3, A, C, C, C, 1, 9]

B: [6, 7, 8, 6, 3, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 3, 0, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[2 y₂, 0, y₂, 0, 0, 0, y₁, y₂, y₃, y₄, 0, y₅]

$$p' = -s^4 + s^6 \quad p = -s^4 + s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 4, 0] , [0, 1, 2, 4, 0, 2, 2, 1, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 1, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 2, 2, 0, 0, 4, 3, 0] , [0, 4, 0, 3, 0, 3, 2, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 3, 4, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 2, 0, 0, 3, 4, 0] , [0, 3, 0, 4, 0, 2, 3, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 3, 0, 0, 2, 3, 0]] \$

[0, y₁, y₂, y₃, y₄, y₆, y₇, y₈, 0, y₅, y₉, 0]

1193 . Coloring, {2, 4, 6, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, 3, A, C, B, 2, 4, 5]

B: [6, 7, 8, 6, 3, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 1, 1] , [0, 3, 0, 1, 1, 0, 3, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 1, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 5, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 4, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 2, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 2, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 5, 0, 2, 0, 3]] \$

$$[0, y_2, y_8, y_1, y_3, 0, y_6, y_4, 0, y_5, y_8, y_7]$$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 2, 0, 1, 3, 2, 2, 3], [2, 0, 0, 0, 0, 3, 0, 0, 3, 2, 1, 5], [1, 0, 0, 0, 0, 2, 0, 0, 5, 3, 0, 5], [0, 0, 0, 0, 0, 1, 0, 0, 5, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[y_1, 0, y_3, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p = s^7 - s^9$$

1194 . Coloring, {2, 4, 6, 7, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, A, C, B, 2, 1, 9]

B: [6, 7, 8, 6, 3, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 9

Omega Rank for R : cycles: {{1, 2, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 3, 2, 1, 3, 2, 1], [2, 3, 0, 0, 0, 0, 1, 3, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 2, 3, 2, 1, 1, 3], [1, 1, 0, 0, 0, 0, 1, 3, 3, 2, 2, 3], [2, 2, 0, 0, 0, 0, 1, 1, 3, 1, 3, 3], [3, 1, 0, 0, 0, 0, 2, 2, 3, 1, 3, 1], [3, 1, 0, 0, 0, 0, 3, 1, 1, 2, 3, 2], [3, 2, 0, 0, 0, 0, 3, 1, 2, 3, 1, 1]] \$$$

$$[y_1, y_2, y_3, 0, 0, 0, y_4, y_7, y_5, y_6, y_8, y_9]$$

Omega Rank for B : cycles: {{3, 4, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 2, 0, 1, 0, 2, 2, 1] , [0, 0, 3, 2, 1, 3, 0, 2, 0, 2, 1, 2] , [0, 0, 1, 1, 2, 2, 0, 3, 0, 3, 2, 2] , [0, 0, 2, 2, 2, 1, 0, 1, 0, 2, 3, 3] , [0, 0, 2, 3, 3, 2, 0, 2, 0, 1, 1, 2] , [0, 0, 3, 1, 2, 3, 0, 2, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 1, 0, 3, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 2, 0, 2, 0, 1, 3, 3]] \$

$$[0, 0, y_4, y_2, y_3, y_1, y_5, y_6, 0, y_7, y_8, y_9]$$

1195 . Coloring, {2, 4, 6, 7, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, A, C, B, C, 4, 9]

B: [6, 7, 8, 6, 3, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 0, 1, 0, 4, 3, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 2, 3, 1] , [0, 0, 0, 3, 0, 0, 4, 0, 1, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 3, 2, 4]] \$

$$[0, 0, y_4, y_3, 0, 0, y_2, y_4, y_1, y_6, y_5, y_7]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 2, 1, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 3, 1, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 2, 1, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 2, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 3, 0, 0, 3, 3, 0]] \$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, y_{10}, y_9]$$

1196 . Coloring, {2, 4, 6, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, B, B, C, 2, 1, 5]

B: [6, 7, 8, 6, 3, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 3, 1], [3, 1, 0, 0, 1, 0, 3, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 3, 1, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 4, 2, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 5, 1, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$$$

$$[y_1, y_2, y_8, 0, y_3, 0, y_5, y_4, 0, y_6, y_7, y_8]$$

$$p = s^6 - s^9$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 1, 3], [0, 0, 0, 1, 0, 2, 0, 1, 3, 3, 2, 4], [0, 0, 0, 2, 0, 1, 0, 0, 4, 2, 3, 4], [0, 0, 0, 3, 0, 2, 0, 0, 4, 1, 4, 2], [0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 4, 1], [0, 0, 0, 4, 0, 4, 0, 0, 1, 3, 2, 2], [0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 1, 3], [0, 0, 0, 1, 0, 2, 0, 0, 3, 4, 2, 4], [0, 0, 0, 2, 0, 1, 0, 0, 4, 2, 3, 4]] \$$$

$$[0, 0, y_2, y_1 + 2y_2 - y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

1197 . Coloring, {2, 4, 6, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, B, B, C, C, 4, 5]

B: [6, 7, 8, 6, 3, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	4 vs 8	10 vs 10

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 3, 3] , [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 4, 1] , [0, 0, 0, 4, 1, 0, 3, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 3, 3] , [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 4, 1] , [0, 0, 0, 4, 1, 0, 3, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 3, 3] , [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 4, 1]] \$

[0, 0, y_1 , $-7y_1 - 6y_2 + 4y_4 + 5y_3$, $5y_1 + 5y_2 - 2y_4 - 4y_3$, 0, y_2 , y_1 , 0, $-8y_1 - 8y_2 + 5y_4 + 6y_3$, y_4, y_3]

$$p' = -s^4 + s^7 \quad p' = -s^3 + s^6 \quad p' = s^2 - s^5 \quad p = s^2 - s^5$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 2, 2, 1, 1, 3, 2, 1] , [2, 3, 0, 0, 0, 1, 3, 0, 1, 4, 1, 1] , [1, 4, 0, 0, 0, 2, 3, 0, 1, 4, 1, 0] , [1, 4, 0, 0, 0, 1, 4, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

[$y_1, y_2, y_3, 0, 0, y_4, y_8, y_9, y_7, y_{10}, y_5, y_6$]

1198 . Coloring, {2, 4, 6, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, B, B, C, C, 1, 9]

B: [6, 7, 8, 6, 3, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	4 vs 8	9 vs 10

Omega Rank for R : cycles: $\{\{9, 12\}, \{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3]] \$$

$$[3 y_4, 0, 3 y_3, 0, 0, 0, 3 y_2, 3 y_3, 3 y_1, 3 y_3, -3 y_4 + 4 y_3 - 3 y_2 + 10 y_1, 3 y_3 + 3 y_1]$$

$$p' = -s^3 + s^6 \quad p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}, \{2, 7, 10\}\}$ order: 12

See Matrix

$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 2, 1, 0, 3, 0, 1], [0, 3, 1, 0, 1, 1, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 1, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 4, 1, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 4, 1, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 4, 1, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 4, 1, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 3, 1, 0, 4, 0, 1]] \$$

$$[0, 11 y_6 - 5 y_4 + 11 y_5 - 5 y_3 - 5 y_1 + 11 y_2 - 5 y_8 - 5 y_9 + 11 y_7, 5 y_6, 5 y_4, 5 y_5, 5 y_3, 5 y_1, 5 y_2, 0, 5 y_8, 5 y_9, 5 y_7]$$

$$p = -s^4 - s^5 - s^6 + s^8 + s^9 + s^{10}$$

1199 . Coloring, $\{2, 4, 6, 8, 10, 11\}$

R: [7, 8, 7, 7, A, 3, B, B, B, 2, 4, 5]

B: [6, 7, 8, 6, 3, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	4 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 3, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 4, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 2, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, y_4, y_5, y_6, 2y_5, 0, y_7, y_1, 0, y_2, y_3, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 4
See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 1, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[2y_3, 0, y_3, 0, 0, 2y_2, y_3, y_2, y_1, y_2 - y_1 + y_4, 0, y_4]$$

$$p' = s^4 - s^6 \quad p = s^4 - s^7 \quad p' = -s^6 + s^7 \quad p' = s^5 - s^6$$

1200 . Coloring, {2, 4, 6, 8, 10, 12}

R: [7, 8, 7, 7, A, 3, B, B, B, 2, 1, 9]

B: [6, 7, 8, 6, 3, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	4 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 3, 2, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 1, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_2, y_1, y_4, 0, 0, 0, y_6, y_5, 2y_4, y_4, y_3, 0]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 2, 0, 1, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 2, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$

$$[0, 0, -y_1 + y_3 - y_2, 2y_1, -2y_1 + y_3, y_2, y_1, y_3 - y_4, 0, y_4, 0, y_3]$$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6 \quad p = -s^4 + s^7 \quad p = -s^4 + s^8$$

1201 . Coloring, {2, 4, 6, 8, 11, 12}

R: [7, 8, 7, 7, A, 3, B, B, B, C, 4, 9]

B: [6, 7, 8, 6, 3, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_4, y_1, 0, 0, y_2, y_4, y_3, y_4, y_5, y_6]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}, \{2, 7, 10\}\}$ order: 12

See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 2, 2, 1, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 2, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 4, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 3, 1, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 3, 2, 0, 3, 0, 1], [0, 3, 1, 0, 1, 0, 4, 2, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 3, 1, 0, 4, 0, 2]] \$$$

$$[-3y_1 + 10y_2 - 3y_3 - 3y_4 + 10y_5 - 3y_6, 3y_1, 3y_2 + 3y_5 - 3y_7, 0, 3y_2, 3y_3, 3y_4, 3y_5, 0, 3y_6, 0, 3y_7]$$

$$p = -s^3 - s^5 + s^6 + s^8 \quad p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9$$

1202 . Coloring, $\{2, 4, 6, 9, 10, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^4 - 16s^8 \quad p' = s^4 - 8s^7 \quad p' = s^5 - 4s^7 \quad p' = s^6 - 2s^7$$

R: $[7, 8, 7, 7, A, 3, B, C, C, 2, 4, 5]$

B: $[6, 7, 8, 6, 3, A, A, B, B, C, 1, 9]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{2, 5, 8, 10, 12\}\}$

See Matrix

$$\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 2, 2], [0, 1, 0, 2, 2, 0, 3, 2, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 2, 1, 0, 2, 3, 2], [0, 2, 0, 3, 2, 0, 3, 2, 0, 1, 2, 1], [0, 1, 0, 2, 1, 0, 3, 2, 0, 2, 3, 2], [0, 2, 0, 3, 2, 0, 2, 1, 0, 1, 3, 2], [0, 1, 0, 3, 2, 0, 3, 2, 0, 2, 2, 1], [0, 2, 0, 2, 1, 0, 3, 1, 0, 2, 3, 2], [0, 2, 0, 3, 2, 0, 2, 2, 0, 1, 3, 1]] \$$$

$$[0, y_1 + y_2 - y_6 + y_5 - y_3 - y_4 + y_8 - y_7, y_1, y_2, y_6, 0, y_5, y_3, 0, y_4, y_8, y_7]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: $\{\{1, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 2, 2], [2, 0, 0, 0, 0, 2, 0, 1, 2, 3, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 3, 3], [3, 0, 0, 0, 0, 3, 0, 0, 3, 2, 3, 2], [3, 0, 0, 0, 0, 3, 0, 0, 2, 3, 3, 2], [3, 0, 0, 0, 0, 3, 0, 0, 2, 3, 2, 3], [2, 0, 0, 0, 0, 3, 0, 0, 3, 3, 2, 3], [2, 0, 0, 0, 0, 2, 0, 0, 3, 3, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 3, 3]] \$$

$$[2y_5 + y_7 - y_6 - y_4 - y_2 + y_3 + y_1, 0, y_5, 0, 0, y_7, y_5, y_6, y_4, y_2, y_3, y_1]$$

$$p = s^3 - s^9 \quad p' = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1203 . Coloring, $\{2, 4, 6, 9, 10, 12\}$

R: $[7, 8, 7, 7, A, 3, B, C, C, 2, 1, 9]$

B: $[6, 7, 8, 6, 3, A, A, B, B, C, 4, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 2, 2], [2, 1, 0, 0, 0, 0, 3, 2, 2, 0, 3, 3], [3, 0, 0, 0, 0, 0, 2, 1, 3, 0, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4], [3, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 4], [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 3, 4]] \$$

$$[y_4 - y_1 + 2y_2 + 2y_3 - y_5, y_4 + y_2 + y_3 - y_6, y_4, 0, 0, 0, y_1, y_2, y_3, y_4, y_5, y_6]$$

$$p' = -s^5 + s^8 \quad p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{3, 4, 5, 6, 8, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 2, 2], [0, 0, 2, 2, 2, 2, 0, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 0, 2, 0, 2, 1, 3], [0, 0, 3, 1, 3, 1, 0, 2, 0, 2, 2, 2], [0, 0, 3, 2, 2, 1, 0, 3, 0, 1, 2, 2], [0, 0, 2, 2, 2, 2, 0, 3, 0, 1, 3, 1], [0, 0, 2, 3, 1, 2, 0, 2, 0, 2, 3, 1], [0, 0, 1, 3, 1, 3, 0, 2, 0, 2, 2, 2], [0, 0, 1, 2, 2, 3, 0, 1, 0, 3, 2, 2]] \$$

$$[0, 0, y_5 + y_6 - y_2 - y_3, -y_1 + y_5 + y_6, y_1, y_2, y_3, -y_4 + y_5 + y_6, 0, y_4, y_5, y_6]$$

$$p' = s^3 - s^4 + s^7 - s^8 \quad p' = s^2 - s^4 + s^6 - s^8 \quad p = s^2 - s^5 + s^6 - s^9$$

1204 . Coloring, {2, 4, 6, 9, 11, 12}

R: [7, 8, 7, 7, A, 3, B, C, C, C, 4, 9]

B: [6, 7, 8, 6, 3, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4]] \$$$

$$[0, 0, y_2, -y_2 - y_1 - y_3 + 2y_4, 0, 0, y_1, y_2, -2y_2 + y_4, y_2, y_3, y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p' = -s^3 + s^6 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 2, 0], [2, 3, 2, 0, 0, 2, 2, 1, 0, 3, 1, 0], [1, 3, 0, 0, 0, 2, 3, 2, 0, 4, 1, 0], [1, 4, 0, 0, 0, 1, 3, 0, 0, 5, 2, 0], [2, 5, 0, 0, 0, 1, 4, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 2, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0]] \$$$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9, 0]$$

1205 . Coloring, {2, 4, 6, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, B, C, B, 2, 4, 9]

B: [6, 7, 8, 6, 3, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 3, 2, 1, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 3, 1, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0]] \$

[0, y₂, y₅, y₁, 0, 0, y₈, y₇, y₆, y₅, y₄, y₃]

$$p = s^6 - s^9$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 1, 0, 3, 1, 3] , [1, 0, 3, 0, 3, 1, 0, 2, 0, 2, 1, 3] , [1, 0, 3, 0, 3, 1, 0, 3, 0, 1, 2, 2] , [2, 0, 3, 0, 2, 1, 0, 3, 0, 1, 3, 1] , [3, 0, 2, 0, 1, 2, 0, 3, 0, 1, 3, 1] , [3, 0, 1, 0, 1, 3, 0, 2, 0, 2, 3, 1] , [3, 0, 1, 0, 1, 3, 0, 1, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 3, 0, 1, 0, 3, 1, 3]] \$

[-y₃ + y₄ + y₅, 0, y₂, 0, y₃, y₁, y₄ + y₅ - y₂ - y₁, y₄ + y₅ - y₆, 0, y₆, y₄, y₅]

$$p = -s^2 + s^4 - s^6 + s^8 \quad p = -s^2 + s^5 - s^6 + s^9 \quad p = -s^2 + s^3 - s^6 + s^7$$

1206 . Coloring, {2, 4, 7, 8, 9, 10}

R: [7, 8, 7, 7, A, A, A, B, C, 2, 1, 5]

B: [6, 7, 8, 6, 3, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 4, 1, 1], [1, 4, 0, 0, 1, 0, 2, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 1, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 1, 5, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 2, 3, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 4, 1, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 5, 1, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 3, 2, 0, 5, 1, 0]] \$$

$$[y_1 + y_2 + y_3 - y_5 - y_4 + y_6 - y_7, y_1, 0, 0, y_2, 0, y_3, y_5, 0, y_4, y_6, y_7]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 9, 11, 12\}\}$ order: 7
See Matrix

$\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 0, 3, 3], [0, 0, 2, 3, 0, 2, 0, 2, 3, 0, 3, 1], [0, 0, 2, 3, 0, 3, 0, 2, 1, 0, 3, 2], [0, 0, 3, 3, 0, 3, 0, 2, 2, 0, 1, 2], [0, 0, 3, 1, 0, 3, 0, 3, 2, 0, 2, 2], [0, 0, 3, 2, 0, 1, 0, 3, 2, 0, 2, 3], [0, 0, 1, 2, 0, 2, 0, 3, 3, 0, 2, 3], [0, 0, 2, 2, 0, 2, 0, 1, 3, 0, 3, 3]] \$$

$$[0, 0, y_1, y_2, 0, y_8, y_5, y_6, y_7, 0, y_4, y_3]$$

1207 . Coloring, $\{2, 4, 7, 8, 9, 11\}$

R: [7, 8, 7, 7, A, A, A, B, C, C, 4, 5]

B: [6, 7, 8, 6, 3, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 6
See Matrix

\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 5, 1, 4] , [0, 0, 0, 1, 4, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

[0, 0, 0, y_1 , y_2 , 0, y_3 , y_4 , 0, y_5 , y_6 , y_7]

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 0, 3, 1] , [3, 0, 2, 0, 0, 2, 2, 2, 1, 0, 3, 1] , [3, 0, 2, 0, 0, 3, 0, 2, 1, 0, 3, 2] , [3, 0, 3, 0, 0, 3, 0, 2, 2, 0, 1, 2] , [1, 0, 3, 0, 0, 3, 0, 3, 2, 0, 2, 2] , [2, 0, 3, 0, 0, 1, 0, 3, 2, 0, 2, 3] , [2, 0, 1, 0, 0, 2, 0, 3, 3, 0, 2, 3] , [2, 0, 2, 0, 0, 2, 0, 1, 3, 0, 3, 3] , [3, 0, 2, 0, 0, 2, 0, 2, 3, 0, 3, 1]] \$

[y_9 , y_8 , y_7 , 0, 0, y_6 , y_5 , y_4 , y_3 , 0, y_2 , y_1]

1208 . Coloring, {2, 4, 7, 8, 9, 12}

R: [7, 8, 7, 7, A, A, A, B, C, C, 1, 9]

B: [6, 7, 8, 6, 3, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 3, 1, 6] , [1, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[y_1 , 0, 0, 0, 0, 0, y_3 , y_2 , y_7 , y_6 , y_4 , y_5]

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 0, 3, 1] , [0, 0, 4, 3, 1, 2, 2, 2, 0, 0, 1, 1] , [0, 0, 3, 1, 1, 3, 0, 4, 0, 0, 2, 2] , [0, 0, 4, 2, 2, 1, 0, 3, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 2, 0, 4, 0, 0, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0,

$0, 6, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 3, 0, 0, 0, 6] , [0, 0, 3, 0, 6, 0, 0, 4, 0, 0, 0, 3]] \$$

$[0, y_1, y_2, y_7, y_3, y_4, y_5, y_6, 0, 0, y_9, y_8]$

1209 . Coloring, {2, 4, 7, 8, 10, 11}

$\Omega p(\Delta)=0: p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$

R: [7, 8, 7, 7, A, A, A, B, B, 2, 4, 5]

B: [6, 7, 8, 6, 3, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 2, 2, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 2, 4, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 0, 1, 5, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 2, 2, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 4, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 0, 5, 1, 0, 4, 2, 0]] \$$

$[0, y_1, 0, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, 0]$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 0, 2, 4] , [2, 0, 2, 0, 0, 2, 0, 2, 4, 0, 1, 3] , [1, 0, 2, 0, 0, 2, 0, 2, 3, 0, 0, 6] , [0, 0, 2, 0, 0, 1, 0, 2, 6, 0, 0, 5] , [0, 0, 1, 0, 0, 0, 0, 2, 5, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 1, 8, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$[y_1, 0, y_7, 0, 0, y_8, y_6, y_2, y_3, 0, y_4, y_5]$

1210 . Coloring, {2, 4, 7, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, A, B, B, 2, 1, 9]

B: [6, 7, 8, 6, 3, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 2, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 3, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 2, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 4, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 3, 3, 0, 4, 2, 0]] \$

[$y_1, y_2, 0, 0, 0, 0, y_3, y_4, y_5, y_6, y_7, 0$]

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 0, 2, 4] , [0, 0, 4, 2, 4, 2, 0, 2, 0, 0, 1, 1] , [0, 0, 6, 1, 1, 2, 0, 4, 0, 0, 0, 2] , [0, 0, 3, 0, 2, 1, 0, 6, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4]] \$

[$0, 0, y_6, y_5, y_4, y_3, y_2, y_1, 0, 0, y_8, y_7$]

1211 . Coloring, {2, 4, 7, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, A, B, B, C, 4, 9]

B: [6, 7, 8, 6, 3, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 0, 2, 3, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 2, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 2, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 4, 2, 2]] \$

[0, 0, 0, y₁, 0, 0, y₂, y₃, y₄, y₅, y₆, y₇]

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8
See Matrix

\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 0, 2, 2] , [2, 0, 4, 0, 2, 2, 2, 2, 0, 0, 1, 1] , [1, 0, 4, 0, 1, 2, 0, 4, 0, 0, 2, 2] , [2, 0, 3, 0, 2, 1, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 2, 0, 3, 0, 0, 0, 4] , [0, 0, 6, 0, 4, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 6, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 4, 0, 0, 0, 6] , [0, 0, 3, 0, 6, 0, 0, 3, 0, 0, 0, 4]] \$

[y₁, y₂, y₃, 0, y₆, y₄, y₅, y₇, 0, 0, y₈, y₉]

1212 . Coloring, {2, 4, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, A, C, C, 2, 4, 5]

B: [6, 7, 8, 6, 3, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5
See Matrix

\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 2, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 5, 0, 1, 0, 4] , [0, 1, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 1, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 5, 0, 1]] \$

$$[0, y_1, 0, y_2, y_3, 0, y_4, y_5, 0, y_6, 0, y_7]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 0, 4, 2] , [4, 0, 2, 0, 0, 2, 0, 2, 2, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 2, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 4, 0, 2, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 2, 0, 0, 4, 0]] \$

$$[y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, 0, y_7, 2y_4]$$

$$p = s^3 - s^8$$

1213 . Coloring, {2, 4, 7, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, A, C, C, 2, 1, 9]

B: [6, 7, 8, 6, 3, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 2, 2, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 0, 4, 3, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 3, 4, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[y_1, y_2, 0, 0, 0, 0, y_3, y_4, y_5, y_6, 0, y_7]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 0, 4, 2] , [0, 0, 4, 4, 2, 2, 0, 2, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 0, 4, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 2, 0, 4, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 0, 4, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 0, 2, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 4, 0, 2, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 0, 4, 0, 0, 2, 0]] \$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, 0, y_7, 2 y_5]$$

$$p = -s^3 + s^8$$

1214 . Coloring, $\{2, 4, 7, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, A, C, C, C, 4, 9]

B: [6, 7, 8, 6, 3, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 4

See Matrix

$\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 0, 4, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$$[0, 0, 0, 2 y_3, 0, 0, y_5, y_3, y_4, y_2, 0, y_1]$$

$$p = s^4 - s^6$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 2, 2, 2, 0, 0, 2, 0] , [2, 0, 2, 0, 0, 4, 0, 4, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 2, 0, 2, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 0, 2, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 2, 0, 4, 0, 0, 2, 0] , [2, 0, 2, 0, 0, 4, 0, 4, 0, 0, 4, 0]] \$$

$$[y_1, y_4, y_2, 0, y_4, y_5, y_6, y_7, 0, 0, y_3, 0]$$

$$p = -s^3 + s^8$$

1215 . Coloring, {2, 4, 7, 10, 11, 12}

R: [7, 8, 7, 7, A, A, A, C, B, 2, 4, 9]

B: [6, 7, 8, 6, 3, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 2, 2, 1, 3, 2, 1] , [0, 3, 0, 2, 0, 0, 1, 4, 1, 2, 1, 2] , [0, 2, 0, 1, 0, 0, 2, 3, 2, 1, 1, 4] , [0, 1, 0, 1, 0, 0, 1, 2, 4, 2, 2, 3] , [0, 2, 0, 2, 0, 0, 1, 1, 3, 1, 4, 2] , [0, 1, 0, 4, 0, 0, 2, 2, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 4, 1, 1, 2, 2, 2]] \$

$$[0, y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 0, 3, 3] , [3, 0, 4, 0, 3, 2, 0, 2, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 3, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 2, 0, 5, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 3, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 5, 0, 2, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 3, 0, 4, 0, 0, 2, 0]] \$

$$[y_1, 0, y_2, 0, y_3, y_7, y_4, y_5, 0, 0, y_6, 3y_4]$$

$$p = -s^3 + s^8$$

1216 . Coloring, {2, 4, 8, 9, 10, 11}

R: [7, 8, 7, 7, A, A, B, B, C, 2, 4, 5]

B: [6, 7, 8, 6, 3, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 2, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 3, 2, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 4, 2, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 1, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$

$$[0, y_1, 0, y_6, y_7, 0, y_8, y_5, 0, y_4, y_3, y_2]$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 2, 1, 3], [1, 0, 2, 0, 0, 2, 0, 2, 3, 1, 2, 3], [2, 0, 2, 0, 0, 1, 0, 2, 3, 0, 3, 3], [3, 0, 1, 0, 0, 2, 0, 2, 3, 0, 3, 2], [3, 0, 2, 0, 0, 3, 0, 1, 2, 0, 3, 2], [3, 0, 3, 0, 0, 3, 0, 2, 2, 0, 2, 1], [2, 0, 3, 0, 0, 3, 0, 3, 1, 0, 2, 2], [2, 0, 3, 0, 0, 2, 0, 3, 2, 0, 1, 3], [1, 0, 2, 0, 0, 2, 0, 3, 3, 0, 2, 3]] \$$

$$[y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

1217 . Coloring, $\{2, 4, 8, 9, 10, 12\}$

R: [7, 8, 7, 7, A, A, B, B, C, 2, 1, 9]

B: [6, 7, 8, 6, 3, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	6 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 2, 2, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 2, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2]] \$$

$$[3 y_7, 3 y_6, 0, 0, 0, 0, 3 y_5, 3 y_4, 3 y_3, 3 y_2, -3 y_7 - 3 y_6 - 3 y_5 - 3 y_4 + 13 y_3 - 3 y_2 + 13 y_1, 3 y_1]$$

$$p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 4

See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 2, 1, 3], [0, 0, 4, 1, 3, 2, 0, 2, 0, 1, 0, 3], [0, 0, 5, 0, 3, 1, 0, 4, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5]] \$$

$$[0, 0, y_6, y_5, y_4, y_3, y_1, y_2, 0, y_5, y_1, -y_6 + y_4 + y_3 + y_2]$$

$$p' = -s^4 + s^8 \quad p' = -s^4 + s^5 - s^6 + s^7 \quad p = s^4 - s^5 + s^6 - s^7$$

1218 . Coloring, $\{2, 4, 8, 9, 11, 12\}$

R: $[7, 8, 7, 7, A, A, B, B, C, C, 4, 9]$

B: $[6, 7, 8, 6, 3, 3, A, C, B, 2, 1, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	9 vs 10

Omega Rank for R : cycles: $\{\{9, 12\}, \{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 2, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 0, 4, 4], [0, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2, 3], [0, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 2, 4], [0, 0, 0, 2, 0, 0, 4, 0, 4, 0, 3, 3]] \$$

$$[0, 0, 0, 7y_5, 0, 0, 7y_4, 7y_3, 7y_2, 14y_3, -7y_5 - 7y_4 + 11y_3 + 9y_2 + 9y_1, 7y_1]$$

$$p = s^2 - s^4 - s^5 + s^7 \quad p' = s^2 + s^3 - s^5 - s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {2, 7, 10}} order: 12

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 2, 1, 1], [1, 2, 4, 0, 1, 2, 2, 2, 0, 1, 0, 1], [0, 1, 3, 0, 1, 1, 2, 4, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 1, 3, 0, 2, 0, 4], [0, 2, 2, 0, 4, 0, 2, 2, 0, 1, 0, 3], [0, 1, 4, 0, 3, 0, 2, 2, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 1, 4, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 2, 3, 0, 1, 0, 4], [0, 1, 2, 0, 4, 0, 2, 2, 0, 2, 0, 3], [0, 2, 4, 0, 3, 0, 1, 2, 0, 2, 0, 2]] \$$$

$$[5y_5, 5y_4, 5y_3, 0, 5y_2, -5y_5 + 11y_4 - 5y_3 - 5y_2 + 11y_1 - 5y_9 + 11y_8 - 5y_7 - 5y_6, 5y_1, 5y_9, 0, 5y_8, 5y_7, 5y_6]$$

$$p = s^4 + s^5 + s^6 - s^8 - s^9 - s^{10}$$

1219 . Coloring, {2, 4, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, A, B, B, B, 2, 4, 9]

B: [6, 7, 8, 6, 3, 3, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	6 vs 7	6 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 2, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$$$

$$[0, y_2, 0, y_1, 0, 0, y_4, y_5, y_6, y_6, y_3, 0]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 2, 0, 2, 0, 1, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4]] \$

$$[2 y_3, 0, y_1, 0, y_2, -2 y_3 + 2 y_5, y_3, y_4, 0, y_5, 0, y_6]$$

$$p' = -s^3 + s^7 \quad p = -s^3 + s^7$$

1220 . Coloring, {2, 4, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, B, C, C, 2, 4, 9]

B: [6, 7, 8, 6, 3, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 2, 2, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 2, 3, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 3, 5]] \$

$$[0, 9 y_1 + 9 y_3 - 7 y_2 - 7 y_4 - 7 y_5 + 9 y_6 - 7 y_7, 0, 7 y_1, 0, 0, 7 y_3, 7 y_2, 7 y_4, 7 y_5, 7 y_6, 7 y_7]$$

$$p = s^4 + s^5 - s^7 - s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 2, 2, 2] , [2, 0, 4, 0, 2, 2, 0, 2, 0, 1, 1, 2] , [1, 0, 4, 0, 2, 2, 0, 4, 0, 0, 2, 1] , [2, 0, 4, 0, 1, 1, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 2, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 4, 0, 2, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 0, 4, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 0, 4, 0, 0, 4, 0]] \$

$$[y_1, 0, y_2, 0, y_4, y_3, y_5, y_6, 0, y_7, y_8, y_9]$$

1221 . Coloring, {2, 5, 6, 7, 8, 9}

R: [7, 8, 7, 6, 3, 3, A, B, C, C, 1, 5]

B: [6, 7, 8, 7, A, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 1, 3] , [1, 0, 3, 0, 3, 0, 4, 0, 0, 2, 1, 2] , [1, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 2] , [0, 0, 2, 0, 2, 0, 4, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 0, 0, 4, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 0, 4, 0, 0, 2, 0, 2] , [0, 0, 4, 0, 2, 0, 4, 0, 0, 4, 0, 2] , [0, 0, 2, 0, 2, 0, 4, 0, 0, 4, 0, 4]] \$

$$[y_8, 0, y_7, 0, y_6, y_4, y_5, y_4, 0, y_3, y_2, y_1]$$

$$p = s^4 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 0, 4, 0, 1, 1, 4, 1] , [0, 1, 0, 4, 0, 0, 5, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, -y_4 + 2y_6 + y_3, 0, y_1, 0, y_4 - y_6, y_2, y_4 - y_6, y_3, y_4, y_5, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

1222 . Coloring, {2, 5, 6, 7, 8, 10}

R: [7, 8, 7, 6, 3, 3, A, B, B, 2, 1, 5]

B: [6, 7, 8, 7, A, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	3 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 2, 0], [2, 2, 3, 0, 0, 0, 4, 2, 0, 2, 1, 0], [1, 2, 0, 0, 0, 0, 5, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 1, 2, 0, 5, 2, 0], [2, 5, 0, 0, 0, 0, 2, 4, 0, 1, 2, 0], [2, 1, 0, 0, 0, 0, 2, 5, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 1, 0, 2, 5, 0], [5, 2, 0, 0, 0, 0, 4, 2, 0, 2, 1, 0], [1, 2, 0, 0, 0, 0, 5, 2, 0, 4, 2, 0]] \$$

$$[y_1, y_2, y_3, 0, 2y_4, y_4, y_5, y_6, 0, y_7, y_8, 0]$$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 1, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5]] \$$

$$[0, 0, 0, 2y_2, 0, 5y_2 - 2y_3, 2y_2, 5y_2 - 2y_3, 2y_1, -2y_1 + 2y_3, 2y_2, 2y_3]$$

$$p = -s^3 + s^6 \quad p = -s^3 + s^8 \quad p = -s^3 + s^7 \quad p = -s^3 + s^4 \quad p = -s^3 + s^5$$

1223 . Coloring, $\{2, 5, 6, 7, 8, 11\}$

R: [7, 8, 7, 6, 3, 3, A, B, B, C, 4, 5]

B: [6, 7, 8, 7, A, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	9 vs 9	7 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 2, 2], [0, 0, 3, 2, 2, 2, 2, 0, 0, 2, 1, 2], [0, 0, 4, 1, 2, 2, 3, 0, 0, 2, 0, 2], [0, 0, 4, 0, 2, 1, 4, 0, 0, 3, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 3, 0, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 3, 0, 2]] \$$

$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$

Omega Rank for B : cycles: $\{\{9, 12\}, \{1, 2, 6, 7, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 2, 2], [2, 2, 0, 0, 0, 2, 2, 0, 2, 1, 2, 3], [2, 1, 0, 0, 0, 2, 2, 0, 3, 2, 2, 2], [2, 2, 0, 0, 0, 2, 1, 0, 2, 2, 2, 3], [2, 2, 0, 0, 0, 2, 2, 0, 3, 2, 1, 2], [1, 2, 0, 0, 0, 2, 2, 0, 2, 2, 2, 3], [2, 2, 0, 0, 0, 1, 2, 0, 3, 2, 2, 2], [2, 2, 0, 0, 0, 2, 2, 0, 2, 1, 2, 3], [2, 1, 0, 0, 0, 2, 2, 0, 3, 2, 2, 2]] \$$

$[3 y_1, 8 y_1 - 3 y_2 + 8 y_3 - 11 y_4 - 11 y_5 + 8 y_6 - 3 y_7, 0, 0, 0, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7, 5 y_1 + 5 y_3 - 8 y_4 - 8 y_5 + 5 y_6]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

1224 . Coloring, $\{2, 5, 6, 7, 8, 12\}$

R: $[7, 8, 7, 6, 3, 3, A, B, B, C, 1, 9]$

B: $[6, 7, 8, 7, A, A, B, C, C, 2, 4, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 2, 2], [2, 0, 1, 0, 0, 0, 4, 0, 2, 2, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 4, 2, 2], [2, 0, 0, 0, 0, 3, 0, 2, 3, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 3, 2, 3], [2, 0, 0, 0, 0, 0, 2, 0, 3, 2, 4, 3], [4, 0, 0, 0, 0, 0, 2, 0, 3, 2, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 2, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 4, 2, 2]] \$$

$$[y_1, 0, y_2, 0, 0, y_4, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 4, 0, 0, 3, 2, 1], [0, 3, 0, 2, 1, 0, 4, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 5, 0, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[0, y_1, 0, y_8, y_7, y_6, y_5, y_6, 0, y_4, y_3, y_2]$$

$$p = -s^6 + s^9$$

1225 . Coloring, {2, 5, 6, 7, 9, 10}

R: [7, 8, 7, 6, 3, 3, A, C, C, 2, 1, 5]

B: [6, 7, 8, 7, A, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 4, 2, 0, 2, 0, 1], [0, 2, 2, 0, 1, 0, 3, 2, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 2, 2, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 1, 4, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 2, 3, 0, 1, 0, 4], [0, 1, 2, 0, 4, 0, 2, 2, 0, 2, 0, 3], [0, 2, 4, 0, 3, 0, 2, 1, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 4, 2, 0, 2, 0, 1]] \$$$

$$[2 y_3, y_1, y_5, 0, y_2, y_3, y_4, y_6, 0, y_8, 0, y_7]$$

$$p = -s^2 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 1, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

[0, 0, 0, y_5 , 0, y_3 , y_4 , y_3 , y_2 , y_1 , y_6 , y_7]

$$p = s^5 - s^8$$

1226 . Coloring, {2, 5, 6, 7, 9, 11}

R: [7, 8, 7, 6, 3, 3, A, C, C, C, 4, 5]

B: [6, 7, 8, 7, A, A, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 2, 2, 0, 0, 2, 0, 3] , [0, 0, 6, 0, 3, 0, 3, 0, 0, 2, 0, 2] , [0, 0, 3, 0, 2, 0, 6, 0, 0, 3, 0, 2] , [0, 0, 2, 0, 2, 0, 3, 0, 0, 6, 0, 3] , [0, 0, 2, 0, 3, 0, 2, 0, 0, 3, 0, 6] , [0, 0, 3, 0, 6, 0, 2, 0, 0, 2, 0, 3] , [0, 0, 6, 0, 3, 0, 3, 0, 0, 2, 0, 2]] \$

[0, 0, y_6 , 2 y_4 , y_1 , y_2 , y_3 , y_4 , 0, y_5 , 0, y_7]

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 2, 0, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 4, 2, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 5, 1, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 2, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 2, 4, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 1, 5, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 2, 0, 0, 1, 5, 0]] \$

[y_4 , y_3 , 0, 0, 0, y_2 , y_1 , y_7 , 2 y_7 , y_6 , y_5 , 0]

$$p = -s^2 + s^8$$

1227 . Coloring, {2, 5, 6, 7, 9, 12}

R: [7, 8, 7, 6, 3, 3, A, C, C, C, 1, 9]

B: [6, 7, 8, 7, A, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 0, 4] , [0, 0, 1, 0, 0, 0, 4, 0, 4, 2, 0, 5] , [0, 0, 0, 0, 0, 0, 1, 0, 5, 4, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[2y_6, 0, y_1, 0, 0, y_6, y_5, y_6, y_3, y_4, 0, y_2]$$

$$p = -s^5 + s^7 \quad p' = -s^5 + s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 4, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[0, y_2, 0, y_1, 2y_6, y_6, y_5, y_6, 0, y_4, y_3, 0]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

1228 . Coloring, {2, 5, 6, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s - s^2 - 3s^4 + 4s^5 + 8s^7 - 16s^8$$

R: [7, 8, 7, 6, 3, 3, A, C, B, 2, 4, 5]
B: [6, 7, 8, 7, A, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	10 vs 10	7 vs 8

Omega Rank for R : cycles: $\{\{2, 3, 5, 7, 8, 10, 12\}\}$ order: 7
 See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 1, 1] , [0, 2, 3, 1, 1, 2, 2, 2, 0, 2, 0, 1] , [0, 2, 3, 0, 1, 1, 3, 2, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 3, 2, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 2, 2, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 2, 3, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 2, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 2, 2, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 2, 2, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 0, 3, 2, 0, 2, 0, 2]] \$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_{10}, 0, y_7, y_8, y_9]$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6
 See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 3, 4] , [3, 0, 0, 0, 0, 3, 0, 0, 4, 2, 0, 4] , [0, 0, 0, 0, 3, 0, 0, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[y_1, 0, 0, 0, 0, y_5, 2y_4, y_4, y_3, y_2, y_7, y_6]$$

$$p = -s^6 + s^8$$

1229 . Coloring, $\{2, 5, 6, 7, 10, 12\}$

R: [7, 8, 7, 6, 3, 3, A, C, B, 2, 1, 9]
B: [6, 7, 8, 7, A, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	4 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 9, 10, 11, 12\}\}$ order: 8
See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 1, 1], [1, 2, 1, 0, 0, 0, 4, 2, 1, 2, 2, 1], [2, 2, 0, 0, 0, 0, 2, 2, 1, 4, 1, 2], [1, 4, 0, 0, 0, 0, 2, 2, 2, 1, 2], [1, 2, 0, 0, 0, 0, 1, 4, 2, 2, 2, 2], [2, 2, 0, 0, 0, 0, 1, 2, 2, 1, 2, 4], [2, 1, 0, 0, 0, 0, 2, 2, 4, 1, 2, 2], [2, 1, 0, 0, 0, 0, 2, 1, 2, 2, 4, 2], [4, 2, 0, 0, 0, 0, 2, 1, 2, 2, 2, 1], [2, 2, 0, 0, 0, 0, 4, 2, 1, 2, 2, 1]] \$$

$$[y_3, y_2, y_1, 0, 0, y_{10}, y_9, y_8, y_7, y_6, y_5, y_4]$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}, \{4, 7, 11\}\}$ order: 3
See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2]] \$$

$$[0, 0, 0, y_2, -y_1 + y_3, y_1, -y_1 + y_4, y_1, 0, y_2, y_3, y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6 \quad p''' = -s^2 + s^8$$

1230 . Coloring, $\{2, 5, 6, 7, 11, 12\}$

R: [7, 8, 7, 6, 3, 3, A, C, B, C, 4, 9]

B: [6, 7, 8, 7, A, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 9, 10, 11, 12\}\}$ order: 8
See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 1, 3] , [0, 0, 1, 1, 0, 2, 2, 0, 3, 2, 2, 3] , [0, 0, 2, 2, 0, 1, 1, 0, 3, 2, 3, 2] , [0, 0, 1, 3, 0, 2, 2, 0, 2, 1, 3, 2] , [0, 0, 2, 3, 0, 3, 1, 0, 2, 2, 2, 1] , [0, 0, 3, 2, 0, 3, 2, 0, 1, 1, 2, 2] , [0, 0, 3, 2, 0, 2, 3, 0, 2, 2, 1, 1] , [0, 0, 2, 1, 0, 2, 3, 0, 1, 3, 2, 2] , [0, 0, 2, 2, 0, 1, 2, 0, 2, 3, 1, 3]] \$

$$[0, 0, y_1, y_5, 0, y_4, y_2, y_3, y_6, y_7, y_8, y_9]$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 2, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 3, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0]] \$

$$[y_1 + y_2 + y_3 - y_4 - 2y_7 - y_5 + y_6, y_1, 0, 0, y_2, y_3, y_4, y_7, 0, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

1231 . Coloring, {2, 5, 6, 8, 9, 10}

R: [7, 8, 7, 6, 3, 3, B, B, C, 2, 1, 5]

B: [6, 7, 8, 7, A, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 3, 1] , [3, 0, 3, 0, 1, 0, 4, 2, 0, 0, 3, 0] , [3, 0, 1, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[y_4, 2y_5, y_3, 0, y_2, y_5, y_1, 2y_2 - 3y_5, 0, 0, y_6, y_5]$$

$$p' = -s^5 + s^8 \quad p = -s^4 + s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 3, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 5, 2] , [0, 0, 0, 5, 0, 0, 3, 0, 2, 2, 3, 1] , [0, 0, 0, 3, 0, 0, 5, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 5, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 3, 2, 5]] \$

[0, 0, 0, y₁, 0, y₂, y₇, y₂, y₃, y₄, y₅, y₆]

$$p = -s^2 + s^8$$

1232 . Coloring, {2, 5, 6, 8, 9, 11}

R: [7, 8, 7, 6, 3, 3, B, B, C, C, 4, 5]

B: [6, 7, 8, 7, A, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 3, 3] , [0, 0, 3, 3, 3, 2, 2, 0, 0, 0, 3, 0] , [0, 0, 5, 3, 0, 3, 3, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 5, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 2, 3, 0, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 3, 3, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 5, 2, 0, 0, 0, 3, 0] , [0, 0, 5, 3, 0, 3, 3, 0, 0, 0, 2, 0]] \$

[0, 0, y₁, y₂, y₃, y₅, y₆, y₇, 0, 0, y₄, 3 y₇]

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 2, 2, 0, 1, 3, 2, 1] , [2, 3, 0, 0, 0, 1, 4, 0, 1, 4, 1, 0] , [1, 4, 0, 0, 0, 2, 3, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_2, y_1, 0, 0, 0, y_6, y_5, y_4, y_3, y_9, y_8, y_7]$$

1233 . Coloring, {2, 5, 6, 8, 9, 12}

R: [7, 8, 7, 6, 3, 3, B, B, C, C, 1, 9]

B: [6, 7, 8, 7, A, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 3, 3], [3, 0, 1, 0, 0, 0, 4, 0, 3, 0, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 3], [4, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 2]] \$

$$[-5 y_2 - 10 y_6 - 5 y_1 + 11 y_5 - 5 y_3 + 11 y_4, 0, 5 y_2, 0, 0, 5 y_6, 5 y_1, 5 y_6, 5 y_5, 0, 5 y_3, 5 y_4]$$

$$p' = s^3 + s^4 - s^6 - s^7 \quad p = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 1, 1], [0, 4, 0, 1, 1, 0, 4, 0, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[0, y_3, 0, y_5 + y_4, y_2, y_5, y_1, y_5, 0, y_6, y_5, y_4]$$

$$p = -s^4 + s^7 \quad p' = s^5 - s^8 \quad p' = -s^4 + s^7$$

1234 . Coloring, {2, 5, 6, 8, 10, 11}

R: [7, 8, 7, 6, 3, 3, B, B, B, 2, 4, 5]

B: [6, 7, 8, 7, A, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	5 vs 7

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 2, 2, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 4, 3, 0, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 3, 2, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 4, 4, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 3, 3, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 4, 0, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 4, 3, 0, 0, 0, 4, 0]] \$

$[0, y_7, y_6, y_5, y_7, y_4, y_3, y_2, 0, 0, y_1, 0]$

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 0, 4, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$[2y_1, 0, 0, 0, 0, y_2, 2y_1, y_1, y_3, y_4, 0, y_5]$

$$p' = -s^4 + s^6 \quad p = -s^4 + s^6$$

1235 . Coloring, {2, 5, 6, 8, 10, 12}

R: [7, 8, 7, 6, 3, 3, B, B, B, 2, 1, 9]

B: [6, 7, 8, 7, A, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	5 vs 8	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 4, 0] , [4, 0, 1, 0, 0, 0, 4, 2, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_2, 2y_4, y_1, 0, 0, y_4, y_3, 2y_1 - 3y_4, 2y_4, 0, y_5, 0]$$

$$p' = -s^4 + s^7 \quad p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 5, 0, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[0, 0, 0, 2y_3, y_1, y_3, y_2, y_3, 0, y_4, 0, y_5]$$

$$p' = s^3 - s^6 \quad p = -s^3 + s^6$$

1236 . Coloring, {2, 5, 6, 8, 11, 12}

R: [7, 8, 7, 6, 3, 3, B, B, B, C, 4, 9]

B: [6, 7, 8, 7, A, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 4, 2] , [0, 0, 1, 4, 0, 2, 2, 0, 2, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 1, 0, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 5, 2, 0, 0, 0, 1, 0] , [0, 0, 5, 1, 0, 4, 4, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 1, 5, 0, 0, 0, 4, 0] , [0, 0, 1, 4, 0, 2, 4, 0, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 1, 0, 0, 0, 4, 0]] \$

$$[0, 0, y_7, y_6, 0, y_5, y_4, y_3, y_2, 0, y_1, 2 y_3]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 0, 2], [0, 4, 0, 0, 2, 2, 2, 0, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[2 y_3, y_1, 0, 0, y_2, -3 y_3 + 2 y_4, y_5, y_3, 0, y_6, 0, y_4]$$

$$p = s^4 - s^7 \quad p' = -s^4 + s^7$$

1237 . Coloring, {2, 5, 6, 9, 10, 11}

R: [7, 8, 7, 6, 3, 3, B, C, C, 2, 4, 5]

B: [6, 7, 8, 7, A, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 2, 2], [0, 0, 3, 2, 2, 2, 2, 0, 0, 2, 1], [0, 0, 4, 2, 1, 2, 3, 0, 0, 0, 2, 2], [0, 0, 3, 2, 2, 2, 4, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 2, 3, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 3, 4, 0, 0, 0, 3, 0], [0, 0, 3, 3, 0, 4, 2, 0, 0, 0, 4, 0], [0, 0, 4, 4, 0, 3, 3, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 4, 4, 0, 0, 0, 3, 0]] \$$$

$$[0, y_5, y_4, y_3, y_1, y_2, y_6, y_7, 0, 0, y_8, y_9]$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 2, 2], [2, 0, 0, 0, 0, 2, 0, 0, 2, 3, 3, 4], [3, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 3], [2, 0, 0, 0, 0, 3, 0, 0, 3, 2, 4, 2], [4, 0, 0, 0, 0, 2, 0, 0, 2, 3, 3, 2], [3, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 3], [2, 0, 0, 0, 0, 3, 0, 0, 3, 4, 2, 2], [2, 0, 0, 0, 0, 2, 0, 0, 2, 3, 3, 4]] \$$$

$$[y_1, 0, 0, 0, 0, y_2, 2y_3, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^2 + s^8$$

1238 . Coloring, {2, 5, 6, 9, 10, 12}

R: [7, 8, 7, 6, 3, 3, B, C, C, 2, 1, 9]

B: [6, 7, 8, 7, A, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 2, 2] , [2, 0, 1, 0, 0, 0, 4, 2, 2, 0, 2, 3] , [2, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 4] , [4, 0, 0, 0, 0, 2, 0, 4, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 3, 0, 4, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 2, 0, 3, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 4, 0, 4, 0, 2, 3] , [2, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 4]] \$

$$[11y_1 - 16y_2 - 7y_3 + 9y_4 - 7y_5 + 9y_6, 14y_2, 7y_1, 0, 0, 7y_2, 7y_3, 14y_1 - 21y_2, 7y_4, 0, 7y_5, 7y_6]$$

$$p = s^3 - s^9 \quad p' = s^4 + s^5 - s^7 - s^8 \quad p'' = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 0, 2, 0, 0, 5, 1, 4] , [0, 0, 0, 1, 4, 0, 2, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6]] \$

$$[0, 0, 0, y_4, y_3, y_2, y_1, y_2, 0, y_6, y_7, y_5]$$

$$p = -s^5 + s^8$$

1239 . Coloring, {2, 5, 6, 9, 11, 12}

R: [7, 8, 7, 6, 3, 3, B, C, C, C, 4, 9]

B: [6, 7, 8, 7, A, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {3, 4, 6, 7, 11}} order: 10

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 2, 4] , [0, 0, 1, 2, 0, 2, 2, 0, 4, 0, 2, 3] , [0, 0, 2, 2, 0, 2, 1, 0, 3, 0, 2, 4] , [0, 0, 2, 2, 0, 2, 2, 0, 4, 0, 1, 3] , [0, 0, 2, 1, 0, 2, 2, 0, 3, 0, 2, 4] , [0, 0, 2, 2, 0, 1, 2, 0, 4, 0, 2, 3] , [0, 0, 1, 2, 0, 2, 2, 0, 3, 0, 2, 4] , [0, 0, 2, 2, 0, 2, 1, 0, 4, 0, 2, 3]] \$

[0, 0, -7 y₁ - 7 y₂ - 7 y₅ + 9 y₄ + 9 y₃ - 7 y₆ + 9 y₇, 7 y₁, 0, 7 y₂, 7 y₅, 7 y₄, 7 y₃, 0, 7 y₆, 7 y₇]

$$p = -s^2 - s^3 + s^7 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 2, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 2, 4, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 1, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

[y₁, y₂, 0, 0, 2 y₅, y₃, y₄, y₅, 0, y₆, y₇, 0]

$$p = -s^5 + s^8$$

1240 . Coloring, {2, 5, 6, 10, 11, 12}

R: [7, 8, 7, 6, 3, 3, B, C, B, 2, 4, 9]

B: [6, 7, 8, 7, A, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 3, 1] , [0, 0, 1, 3, 0, 2, 2, 2, 1, 0, 4, 1] , [0, 0, 2, 4, 0, 3, 1, 0, 1, 0, 3, 2] , [0, 0, 3, 3, 0, 4, 2, 0, 2, 0, 2, 0] , [0, 0, 4, 2, 0, 3, 3, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 4, 0, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 4, 3, 0, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 3, 2, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 4, 4, 0, 0, 0, 2, 0]] \$

$$[0, y_1, y_2, y_5, 0, y_4, y_3, y_8, y_9, 0, y_6, y_7]$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 5, 1, 4] , [1, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[y_4, 0, 0, 0, y_2, y_3, 2y_1, y_1, 0, y_5, y_6, y_7]$$

$$p = s^5 - s^8$$

1241 . Coloring, {2, 5, 7, 8, 9, 10}

R: [7, 8, 7, 6, 3, A, A, B, C, 2, 1, 5]

B: [6, 7, 8, 7, A, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	8 vs 9

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1], [1, 3, 2, 0, 1, 0, 3, 2, 0, 3, 1, 0], [1, 3, 1, 0, 0, 0, 3, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 3, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 2, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 3, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 3, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 3, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 3, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 3, 0, 3, 3, 0], [3, 0, 0, 0, 0, 0, 3, 0, 0, 0, 0, 0]] \$$

$$[y_2, y_1, -y_2 + y_1 + y_6 + y_5 - y_4 - y_3 + y_8, 0, y_6, y_7, y_5, y_4, 0, y_3, y_8, y_7]$$

$$p = s^4 - s^{10} \quad p' = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3], [0, 0, 1, 3, 0, 0, 2, 1, 3, 0, 4, 2], [0, 0, 0, 4, 0, 0, 3, 1, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 5, 1], [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$

$$[0, 0, y_4, y_3, 0, y_5, y_2, y_1, y_6, y_5, y_8, y_7]$$

$$p = -s^6 + s^9$$

1242 . Coloring, $\{2, 5, 7, 8, 9, 11\}$

R: [7, 8, 7, 6, 3, A, A, B, C, C, 4, 5]

B: [6, 7, 8, 7, A, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	10 vs 10

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 1, 0, 0, 3, 1, 3], [0, 0, 3, 1, 3, 1, 2, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 1, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3]] \$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_9, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1], [3, 1, 1, 0, 0, 2, 2, 1, 1, 0, 4, 1], [4, 0, 2, 0, 0, 3, 1, 1, 1, 0, 3, 1], [3, 0, 3, 0, 0, 4, 0, 2, 1, 0, 2, 1], [2, 0, 4, 0, 0, 3, 0, 3, 1, 0, 1, 2], [1, 0, 3, 0, 0, 2, 0, 4, 2, 0, 1, 3], [1, 0, 2, 0, 0, 1, 0, 3, 3, 0, 2, 4], [2, 0, 1, 0, 0, 1, 0, 2, 4, 0, 3, 3], [3, 0, 1, 0, 0, 2, 0, 1, 3, 0, 4, 2], [4, 0, 2, 0, 0, 3, 0, 1, 2, 0, 3, 1]] \$$$

$$[y_5, y_3, y_4, 0, 0, y_2, y_1, y_9, y_{10}, y_8, y_6, y_7]$$

1243 . Coloring, $\{2, 5, 7, 8, 9, 12\}$

R: [7, 8, 7, 6, 3, A, A, B, C, C, 1, 9]

B: [6, 7, 8, 7, A, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	10 vs 10

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3], [1, 0, 0, 0, 0, 0, 3, 0, 3, 3, 1, 5], [1, 0, 0, 0, 0, 0, 1, 0, 5, 3, 0, 6], [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[y_1, 0, y_5, 0, 0, y_5, y_4, y_5, y_2, y_3, y_6, y_7]$$

$$p' = s^6 - s^8 \quad p = -s^6 + s^8$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 9

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1], [0, 1, 1, 3, 1, 0, 4, 1, 0, 2, 2, 1], [0, 2, 0, 2, 1, 0, 4, 1, 0, 1, 4, 1], [0, 1, 0, 4, 1, 0, 4, 0, 0, 1, 4, 1], [0, 1, 0, 4, 1, 0, 5, 0, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 5, 0, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_7, 0, y_8, y_9, y_{10}]$$

1244 . Coloring, {2, 5, 7, 8, 10, 11}

R: [7, 8, 7, 6, 3, A, A, B, B, 2, 4, 5]

B: [6, 7, 8, 7, A, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 2, 1, 2, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 2, 2, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 1, 0, 3, 0, 4, 3, 0] , [0, 4, 0, 3, 0, 2, 0, 3, 0, 1, 3, 0] , [0, 1, 0, 3, 0, 3, 0, 4, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 0, 1, 0, 3, 4, 0] , [0, 3, 0, 4, 0, 3, 0, 2, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 4, 0, 3, 0, 3, 2, 0]] \$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_7, 0, y_8, y_9, 0]$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 2, 4] , [2, 0, 1, 0, 0, 2, 0, 1, 4, 0, 2, 4] , [2, 0, 2, 0, 0, 2, 0, 1, 4, 0, 0, 5] , [0, 0, 2, 0, 0, 2, 0, 2, 5, 0, 0, 5] , [0, 0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[y_7, 0, y_8, 0, 0, y_6, 2y_2, y_4, y_5, y_2, y_3, y_1]$$

$$p = s^7 - s^9$$

1245 . Coloring, {2, 5, 7, 8, 10, 12}

R: [7, 8, 7, 6, 3, A, A, B, B, 2, 1, 9]

B: [6, 7, 8, 7, A, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 9

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 3, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 2, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 3, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 2, 3, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 3, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 3, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 3, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 2, 3, 0, 3, 2, 0]] \$

$$[y_5, y_4, y_3, 0, 0, y_3, y_2, y_1, 2y_3, y_7, y_6, 0]$$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 2, 4] , [0, 0, 1, 2, 4, 0, 2, 1, 0, 2, 2, 2] , [0, 0, 0, 2, 2, 0, 2, 1, 0, 4, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 0, 0, 2, 2, 5] , [0, 0, 0, 2, 5, 0, 2, 0, 0, 3, 2, 2] , [0, 0, 0, 2, 2, 0, 2, 0, 0, 5, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 0, 0, 2, 2, 5] , [0, 0, 0, 2, 5, 0, 2, 0, 0, 3, 2, 2] , [0, 0, 0, 2, 2, 0, 2, 0, 0, 5, 2, 3]] \$

$$[0, 0, 5y_5 - y_1 - y_2 - y_3 - y_4 - y_6, y_5, y_1, y_2, y_5, y_3, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p' = -s^5 + s^8$$

1246 . Coloring, {2, 5, 7, 8, 11, 12}

R: [7, 8, 7, 6, 3, A, A, B, B, C, 4, 9]

B: [6, 7, 8, 7, A, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 10

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 2, 1, 0, 2, 3, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2, 3] , [0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 3, 2] , [0, 0, 0, 3, 0, 3, 0, 0, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 3, 0, 0, 3, 3, 2, 2] , [0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2, 3]] \$

[0, 0, y₆, y₁, 0, y₇, y₈, y₆, y₅, y₂, y₃, y₄]

$$p = s^3 - s^9$$

Omega Rank for B : cycles: {{1, 2, 3, 5, 6, 7, 8, 10, 11, 12}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 2, 2] , [2, 1, 1, 0, 2, 2, 2, 1, 0, 2, 2, 1] , [2, 2, 2, 0, 1, 2, 1, 1, 0, 2, 2, 1] , [2, 2, 2, 0, 1, 2, 2, 0, 1, 1, 1] , [1, 1, 2, 0, 1, 2, 2, 2, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 1, 1, 2, 0, 1, 2, 2] , [2, 1, 1, 0, 2, 2, 1, 2, 0, 2, 1, 2] , [1, 2, 2, 0, 2, 2, 1, 1, 0, 2, 1, 2] , [1, 2, 2, 0, 2, 1, 2, 2, 0, 2, 1, 1] , [1, 2, 1, 0, 1, 1, 2, 2, 0, 2, 2, 2]] \$

[y₁ - y₂ + y₆ + y₅ - y₃ + y₄ - y₇ + y₈ - y₉, y₁, y₂, 0, y₆, y₅, y₃, y₄, 0, y₇, y₈, y₉]

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

1247 . Coloring, {2, 5, 7, 9, 10, 11}

R: [7, 8, 7, 6, 3, A, A, C, C, 2, 4, 5]

B: [6, 7, 8, 7, A, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 2, 1, 2, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 2, 3, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 2, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 1, 3, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 2, 2, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 3, 2, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 0, 3, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 3, 2, 0, 3, 0, 1]] \$

$$[0, y_9, y_8, y_7, y_6, y_5, y_4, y_3, 0, y_2, 0, y_1]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 4, 2], [4, 0, 1, 0, 0, 2, 0, 1, 2, 0, 5, 1], [5, 0, 2, 0, 0, 4, 0, 1, 1, 0, 3, 0], [3, 0, 4, 0, 0, 5, 0, 2, 0, 0, 2, 0], [2, 0, 5, 0, 0, 3, 0, 4, 0, 0, 2, 0], [2, 0, 3, 0, 0, 2, 0, 5, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 0, 3, 0, 0, 5, 0], [5, 0, 2, 0, 0, 4, 0, 2, 0, 0, 3, 0], [3, 0, 4, 0, 0, 5, 0, 2, 0, 0, 2, 0]] \$$$

$$[y_1, 0, y_2, 0, 0, y_8, 2 y_5, y_7, y_6, y_5, y_4, y_3]$$

$$p = s^4 - s^9$$

1248 . Coloring, {2, 5, 7, 9, 10, 12}

R: [7, 8, 7, 6, 3, A, A, C, C, 2, 1, 9]

B: [6, 7, 8, 7, A, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 3, 2, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 0, 3, 3, 3, 0, 4], [0, 3, 0, 0, 0, 0, 3, 4, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 3, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[2 y_6, y_1, y_6, 0, 0, y_6, y_5, y_2, y_3, y_4, 0, y_7]$$

$$p = -s^6 + s^8 \quad p' = -s^6 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}, {5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 4, 2], [0, 0, 1, 4, 2, 0, 2, 1, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 4, 1, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 5, 2], [0, 0, 0, 5, 2, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 5, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 5, 2], [0, 0, 0, 5, 2, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 5, 0, 0, 2, 3, 2]] \$$$

$$[0, 0, 3y_2, -3y_2 - 7y_1 - 7y_5 + 14y_4 + 8y_3, -5y_1 - 5y_5 + 7y_4 + 7y_3, 3y_6, 3y_1, 3y_5, 0, 3y_4, -3y_6 - 7y_1 - 7y_5 + 8y_4 + 14y_3, 3y_3]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

1249 . Coloring, {2, 5, 7, 9, 11, 12}

R: [7, 8, 7, 6, 3, A, A, C, C, C, 4, 9]

B: [6, 7, 8, 7, A, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 4
See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 0, 4], [0, 0, 0, 0, 0, 2, 1, 0, 4, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[0, 0, y_5, 2y_5, 0, -3y_5 + 2y_4, y_4, y_5, y_3, y_2, 0, y_1]$$

$$p' = -s^5 + s^7 \quad p'' = s^4 - s^6 \quad p = s^4 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5
See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 4, 0], [4, 1, 1, 0, 0, 2, 2, 1, 0, 2, 3, 0], [3, 2, 2, 0, 0, 4, 1, 1, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 2, 2, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 0, 3, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 0, 4, 0, 0, 2, 0]] \$$$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9, 0]$$

1250 . Coloring, {2, 5, 7, 10, 11, 12}

R: [7, 8, 7, 6, 3, A, A, C, B, 2, 4, 9]

B: [6, 7, 8, 7, A, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	8 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 1, 2, 1, 3, 2, 1], [0, 3, 0, 2, 0, 1, 0, 3, 1, 3, 1, 2], [0, 3, 0, 1, 0, 2, 0, 3, 2, 1, 1, 3], [0, 1, 0, 1, 0, 1, 0, 3, 3, 2, 2, 3], [0, 2, 0, 2, 0, 1, 0, 1, 3, 1, 3, 3], [0, 1, 0, 3, 0, 2, 0, 2, 3, 1, 3, 1], [0, 1, 0, 3, 0, 3, 0, 1, 1, 2, 3, 2], [0, 2, 0, 3, 0, 3, 0, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 3, 0, 2, 1, 3, 2, 1]] \$$

$$[0, y_7, y_8, y_9, 0, y_{10}, y_1, y_2, y_3, y_4, y_5, y_6]$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}, \{1, 3, 6, 8, 11\}\}$

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3], [3, 0, 1, 0, 3, 2, 0, 1, 0, 2, 3, 1], [3, 0, 2, 0, 1, 3, 0, 1, 0, 3, 1, 2], [1, 0, 3, 0, 2, 3, 0, 2, 0, 1, 1, 3], [1, 0, 3, 0, 3, 1, 0, 3, 0, 2, 2, 1], [2, 0, 1, 0, 1, 1, 0, 3, 0, 3, 3, 2], [3, 0, 1, 0, 2, 2, 0, 1, 0, 1, 3, 3], [3, 0, 2, 0, 3, 3, 0, 1, 0, 2, 1, 1], [1, 0, 3, 0, 1, 3, 0, 2, 0, 3, 1, 2]] \$$

$$[3 y_5, 0, -3 y_5 + 5 y_1 - 3 y_2 - 3 y_3 - 3 y_4 + 5 y_8 - 3 y_6 + 5 y_7, 0, 3 y_1, 3 y_2, 3 y_3, 3 y_4, 0, 3 y_8, 3 y_6, 3 y_7]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1251 . Coloring, $\{2, 5, 8, 9, 10, 11\}$

R: [7, 8, 7, 6, 3, A, B, B, C, 2, 4, 5]

B: [6, 7, 8, 7, A, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	9 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1], [0, 1, 2, 3, 1, 2, 1, 2, 0, 1, 3, 0], [0, 1, 1, 3, 0, 3, 2, 1, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 1, 1, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 0, 2, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 0, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 3, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 2, 0, 3, 3, 0]] \$$

$$[0, y_5, y_4, y_3, y_2, y_1, y_5 + y_4 - y_3 - y_2 + y_1 - y_9 - y_8 + y_7 + y_6, y_9, 0, y_8, y_7, y_6]$$

$$p = -s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7
See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3], [1, 0, 1, 0, 0, 2, 0, 1, 3, 2, 2, 4], [2, 0, 2, 0, 0, 1, 0, 1, 4, 0, 3, 3], [3, 0, 1, 0, 0, 2, 0, 2, 3, 0, 4, 1], [4, 0, 2, 0, 0, 3, 0, 1, 1, 0, 3, 2], [3, 0, 3, 0, 0, 4, 0, 2, 2, 0, 1, 1], [1, 0, 4, 0, 0, 3, 0, 3, 1, 0, 2, 2], [2, 0, 3, 0, 0, 1, 0, 4, 2, 0, 1, 3], [1, 0, 1, 0, 0, 2, 0, 3, 3, 0, 2, 4]] \$$

$$[y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

1252 . Coloring, $\{2, 5, 8, 9, 10, 12\}$

R: [7, 8, 7, 6, 3, A, B, B, C, 2, 1, 9]

B: [6, 7, 8, 7, A, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	6 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6
See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 0, 3, 2, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 0, 3, 1, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 3, 1, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2]] \$

[3 y₁, -3 y₁ - 6 y₃ - 3 y₄ - 3 y₂ + 13 y₆ - 3 y₇ - 3 y₅ + 13 y₈, 3 y₃, 0, 0, 3 y₃, 3 y₄, 3 y₂, 3 y₆, 3 y₇, 3 y₅, 3 y₈]

$$p = -s^5 - s^6 + s^8 + s^9 \quad p' = -s^5 - s^6 + s^8 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 0, 2, 1, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 1, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

[0, 0, y₂, y₂ + y₄, y₁, y₄, y₂ + y₆, y₆, 0, y₅, y₄, y₃]

$$p = -s^4 + s^7 \quad p' = -s^5 + s^8 \quad p'' = -s^4 + s^7$$

1253 . Coloring, {2, 5, 8, 9, 11, 12}

R: [7, 8, 7, 6, 3, A, B, B, C, C, 4, 9]

B: [6, 7, 8, 7, A, 3, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	10 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 2, 1, 0, 3, 1, 3, 3] , [0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 1, 4] , [0, 0, 0, 1, 0, 3, 0, 0, 4, 3, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_3, y_4, 0, y_5, -y_4 + y_5 - y_1 - y_2 + y_6 + y_7, y_3, y_1, y_2, y_6, y_7]$$

$$p = -s^7 + s^8 \quad p = -s^7 + s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1], [1, 3, 1, 0, 1, 2, 2, 1, 0, 4, 0, 1], [0, 4, 2, 0, 1, 1, 3, 1, 0, 3, 0, 1], [0, 3, 1, 0, 1, 0, 4, 2, 0, 4, 0, 1], [0, 4, 0, 0, 1, 0, 3, 1, 0, 5, 0, 2], [0, 5, 0, 0, 2, 0, 4, 0, 0, 4, 0, 1], [0, 4, 0, 0, 1, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]] \$$$

$$[y_1, y_2, y_{10}, 0, y_6, y_7, y_8, y_9, 0, y_5, y_3, y_4]$$

1254 . Coloring, {2, 5, 8, 10, 11, 12}

R: [7, 8, 7, 6, 3, A, B, B, B, 2, 4, 9]

B: [6, 7, 8, 7, A, 3, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 4, 0], [0, 1, 0, 4, 0, 2, 1, 2, 0, 1, 5, 0], [0, 1, 0, 5, 0, 4, 0, 1, 0, 2, 3, 0], [0, 2, 0, 3, 0, 5, 0, 1, 0, 4, 1, 0], [0, 4, 0, 1, 0, 3, 0, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 1, 0, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 1, 0, 5, 0, 1, 4, 0], [0, 1, 0, 4, 0, 2, 0, 3, 0, 1, 5, 0], [0, 1, 0, 5, 0, 4, 0, 1, 0, 2, 3, 0]] \$$$

$$[0, y_7, y_6, y_5, 0, y_4, y_3, y_2, 2y_6, y_1, -y_7 + y_6 + y_5 - y_4 + y_3 + y_2 + y_1, 0]$$

$$p' = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = s^3 - s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 0, 4], [0, 0, 1, 0, 4, 2, 0, 1, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0, 0, 1, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 0, 2, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 0, 0, 0]] \$$$

$0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$

$[y_7, 0, y_6, 0, y_5, y_4, y_7, y_3, 0, y_2, 0, y_1]$

$$p = s^5 - s^8$$

1255 . Coloring, {2, 5, 9, 10, 11, 12}

R: [7, 8, 7, 6, 3, A, B, C, C, 2, 4, 9]

B: [6, 7, 8, 7, A, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 10

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 2, 2], [0, 1, 0, 2, 0, 2, 1, 2, 2, 1, 2, 3], [0, 1, 0, 2, 0, 2, 0, 1, 3, 2, 1, 4], [0, 2, 0, 1, 0, 2, 0, 1, 4, 2, 0, 4], [0, 2, 0, 0, 0, 1, 0, 2, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 0, 2, 5, 1, 0, 6], [0, 1, 0, 0, 0, 0, 0, 2, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$[0, -y_6 + y_7 - y_4 + y_5 + y_3 + y_1 + y_2 - y_9 - y_8, y_6, y_7, 0, y_4, y_5, y_3, y_1, y_2, y_9, y_8]$

$$p = -s^9 + s^{10}$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {5, 10, 12}}

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 2, 2], [2, 0, 1, 0, 2, 2, 0, 1, 0, 4, 1, 3], [1, 0, 2, 0, 3, 2, 0, 1, 0, 2, 1, 4], [1, 0, 2, 0, 4, 1, 0, 2, 0, 3, 1, 2], [1, 0, 1, 0, 2, 1, 0, 2, 0, 4, 2, 3], [2, 0, 1, 0, 3, 1, 0, 1, 0, 2, 2, 4], [2, 0, 1, 0, 4, 2, 0, 1, 0, 3, 1, 2], [1, 0, 2, 0, 2, 2, 0, 1, 0, 4, 1, 3], [1, 0, 2, 0, 3, 1, 0, 2, 0, 2, 1, 4]] \$$

$[7 y_1, 0, 7 y_2, 0, 9 y_1 + 9 y_2 + 9 y_4 - 7 y_5 + 9 y_3 - 7 y_6 + 9 y_7 - 7 y_8, 7 y_4, 7 y_5, 7 y_3, 0, 7 y_6, 7 y_7, 7 y_8]$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1256 . Coloring, {2, 6, 7, 8, 9, 10}

R: [7, 8, 7, 6, A, 3, A, B, C, 2, 1, 5]

B: [6, 7, 8, 7, 3, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	7 vs 9

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1] , [1, 3, 1, 0, 1, 0, 3, 2, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 2, 3, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 1, 4, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 2, 4, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 3, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 1, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 4, 2, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 2, 3, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 1, 4, 0, 2, 3, 0]] \$

$$[y_1 + y_7 + y_3 - y_4 - y_5 + y_6, y_1, y_2 - y_7, 0, y_2, y_7, y_3, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9 \quad p' = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 1, 3, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, 0, y_5, y_1, 0, y_5, y_2, y_4, y_3, y_4, y_6, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

1257 . Coloring, {2, 6, 7, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^4 + 4s^5 - 8s^6 - 8s^7 - 16s^8$$

R: [7, 8, 7, 6, A, 3, A, B, C, C, 4, 5]

B: [6, 7, 8, 7, 3, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 2, 1, 0, 0, 4, 1, 3] , [0, 0, 2, 1, 3, 1, 1, 0, 0, 4, 0, 4] , [0, 0, 1, 0, 4, 1, 2, 0, 0, 4, 0, 4] , [0, 0, 1, 0, 4, 0, 1, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

[0, 0, y_2 , y_1 , y_7 , y_3 , y_4 , y_5 , 0, y_6 , y_9 , y_8]

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 2, 1, 1, 1, 4, 1] , [4, 1, 0, 0, 0, 3, 1, 0, 1, 2, 3, 1] , [3, 2, 0, 0, 0, 4, 1, 0, 1, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 2, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 4, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 3, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 3, 2, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 4, 2, 0, 0, 3, 2, 0]] \$

[$y_1 + y_2 + y_3 - y_4 - y_5 - y_6 - y_7 + y_8 + y_9$, $y_1, y_2, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9$]

$$p = -s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

1258 . Coloring, {2, 6, 7, 8, 9, 12}

R: [7, 8, 7, 6, A, 3, A, B, C, C, 1, 9]

B: [6, 7, 8, 7, 3, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3], [1, 0, 1, 0, 0, 0, 3, 0, 3, 2, 1, 5], [1, 0, 0, 0, 0, 0, 2, 0, 5, 3, 0, 5], [0, 0, 0, 0, 0, 1, 0, 5, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$[y_1, 0, y_6, 0, 0, y_3, y_2, y_3, y_4, y_5, y_6, y_7]$

$$p = -s^6 + s^8 \quad p' = -s^6 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1], [0, 1, 2, 3, 1, 0, 4, 1, 0, 1, 2, 1], [0, 1, 1, 2, 1, 0, 4, 2, 0, 0, 4, 1], [0, 0, 1, 4, 1, 0, 3, 1, 0, 0, 4, 2], [0, 0, 1, 4, 2, 0, 4, 1, 0, 0, 3, 1], [0, 0, 2, 3, 1, 0, 4, 1, 0, 0, 4, 1], [0, 0, 1, 4, 1, 0, 3, 2, 0, 0, 4, 1], [0, 0, 1, 4, 1, 0, 4, 1, 0, 0, 3, 2], [0, 0, 1, 3, 2, 0, 4, 1, 0, 0, 4, 1], [0, 0, 2, 4, 1, 0, 3, 1, 0, 0, 4, 1]] \$$

$[0, 11 y_1 - 5 y_2 + 11 y_3 - 5 y_6 - 5 y_4 + 11 y_5 - 5 y_7 - 5 y_8 + 11 y_9, 5 y_1, 5 y_2, 5 y_3, 5 y_6, 5 y_4, 5 y_5, 0, 5 y_7, 5 y_8, 5 y_9]$

$$p = s^4 + s^5 + s^6 - s^8 - s^9 - s^{10}$$

1259 . Coloring, {2, 6, 7, 8, 10, 11}

R: [7, 8, 7, 6, A, 3, A, B, B, 2, 4, 5]

B: [6, 7, 8, 7, 3, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 9

Omega Rank for R : cycles: $\{\{2, 3, 4, 6, 7, 8, 10, 11\}\}$ order: 8

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 2, 0], [0, 3, 1, 2, 0, 2, 1, 2, 0, 4, 1, 0], [0, 4, 2, 1, 0, 2, 1, 3, 0, 1, 2, 0], [0, 1, 2, 2, 0, 1, 2, 4, 0, 1, 3, 0], [0, 1, 1, 3, 0, 2, 2, 1, 0, 2, 4, 0], [0, 2, 2, 4, 0, 3, 1, 1, 0, 2, 1, 0], [0, 2, 3, 1, 0, 4, 2, 2, 0, 1, 1, 0], [0, 1, 4, 1, 0, 1, 3, 2, 0, 2, 2, 0], [0, 2, 1, 2, 0, 1, 4, 1, 0, 3, 2, 0]] \$$

$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_7, 0, y_8, y_9, 0]$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 2, 4], [2, 0, 0, 0, 0, 2, 0, 1, 4, 1, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 0, 6], [0, 0, 0, 0, 2, 0, 0, 6, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$[-y_1 + y_2 + y_3 - y_4 - y_5 + y_6, 0, y_1, 0, 0, y_2, 2y_1, y_3, y_4, y_5, 2y_3, y_6]$

$$p = -s^6 + s^8 \quad p = -s^6 + s^9 \quad p = -s^6 + s^7$$

1260 . Coloring, $\{2, 6, 7, 8, 10, 12\}$

R: $[7, 8, 7, 6, A, 3, A, B, B, 2, 1, 9]$

B: $[6, 7, 8, 7, 3, A, B, C, C, C, 4, 5]$

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 9

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 2, 0], [2, 3, 1, 0, 0, 0, 3, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 3, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 2, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 3, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 2, 3, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 3, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 3, 3, 0, 3, 2, 0]] \$$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, 2y_4, y_7, y_8, 0]$$

$$p = s^3 - s^9$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {4, 7, 11}} order: 12

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 2, 4], [0, 0, 2, 2, 4, 0, 2, 1, 0, 1, 2, 2], [0, 0, 4, 2, 2, 0, 2, 2, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 2, 4, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 2, 2, 0, 0, 2, 4], [0, 0, 2, 2, 4, 0, 2, 2, 0, 0, 2, 2], [0, 0, 4, 2, 2, 0, 2, 2, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 2, 4, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 2, 2, 0, 0, 2, 4]] \$$$

$$[0, 0, y_6, y_5, y_4, y_3, y_5, y_2, 0, y_1, y_5, -y_6 - y_4 - y_3 - y_2 - y_1 + 5y_5]$$

$$p' = s^4 - s^8 \quad p' = -s^3 + s^7 \quad p = s^3 - s^7$$

1261 . Coloring, {2, 6, 7, 8, 11, 12}

R: [7, 8, 7, 6, A, 3, A, B, B, C, 4, 9]

B: [6, 7, 8, 7, 3, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 10

Omega Rank for R : cycles: {{3, 4, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 2, 2], [0, 0, 1, 2, 0, 2, 1, 0, 2, 2, 3, 3], [0, 0, 2, 3, 0, 2, 1, 0, 3, 1, 2, 2], [0, 0, 2, 2, 0, 3, 2, 0, 2, 1, 3, 1], [0, 0, 3, 3, 0, 2, 2, 0, 1, 2, 2, 1], [0, 0, 2, 2, 0, 3, 3, 0, 1, 2, 1, 2], [0, 0, 3, 1, 0, 2, 2, 0, 2, 3, 1, 2], [0, 0, 2, 1, 0, 1, 3, 0, 2, 2, 2, 3], [0, 0, 1, 2, 0, 1, 2, 0, 3, 3, 2, 2]] \$$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_9, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 2, 2, 1, 0, 1, 2, 1] , [2, 1, 2, 0, 1, 2, 1, 2, 0, 2, 2, 1] , [2, 2, 1, 0, 1, 2, 1, 2, 0, 2, 1, 2] , [1, 2, 1, 0, 2, 2, 2, 1, 0, 2, 1, 2] , [1, 2, 2, 0, 2, 1, 2, 1, 0, 2, 2, 1] , [2, 2, 2, 0, 1, 1, 2, 2, 0, 1, 2, 1] , [2, 1, 1, 0, 1, 2, 2, 2, 0, 1, 2, 2] , [2, 1, 1, 0, 2, 2, 1, 1, 0, 2, 2, 2] , [2, 2, 2, 0, 2, 2, 1, 1, 0, 2, 1, 1]] \$

[3 y₃, 5 y₁ - 3 y₂ + 5 y₄ - 3 y₆, 3 y₁ + 3 y₄ - 3 y₇, 0, 3 y₁, 3 y₂, -3 y₃ + 5 y₁ + 5 y₄ - 3 y₅, 3 y₄, 0, 3 y₅, 3 y₆, 3 y₇]

$$p = s + s^3 - s^7 - s^9 \quad p' = s - s^2 + 2s^3 - 2s^4 + 2s^5 - 2s^6 + s^7 - s^8 \quad p'' = -s^2 + s^3 - 2s^4 + 2s^5 - 2s^6 + 2s^7 - s^8 + s^9$$

1262 . Coloring, {2, 6, 7, 9, 10, 11}

R: [7, 8, 7, 6, A, 3, A, C, C, 2, 4, 5]

B: [6, 7, 8, 7, 3, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 9

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 2, 1, 2, 0, 4, 0, 1] , [0, 4, 2, 0, 1, 0, 1, 3, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 2, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 3, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 4, 0, 2, 0, 3]] \$

[0, y₉, y₇, y₈, y₆, y₄, y₅, y₃, 0, y₂, 0, y₁]

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 4, 2] , [4, 0, 0, 0, 0, 2, 0, 1, 2, 1, 5, 1] , [5, 0, 0, 0, 0, 4, 0, 0, 1, 2, 3, 1] , [3, 0, 0, 0, 0, 5, 0, 0, 1, 4, 1, 2] , [1, 0, 0, 0, 0, 3, 0, 0, 2, 5, 1, 4] , [1, 0, 0, 0, 0, 1, 0, 0, 4, 3, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 0, 5, 1, 4, 3] , [4, 0, 0, 0, 0, 2, 0, 0, 3, 1, 5, 1] , [5, 0, 0, 0, 0, 4, 0, 0, 1, 2, 3, 1]] \$

$$[-y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, 0, 0, y_2, 2y_1, y_3, y_4, y_5, y_6, y_7]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p = -s^3 + s^9$$

1263 . Coloring, {2, 6, 7, 9, 10, 12}

R: [7, 8, 7, 6, A, 3, A, C, C, 2, 1, 9]

B: [6, 7, 8, 7, 3, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 0, 2] , [0, 3, 1, 0, 0, 0, 3, 2, 2, 2, 0, 3] , [0, 2, 0, 0, 0, 0, 1, 3, 3, 3, 0, 4] , [0, 3, 0, 0, 0, 0, 2, 4, 1, 0, 6] , [0, 1, 0, 0, 0, 0, 3, 6, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 6, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[2y_8, y_1, y_2, 0, 0, y_8, y_3, y_4, y_5, y_6, 0, y_7]$$

$$p = -s^7 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 9

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 0, 2, 1, 0, 1, 3, 1] , [0, 0, 2, 3, 1, 0, 4, 2, 0, 0, 3, 1] , [0, 0, 1, 3, 1, 0, 3, 2, 0, 0, 6, 0] , [0, 0, 1, 6, 0, 0, 3, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 1, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0]] \$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

1264 . Coloring, {2, 6, 7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s + s^2 + s^4 + 4s^5 - 8s^7 - 16s^8$$

R: [7, 8, 7, 6, A, 3, A, C, C, C, 4, 9]

B: [6, 7, 8, 7, 3, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 0, 4] , [0, 0, 1, 0, 0, 2, 1, 0, 4, 2, 0, 6] , [0, 0, 2, 0, 0, 0, 1, 0, 6, 1, 0, 6] , [0, 0, 0, 0, 0, 2, 0, 6, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, 0, y_1, 2y_4, 0, y_2, y_3, y_4, y_5, y_6, 0, y_7]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 4, 0] , [4, 1, 2, 0, 0, 2, 2, 1, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 4, 1, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 1, 0, 0, 4, 3, 0] , [3, 4, 0, 0, 0, 3, 2, 0, 0, 3, 1, 0] , [1, 3, 0, 0, 0, 3, 4, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 1, 3, 0, 0, 3, 4, 0] , [4, 3, 0, 0, 0, 2, 3, 0, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 4, 3, 0, 0, 2, 3, 0]] \$

$$[y_1, y_2, y_1 - y_2 + y_6 - y_5 + y_3 + y_4 + y_7 - y_8, 0, y_6, y_5, y_3, y_4, 0, y_7, y_8, 0]$$

$$p = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

1265 . Coloring, {2, 6, 7, 10, 11, 12}

R: [7, 8, 7, 6, A, 3, A, C, B, 2, 4, 9]

B: [6, 7, 8, 7, 3, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	8 vs 9

Omega Rank for R : cycles: $\{\{2, 3, 4, 6, 7, 8, 9, 10, 11, 12\}\}$ order: 10
See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1], [0, 3, 1, 1, 0, 2, 1, 2, 1, 2, 2, 1], [0, 2, 2, 2, 0, 1, 1, 3, 1, 1, 1, 2], [0, 1, 1, 1, 0, 2, 2, 2, 1, 1, 3], [0, 1, 2, 1, 0, 1, 1, 1, 3, 2, 2, 2], [0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1], [0, 1, 1, 3, 0, 2, 1, 2, 1, 2, 2, 1], [0, 2, 2, 2, 0, 3, 1, 1, 1, 1, 1, 2], [0, 1, 3, 1, 0, 2, 2, 2, 2, 1, 1, 1], [0, 1, 2, 1, 0, 1, 3, 1, 1, 2, 2, 2]] \$$

$$[0, y_2, y_1, y_4, 0, y_3, y_9, y_{10}, y_8, y_6, y_7, y_5]$$

Omega Rank for B : cycles: $\{\{1, 3, 5, 6, 8, 10, 11, 12\}\}$ order: 8
See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 0, 1, 0, 1, 3, 1], [3, 0, 3, 0, 1, 3, 0, 2, 0, 2, 1, 1], [1, 0, 1, 0, 1, 3, 0, 3, 0, 3, 2, 2], [2, 0, 1, 0, 2, 1, 0, 1, 0, 3, 3, 3], [3, 0, 2, 0, 3, 2, 0, 1, 0, 1, 1, 3], [1, 0, 3, 0, 3, 3, 0, 2, 0, 2, 1, 1], [1, 0, 3, 0, 1, 1, 0, 3, 0, 3, 2, 2], [2, 0, 1, 0, 2, 1, 0, 3, 0, 1, 3, 3]] \$$

$$[y_1 - y_2 + y_3 - y_4 - y_5 - y_6 + y_7 + y_8, 0, y_1, 0, y_2, y_3, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

1266 . Coloring, $\{2, 6, 8, 9, 10, 11\}$

R: [7, 8, 7, 6, A, 3, B, B, C, 2, 4, 5]

B: [6, 7, 8, 7, 3, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 10
See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1] , [0, 1, 1, 3, 1, 2, 1, 2, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 3, 1, 1, 0, 1, 3, 0] , [0, 1, 3, 3, 0, 3, 2, 2, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 3, 1, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 4, 0, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0]] \$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_7, 0, y_8, y_9, y_{10}]$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 1, 3, 3, 2, 4] , [2, 0, 0, 0, 0, 1, 0, 0, 4, 2, 3, 4] , [3, 0, 0, 0, 0, 2, 0, 0, 4, 1, 4, 2] , [4, 0, 0, 0, 0, 3, 0, 0, 2, 2, 4, 1] , [4, 0, 0, 0, 0, 4, 0, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 4, 0, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 4, 2, 4] , [2, 0, 0, 0, 0, 1, 0, 0, 4, 2, 3, 4]] \$

$$[y_5, 0, y_6, 0, 0, y_5 - 3y_6 + y_1 + y_2 + y_3 - y_4 - y_7, 2y_6, y_1, y_2, y_3, y_4, y_7]$$

$$p = s^3 - s^9 \quad p' = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1267 . Coloring, {2, 6, 8, 9, 10, 12}

R: [7, 8, 7, 6, A, 3, B, B, C, 2, 1, 9]

B: [6, 7, 8, 7, 3, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	5 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1] , [3, 1, 1, 0, 0, 0, 3, 2, 1, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 1, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 3, 0, 1, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 5, 0, 2, 0, 3, 1] , [3, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 5, 0, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 3, 0, 1, 0, 5, 2]] \$

$$[3y_7, 3y_6, 3y_5, 0, 0, 3y_6 - 3y_5, 3y_4, 3y_3, 3y_2, 3y_6 - 3y_5, -3y_7 - 9y_6 + 3y_5 - 3y_4 - 3y_3 + 13y_2 + 13y_1, 3y_1]$$

$$p = -s^4 + s^{10} \quad p = -s^4 - s^5 + s^7 + s^8 \quad p' = s^4 + s^5 - s^7 - s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 0, 2, 1, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 1, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 1, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$$$

$$[0, 0, y_5 - y_2, -y_1 + y_4 + y_5, y_1, y_4, y_2, -y_3 + y_4 + y_5, 0, y_3, y_4, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7 \quad p = -s^5 + s^8 \quad p = -s^5 + s^9$$

1268 . Coloring, {2, 6, 8, 9, 11, 12}

R: [7, 8, 7, 6, A, 3, B, B, C, C, 4, 9]

B: [6, 7, 8, 7, 3, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	9 vs 10

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3], [0, 0, 1, 3, 0, 2, 1, 0, 3, 0, 3, 3], [0, 0, 2, 3, 0, 3, 1, 0, 3, 0, 1, 3], [0, 0, 3, 1, 0, 3, 2, 0, 3, 0, 1, 3], [0, 0, 3, 1, 0, 1, 3, 0, 3, 0, 2, 3], [0, 0, 1, 2, 0, 1, 3, 0, 3, 0, 3, 3], [0, 0, 1, 3, 0, 2, 1, 0, 3, 0, 3, 3], [0, 0, 2, 3, 0, 3, 1, 0, 3, 0, 1, 3], [0, 0, 3, 1, 0, 3, 2, 0, 3, 0, 1, 3]] \$$$

$$[0, 0, -3y_1 - 3y_2 - 3y_3 - 3y_5 + 10y_6 - 3y_4, 3y_1, 0, 3y_2, 3y_3, 3y_5, -3y_5 + 3y_6, 3y_5, 3y_4, 3y_6]$$

$$p = s^2 - s^7 \quad p' = s^2 - s^7 \quad p' = s^3 - s^8$$

Omega Rank for B : cycles: {{2, 7, 10}, {3, 5, 8, 12}} order: 12

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1], [1, 3, 2, 0, 1, 2, 2, 1, 0, 3, 0, 1], [0, 3, 1, 0, 1, 1, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 1, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 4, 1, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 4, 1, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 4, 1, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 4, 1, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 3, 1, 0, 4, 0, 1]] \$$$

$$[5 y_3, -5 y_3 + 11 y_2 + 11 y_1 - 5 y_9 - 5 y_8 + 11 y_7 - 5 y_6 - 5 y_5 + 11 y_4, 5 y_2, 0, 5 y_1, 5 y_9, 5 y_8, 5 y_7, 0, 5 y_6, 5 y_5, 5 y_4]$$

$$p = s^4 + s^5 + s^6 - s^8 - s^9 - s^{10}$$

1269 . Coloring, {2, 6, 8, 10, 11, 12}

R: [7, 8, 7, 6, A, 3, B, B, B, 2, 4, 9]

B: [6, 7, 8, 7, 3, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	4 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5
See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 4, 0], [0, 1, 1, 4, 0, 2, 1, 2, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 1, 1, 0, 0, 3, 0], [0, 0, 4, 3, 0, 5, 2, 0, 0, 0, 2, 0], [0, 0, 5, 2, 0, 3, 4, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 2, 5, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 3, 0, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 2, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 5, 2, 0, 0, 0, 2, 0]] \$$$

$$[0, y_1, y_2, y_3, 0, y_4, y_5, y_6, 2 y_7, y_7, y_8, 0]$$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4
See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 0, 4], [0, 0, 2, 0, 4, 2, 0, 1, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 0, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$$$

$$[-y_2 + y_4, 0, -y_3 + y_2, 0, y_2, y_3, -y_2 + y_4, y_1, 0, -y_1 + y_4, 0, y_4]$$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6 \quad p = -s^4 + s^7 \quad p = -s^4 + s^8$$

1270 . Coloring, {2, 6, 9, 10, 11, 12}

R: [7, 8, 7, 6, A, 3, B, C, C, 2, 4, 9]

B: [6, 7, 8, 7, 3, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	6 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 2, 2] , [0, 1, 1, 2, 0, 2, 1, 2, 2, 0, 2, 3] , [0, 0, 2, 2, 0, 2, 1, 1, 3, 0, 1, 4] , [0, 0, 2, 1, 0, 2, 2, 0, 4, 0, 1, 4] , [0, 0, 2, 1, 0, 1, 2, 0, 4, 0, 2, 4] , [0, 0, 1, 2, 0, 1, 2, 0, 4, 0, 2, 4] , [0, 0, 1, 2, 0, 2, 1, 0, 4, 0, 2, 4] , [0, 0, 2, 2, 0, 2, 1, 0, 4, 0, 1, 4] , [0, 0, 2, 1, 0, 2, 2, 0, 4, 0, 1, 4] , [0, 0, 2, 1, 0, 1, 2, 0, 4, 0, 2, 4]] \$

$$[0, y_4 + y_5 + y_7 - y_8, y_1, -y_1 - y_3 - y_2 + 2y_4 + 2y_5 + 2y_7 - y_6, 0, y_3, y_2, y_4, y_5, y_7, y_6, y_8]$$

$$p = -s^4 + s^9 \quad p' = -s^4 + s^9$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 2, 0, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 2, 0, 2, 1, 3] , [1, 0, 3, 0, 3, 1, 0, 2, 0, 2, 2, 2] , [2, 0, 3, 0, 2, 1, 0, 3, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 2, 0, 3, 0, 1, 3, 1] , [3, 0, 2, 0, 1, 2, 0, 2, 0, 2, 3, 1] , [3, 0, 1, 0, 1, 3, 0, 2, 0, 2, 2, 2] , [2, 0, 1, 0, 2, 3, 0, 1, 0, 3, 2, 2]] \$

$$[-y_1 + y_5 + y_6, 0, y_5 + y_6 - y_3 - y_2, 0, y_1, y_3, y_2, -y_4 + y_5 + y_6, 0, y_4, y_5, y_6]$$

$$p = s^2 - s^5 + s^6 - s^9 \quad p' = s^3 - s^4 + s^7 - s^8 \quad p'' = s^2 - s^4 + s^6 - s^8$$

1271 . Coloring, {2, 7, 8, 9, 10, 11}

R: [7, 8, 7, 6, A, A, A, B, C, 2, 4, 5]

B: [6, 7, 8, 7, 3, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 1, 1], [0, 4, 0, 1, 1, 2, 0, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 1, 0, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 1, 0, 5, 0, 1, 4, 0], [0, 1, 0, 4, 0, 2, 0, 3, 0, 1, 5, 0], [0, 1, 0, 5, 0, 4, 0, 1, 0, 2, 3, 0], [0, 2, 0, 3, 0, 5, 0, 1, 0, 4, 1, 0], [0, 4, 0, 1, 0, 3, 0, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 1, 0, 4, 0, 3, 2, 0]] \$$

$$[0, y_1, 0, y_1 + y_2 + y_3 - y_4 - y_7 + y_5 + y_6, y_2, y_3, 2y_6, y_4, 0, y_7, y_5, y_6]$$

$$p = -s^3 + s^9 \quad p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 3, 3], [3, 0, 1, 0, 0, 2, 0, 2, 3, 0, 4, 1], [4, 0, 2, 0, 0, 3, 0, 1, 1, 0, 3, 2], [3, 0, 3, 0, 0, 4, 0, 2, 2, 0, 1, 1], [1, 0, 4, 0, 0, 3, 0, 3, 1, 0, 2, 2], [2, 0, 3, 0, 0, 1, 0, 4, 2, 0, 1, 3], [1, 0, 1, 0, 0, 2, 0, 3, 3, 0, 2, 4], [2, 0, 2, 0, 0, 1, 0, 1, 4, 0, 3, 3]] \$$

$$[y_5, 0, y_4, 0, 0, y_3, y_1, y_2, y_8, 0, y_7, y_6]$$

1272 . Coloring, $\{2, 7, 8, 9, 10, 12\}$

R: [7, 8, 7, 6, A, A, A, B, C, 2, 1, 9]

B: [6, 7, 8, 7, 3, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}, \{9, 12\}\}$ order: 6
 See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 2, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 1, 4, 2, 2, 2, 1], [2, 2, 0, 0, 0, 0, 1, 3, 1, 1, 4, 2], [4, 1, 0, 0, 0, 0, 2, 2, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 4, 1, 1, 2, 2, 2], [2, 2, 0, 0, 0, 0, 3, 1, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 2, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 1, 4, 2, 2, 2, 1]] \$$

$[-3 y_1 + 8 y_3 - 3 y_5 + 5 y_7, 3 y_4, 0, 0, 0, -3 y_4 - 3 y_2 + 5 y_3 - 3 y_6 + 8 y_7, 3 y_2, 3 y_1, 3 y_3, 3 y_5, 3 y_6, 3 y_7]$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}, \{4, 7, 11\}\}$ order: 12
 See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 3, 3], [0, 0, 3, 3, 3, 0, 2, 2, 0, 0, 2, 1], [0, 0, 3, 2, 1, 0, 3, 3, 0, 0, 2, 2], [0, 0, 1, 2, 2, 0, 2, 3, 0, 0, 3, 3], [0, 0, 2, 3, 3, 0, 2, 1, 0, 0, 2, 3], [0, 0, 3, 2, 3, 0, 3, 2, 0, 0, 2, 1], [0, 0, 3, 2, 1, 0, 2, 3, 0, 0, 3, 2], [0, 0, 1, 3, 2, 0, 2, 3, 0, 0, 2, 3]] \$$

$[0, 0, 7 y_2, 7 y_1, -7 y_2 + 9 y_1 - 7 y_7 + 9 y_6 - 7 y_5 + 9 y_4 - 7 y_3, 7 y_7, 7 y_6, 7 y_5, 0, 0, 7 y_4, 7 y_3]$

$$p = -s^2 - s^3 - s^4 + s^6 + s^7 + s^8$$

1273 . Coloring, $\{2, 7, 8, 9, 11, 12\}$

R: $[7, 8, 7, 6, A, A, A, B, C, C, 4, 9]$

B: $[6, 7, 8, 7, 3, 3, B, C, B, 2, 1, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 6
 See Matrix

$\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 1, 3], [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 1, 6], [0, 0, 0, 1, 0, 1, 0, 0, 6, 2, 0, 6], [0, 0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$$[0, 0, 0, y_1, 0, y_2, 2 y_3, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 3, 1], [3, 0, 3, 0, 1, 2, 2, 2, 0, 0, 2, 1], [2, 0, 3, 0, 1, 3, 0, 3, 0, 0, 2, 2], [2, 0, 4, 0, 2, 2, 0, 3, 0, 0, 0, 3], [0, 0, 4, 0, 3, 2, 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3]] \$$$

$$[y_1, y_3, y_2, 0, y_7, y_4, y_5, y_6, 0, 0, y_9, y_8]$$

1274 . Coloring, {2, 7, 8, 10, 11, 12}

R: [7, 8, 7, 6, A, A, A, B, B, 2, 4, 9]

B: [6, 7, 8, 7, 3, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 2, 0], [0, 4, 0, 2, 0, 2, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 0, 4, 0, 2, 2, 0], [0, 2, 0, 3, 0, 3, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 4, 0, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 3, 0, 3, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 0, 2, 0, 3, 3, 0]] \$$$

$$[0, y_6, 0, y_7, 0, y_5, y_2, y_1, y_2, y_3, y_4, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 2, 4], [2, 0, 3, 0, 4, 2, 0, 2, 0, 0, 2, 1], [2, 0, 6, 0, 1, 2, 0, 3, 0, 0, 0, 2], [0, 0, 3, 0, 2, 2, 0, 6, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 3, 0, 0, 0, 6], [0, 0, 3, 0, 6, 0, 0, 4, 0, 0, 0, 3], [0, 0, 6, 0, 3, 0, 0, 3, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 6, 0, 0, 0, 3]] \$$$

$$[y_1, 0, y_2, 0, y_4, y_5, y_6, y_7, 0, 0, y_3, y_8]$$

1275 . Coloring, {2, 7, 9, 10, 11, 12}

R: [7, 8, 7, 6, A, A, A, C, C, 2, 4, 9]

B: [6, 7, 8, 7, 3, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 2, 0, 2, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 0, 4, 3, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 3, 4, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, y_1, 0, y_3, 0, y_2, y_3, y_4, y_5, y_6, 0, y_7]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 4, 2] , [4, 0, 3, 0, 2, 2, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 3, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 0, 4, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 2, 0, 4, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 0, 3, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 3, 0, 0, 2, 0]] \$

$$[y_3, 0, y_2, 0, y_1, y_7, y_6, y_5, 0, 0, y_4, y_6]$$

$$p = s^3 - s^8$$

1276 . Coloring, {2, 8, 9, 10, 11, 12}

R: [7, 8, 7, 6, A, A, B, B, C, 2, 4, 9]

B: [6, 7, 8, 7, 3, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 0, 2, 1, 1, 3, 2], [0, 1, 0, 3, 0, 3, 0, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 3, 0, 1, 1, 3, 2, 2], [0, 3, 0, 2, 0, 2, 0, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 0, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 1, 0, 3, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 0, 2, 1, 1, 3, 2], [0, 1, 0, 3, 0, 3, 0, 2, 2, 2, 2, 1]] \$$

$[0, 3 y_3, 0, 3 y_4, 0, -3 y_3 + 5 y_2 - 3 y_6 + 8 y_7, -3 y_4 - 3 y_1 + 8 y_2 - 3 y_5 + 5 y_7, 3 y_1, 3 y_2, 3 y_5, 3 y_6, 3 y_7]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 1, 3], [1, 0, 3, 0, 3, 2, 0, 2, 0, 2, 0, 3], [0, 0, 5, 0, 3, 1, 0, 3, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5]] \$$

$$[y_3, 0, y_2, 0, y_1, y_4, 2 y_7, y_5, 0, 2 y_3 - 2 y_7, y_7, y_6]$$

$$p' = s^4 - s^8 \quad p = s^4 - s^8$$

1277 . Coloring, {3, 4, 5, 6, 7, 8}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, B, B, C, 1, 5]

B: [6, 8, 7, 6, A, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{1, 3, 5, 7, 8, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 2, 2, 2], [2, 0, 2, 0, 2, 0, 2, 2, 0, 3, 1, 2], [1, 0, 2, 0, 2, 0, 2, 2, 0, 2, 2, 3], [2, 0, 2, 0, 3, 0, 1, 2, 0, 2, 2, 2], [2, 0, 3, 0, 2, 0, 2, 2, 0, 1, 2, 2], [2, 0, 2, 0, 2, 0, 2, 3, 0, 2, 2, 1], [2, 0, 2, 0, 1, 0, 2, 2, 0, 2, 3, 2], [3, 0, 1, 0, 2, 0, 2, 2, 0, 2, 2, 2]] \$$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8

See Matrix

$\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 2, 2, 2], [0, 2, 0, 2, 0, 2, 0, 2, 2, 2, 1, 3], [0, 2, 0, 1, 0, 2, 0, 2, 3, 2, 0, 4], [0, 2, 0, 0, 0, 1, 0, 2, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 0, 2, 5, 1, 0, 6], [0, 1, 0, 0, 0, 0, 0, 2, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[0, y_1 - y_8 + y_6 + y_7 + y_4 + y_5 - y_2 - y_3, 0, y_1, 0, y_8, y_6, y_7, y_4, y_5, y_2, y_3]$$

$$p = s^8 - s^9$$

1278 . Coloring, $\{3, 4, 5, 6, 7, 9\}$

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, C, C, C, 1, 5]

B: [6, 8, 7, 6, A, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	7 vs 7	6 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}\}$ order: 4
 See Matrix

$\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 2, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 2, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 2, 0, 2, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5]] \$$

$$[y_1, 0, y_5, 0, y_4, 0, y_3, y_2, 0, y_6, 0, y_7]$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6
 See Matrix

$\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 4, 0, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 0, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 4, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 2, 0, 4, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 2, 0, 2, 4, 0]] \$$

$$[0, y_3 - y_2 + 3y_1 + y_4 + y_5 - y_6, 0, y_3, 0, y_2, y_1, y_4, 2y_1, y_5, y_6, 0]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 \quad p = -s^2 + s^8$$

1279 . Coloring, $\{3, 4, 5, 6, 7, 10\}$

R: $[7, 7, 8, 7, 3, 3, A, C, B, 2, 1, 5]$

B: $[6, 8, 7, 6, A, A, B, B, C, C, 4, 9]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{2, 7, 10\}\}$ order: 12
 See Matrix

$\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 2, 1, 1] , [1, 2, 2, 0, 1, 0, 4, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 3, 2, 0, 4, 0, 2] , [0, 4, 1, 0, 2, 0, 3, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 4, 1, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 3, 2, 0, 4, 0, 1] , [0, 4, 1, 0, 1, 0, 3, 2, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 4, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 3, 1, 0, 4, 0, 1]] \$$

$$[3 y_5, 3 y_4, 3 y_3, 0, 3 y_2, 0, 3 y_1, 3 y_3 - 3 y_2 + 3 y_6, 0, -3 y_5 - 3 y_4 + 10 y_3 - 3 y_1 - 3 y_7 + 10 y_6, 3 y_7, 3 y_6]$$

$$p' = -s^3 - s^5 + s^6 + s^8 \quad p = s^3 + s^5 - s^6 - s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 2, 4], [0, 0, 0, 2, 0, 3, 0, 0, 4, 2, 0, 5], [0, 0, 0, 0, 2, 0, 0, 5, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[0, 0, 0, y_6, 0, y_5, y_4, y_4, y_3, y_2, y_1, y_6 - y_5 + 2 y_4 + y_3 + y_2 - y_1]$$

$$p = -s^6 + s^8 \quad p = -s^6 + s^7$$

1280 . Coloring, {3, 4, 5, 6, 7, 11}

R: [7, 7, 8, 7, 3, 3, A, C, B, C, 4, 5]

B: [6, 8, 7, 6, A, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 2, 1, 3], [0, 0, 2, 1, 3, 0, 2, 2, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 1, 2, 0, 2, 0, 5], [0, 0, 3, 0, 5, 0, 0, 3, 0, 1, 0, 4], [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4]] \$$$

$$[0, 0, y_3, y_4, y_2, 0, y_1, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 0, 2, 1, 2, 2, 2], [2, 2, 0, 0, 0, 3, 0, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 2, 0, 2, 1, 3, 2, 2], [2, 3, 0, 0, 0, 2, 0, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2], [2, 2, 0, 0, 0, 2,$$

0, 2, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 0, 2, 1, 2, 2, 2], [2, 2, 0, 0, 0, 3, 0, 2, 2, 2, 2, 1]] \$

[3 y₇, 3 y₆, 0, 0, 0, -3 y₆ + 8 y₁ - 3 y₅ + 5 y₄, -3 y₇ - 3 y₃ + 5 y₁ - 3 y₂ + 8 y₄, 3 y₃, 3 y₁, 3 y₂, 3 y₅,
3 y₄]

$$p' = -s^2 + s^8 \quad p = s^2 - s^8$$

1281 . Coloring, {3, 4, 5, 6, 7, 12}

R: [7, 7, 8, 7, 3, 3, A, C, B, C, 1, 9]

B: [6, 8, 7, 6, A, A, B, B, C, 2, 4, 5]

' See graph

' ' See pair graph

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 2, 1, 3], [1, 0, 0, 0, 0, 0, 2, 2, 3, 3, 2, 3], [2, 0, 0, 0, 0, 0, 1, 0, 3, 2, 3, 5], [3, 0,
0, 0, 0, 0, 2, 0, 5, 1, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 2, 5, 1], [5, 0, 0, 0, 0, 0, 3, 0, 1, 3, 2, 2], [2, 0, 0, 0, 0, 0,
5, 0, 2, 3, 1, 3], [1, 0, 0, 0, 0, 0, 2, 0, 3, 5, 2, 3]] \$

[y₂, 0, y₁, 0, 0, 0, y₅, y₃, y₄, y₈, y₆, y₇]

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 2, 3, 1], [0, 2, 0, 3, 1, 2, 0, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 3, 0, 2, 0, 3, 2, 0], [0, 3,
0, 2, 0, 2, 0, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 3, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 4,
0, 2, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 3, 0, 2, 0, 3, 2, 0]] \$

[0, y₁, 0, y₂, y₃, y₄, y₈, y₅, 0, y₆, y₇, y₈]

$$p = -s^3 + s^9$$

1282 . Coloring, {3, 4, 5, 6, 8, 9}

R: [7, 7, 8, 7, 3, 3, B, B, C, C, 1, 5]

B: [6, 8, 7, 6, A, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 0, 3, 3] , [3, 0, 2, 0, 3, 0, 2, 2, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 0, 3, 2, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 4, 3, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0]] \$

$[y_1, 0, y_2, 0, y_3, 0, y_4, y_5, 0, 0, y_6, y_7]$

Omega Rank for B : cycles: {{2, 4, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 0, 2, 1, 3, 2, 1] , [0, 3, 0, 2, 0, 1, 0, 4, 1, 2, 1, 2] , [0, 2, 0, 1, 0, 2, 0, 3, 2, 1, 1, 4] , [0, 1, 0, 1, 0, 1, 0, 2, 4, 2, 2, 3] , [0, 2, 0, 2, 0, 1, 0, 1, 3, 1, 4, 2] , [0, 1, 0, 4, 0, 2, 0, 2, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 4, 0, 1, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 3, 0, 1, 2, 4, 1, 1]] \$

$[0, y_1, 0, y_2, 0, y_7, y_3, y_4, y_5, y_6, y_8, y_9]$

1283 . Coloring, {3, 4, 5, 6, 8, 10}

$\Omega p(\Delta)=0: p = s^3 + 2s^4 - 8s^6 + 32s^8$

R: [7, 7, 8, 7, 3, 3, B, B, B, 2, 1, 5]

B: [6, 8, 7, 6, A, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	5 vs 7

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 0, 4, 0], [4, 0, 2, 0, 0, 0, 4, 2, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 4, 2, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$$

$[y_2, y_3, y_1, 0, y_3, 0, y_4, y_5, 0, 0, y_6, 0]$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 4
See Matrix

$\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 4, 0, 4], [0, 0, 0, 0, 0, 2, 0, 0, 4, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$[0, 0, 0, 2y_4, 0, y_1, y_4, y_4, y_2, y_3, 0, y_5]$

$$p' = -s^4 + s^6 \quad p = s^4 - s^6$$

1284 . Coloring, $\{3, 4, 5, 6, 8, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, B, B, C, 4, 5]

B: [6, 8, 7, 6, A, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 0, 4, 2] , [0, 0, 2, 4, 2, 0, 2, 2, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 0, 4, 2, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 4, 2, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

[0, 0, y₁, y₂, y₃, 0, y₄, y₅, 0, 0, y₆, y₇]

Omega Rank for B : cycles: {{9, 12}} order: 6
See Matrix

\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 2, 0, 2, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 0, 4, 3, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 3, 4, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[2 y₂, y₃, 0, 0, 0, y₁, y₂, y₇, y₅, y₆, 0, y₄]

$$p = -s^6 + s^8$$

1285 . Coloring, {3, 4, 5, 6, 8, 12}

$$\Omega p(\Delta)=0: p = s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, B, B, C, 1, 9]
B: [6, 8, 7, 6, A, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	8 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 3
See Matrix

\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 2, 2, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$$[y_5, 0, -2y_3 + 2y_2, 0, 0, 0, y_4, y_3, y_2, 0, y_1, -2y_3 + 2y_2]$$

$$p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 4, 0, 2], [0, 4, 0, 0, 2, 2, 0, 2, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 5, 0, 1, 0, 4], [0, 1, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5], [0, 2, 0, 0, 5, 0, 0, 1, 0, 4, 0, 4], [0, 4, 0, 0, 4, 0, 0, 2, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2]] \$$$

$$[0, y_1, 0, 2y_5, y_3, y_4, y_5, y_2, 0, y_6, 0, y_7]$$

$$p = s^3 - s^8$$

1286 . Coloring, {3, 4, 5, 6, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, C, C, 2, 1, 5]

B: [6, 8, 7, 6, A, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

$$\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 4, 2, 0, 0, 3, 1], [3, 0, 2, 0, 1, 0, 2, 2, 0, 0, 4, 2], [4, 0, 1, 0, 2, 0, 3, 2, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 4, 1, 0, 0, 3, 2], [3, 0, 2, 0, 2, 0, 2, 2, 0, 0, 4, 1], [4, 0, 2, 0, 1, 0, 3, 2, 0, 0, 2, 2], [2, 0, 1, 0, 2, 0, 4, 2, 0, 0, 3, 2]] \$$$

$$[-7y_2 + 9y_1 + 9y_5 - 7y_3 + 9y_4 - 7y_6 + 9y_7, 7y_2, 7y_1, 0, 7y_5, 0, 7y_3, 7y_4, 0, 0, 7y_6, 7y_7]$$

$$p = s^2 + s^3 + s^4 - s^6 - s^7 - s^8$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 3, 3, 4] , [0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 2, 3] , [0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 4, 0, 0, 2, 2, 2, 3] , [0, 0, 0, 2, 0, 3, 0, 0, 3, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 3, 3, 4]] \$

[0, 0, 0, y_1 , 0, y_2 , y_3 , y_3 , y_4 , y_5 , y_6 , y_7]

$$p = s^2 - s^8$$

1287 . Coloring, {3, 4, 5, 6, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, C, C, C, 4, 5]

B: [6, 8, 7, 6, A, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 0, 2, 4] , [0, 0, 2, 2, 4, 0, 2, 2, 0, 0, 3, 1] , [0, 0, 4, 3, 1, 0, 2, 2, 0, 0, 2, 2] , [0, 0, 1, 2, 2, 0, 3, 4, 0, 0, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 1, 0, 0, 3, 4] , [0, 0, 2, 3, 4, 0, 2, 2, 0, 0, 2, 1] , [0, 0, 4, 2, 1, 0, 3, 2, 0, 0, 2, 2]] \$

[0, 0, 7 y_2 , 7 y_1 , -7 y_2 + 9 y_1 + 9 y_3 - 7 y_5 + 9 y_4 - 7 y_6 , 0, 7 y_3 , 7 y_5 , 0, 0, 7 y_4 , 7 y_6]

$$p = -s - s^2 - s^3 + s^5 + s^6 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 0, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 0, 3, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 2, 0, 3, 3, 0]] \$

$$[y_1, y_2, 0, 0, 0, y_7, y_5, y_6, 2y_5, y_4, y_3, 0]$$

$$p = -s^2 + s^8$$

1288 . Coloring, {3, 4, 5, 6, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, C, C, C, 1, 9]

B: [6, 8, 7, 6, A, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 2, 4, 0, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 0, 2, 6], [2, 0, \\ 0, 0, 0, 0, 3, 0, 6, 0, 2, 3], [2, 0, 0, 0, 0, 0, 2, 0, 3, 0, 3, 6], [3, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 3], [2, 0, 0, 0, 0, 0, \\ 3, 0, 3, 0, 2, 6]] \$ \end{aligned}$$

$$[7y_1, 0, 9y_1 + 9y_2 - 7y_3 - 7y_6 + 9y_4 - 7y_5, 0, 0, 0, 7y_2, 7y_3, 7y_6, 0, 7y_4, 7y_5]$$

$$p = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 0, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 2, 0, 4, 0, 2, 2, 0], [0, 2, \\ 0, 2, 0, 1, 0, 5, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 0, 2, 0, 1, 5, 0], [0, 1, 0, 5, 0, 4, 0, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 5, \\ 0, 1, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 0, 2, 0, 5, 1, 0]] \$ \end{aligned}$$

$$[0, y_5, 0, y_4, 2y_2, y_1, y_2, y_3, 0, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

1289 . Coloring, {3, 4, 5, 6, 10, 11}

R: [7, 7, 8, 7, 3, 3, B, C, B, 2, 4, 5]

B: [6, 8, 7, 6, A, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 0, 3, 1] , [0, 0, 2, 3, 1, 0, 4, 2, 0, 0, 3, 1] , [0, 0, 1, 3, 1, 0, 3, 2, 0, 0, 4, 2] , [0, 0, 1, 4, 2, 0, 3, 1, 0, 0, 3, 2] , [0, 0, 2, 3, 2, 0, 4, 1, 0, 0, 3, 1] , [0, 0, 2, 3, 1, 0, 3, 2, 0, 0, 4, 1] , [0, 0, 1, 4, 1, 0, 3, 2, 0, 0, 3, 2] , [0, 0, 1, 3, 2, 0, 4, 1, 0, 0, 3, 2]] \$

[0, 3 y₆, 3 y₅, 3 y₄, 3 y₃, 0, 3 y₂, 3 y₁, 0, 0, -3 y₆ - 3 y₄ - 3 y₂ + 10 y₃ + 10 y₁, -3 y₅ + 3 y₃ + 3 y₁]

$$p = s^2 + s^4 - s^5 - s^7 \quad p' = s^2 + s^4 - s^5 - s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 1, 6] , [1, 0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[y₁, 0, 0, 0, 0, y₂, y₄, y₄, y₃, y₅, y₆, y₇]

$$p = -s^6 + s^8$$

1290 . Coloring, {3, 4, 5, 6, 10, 12}

R: [7, 7, 8, 7, 3, 3, B, C, B, 2, 1, 9]

B: [6, 8, 7, 6, A, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 0, 3, 1] , [3, 0, 0, 0, 0, 0, 4, 2, 1, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 3, 0, 1, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 4, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 7, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 0, 0, 0, 7, 0]] \$

$$[y_1, y_2, y_2, 0, 0, 0, y_6, y_7, y_5, 0, y_3, y_4]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 2, 0, 0, 0, 5, 1, 4] , [0, 0, 0, 1, 4, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[0, 0, 0, y_1, y_2, y_3, y_6, y_6, 0, y_4, y_5, y_7]$$

$$p = s^5 - s^8$$

1291 . Coloring, {3, 4, 5, 6, 11, 12}

R: [7, 7, 8, 7, 3, 3, B, C, B, C, 4, 9]

B: [6, 8, 7, 6, A, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 2, 3, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 5, 0, 2, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0]] \$

[0, 0, y₅, y₆, 0, 0, y₇, y₄, y₃, 0, y₂, y₁]

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6
See Matrix

\$ [[2, 2, 0, 0, 2, 2, 1, 1, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 2, 0, 2, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 1, 0, 4, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 1, 0, 5, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 2, 0, 3, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 4, 0, 1, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 5, 0, 1, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 3, 0, 2, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 1, 0, 4, 0, 3, 2, 0]] \$

[y₁, y₁ - y₂ - y₃ + y₄ + y₅ - y₆, 0, 0, y₂, y₃, y₇, y₄, 0, y₅, y₆, y₇]

$$p = -s^3 + s^9 \quad p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1292 . Coloring, {3, 4, 5, 7, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, A, B, C, C, 1, 5]
B: [6, 8, 7, 6, A, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	10 vs 10

Omega Rank for R : cycles: {{1, 3, 5, 7, 8, 10, 11, 12}} order: 8
See Matrix

\$ [[2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 0, 2, 1, 0, 3, 1, 3] , [1, 0, 3, 0, 3, 0, 1, 2, 0, 2, 1, 3] , [1, 0, 3, 0, 3, 0, 1, 3, 0, 1, 2, 2] , [2, 0, 3, 0, 2, 0, 1, 3, 0, 1, 3, 1] , [3, 0, 2, 0, 1, 0, 2, 3, 0, 1, 3, 1] , [3, 0, 1, 0, 1, 0, 3, 2, 0, 2, 3, 1] , [3, 0, 1, 0, 1, 0, 3, 1, 0, 3, 2, 2]] \$

$$[y_4 + y_5 - y_1, 0, -y_2 + y_4 + y_5, 0, y_1, 0, y_2, -y_3 + y_4 + y_5, 0, y_3, y_4, y_5]$$

$$p = s - s^2 + s^5 - s^6 \quad p' = -s + s^2 - s^5 + s^6 \quad p'' = -s + s^3 - s^5 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 10

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 3, 1], [0, 1, 2, 3, 0, 2, 1, 2, 1, 0, 3, 1], [0, 0, 2, 3, 0, 3, 2, 1, 1, 0, 2, 2], [0, 0, 3, 2, 0, 3, 2, 0, 2, 0, 3, 1], [0, 0, 3, 3, 0, 2, 3, 0, 1, 0, 4, 0], [0, 0, 2, 4, 0, 3, 3, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 4, 2, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 3, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 3, 4, 0, 0, 0, 3, 0], [0, 0, 3, 3, 0, 2, 4, 0, 0, 0, 4, 0]] \$$$

$$[0, y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, y_8, y_9, y_{10}]$$

1293 . Coloring, {3, 4, 5, 7, 8, 10}

R: [7, 7, 8, 7, 3, A, A, B, B, 2, 1, 5]

B: [6, 8, 7, 6, A, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	6 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 2, 0], [2, 3, 2, 0, 0, 0, 4, 1, 0, 3, 1, 0], [1, 3, 0, 0, 0, 0, 5, 2, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 4, 0, 0, 5, 2, 0], [2, 5, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0]] \$$$

$$[y_3, y_4, y_5, 0, y_6, 0, y_1, y_2, 0, y_7, y_8, 0]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

$$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 2, 4], [0, 0, 2, 2, 0, 2, 1, 0, 4, 0, 1, 4], [0, 0, 2, 1, 0, 2, 2, 0, 4, 0, 1, 4], [0, 0, 2, 1, 0, 1, 2, 0, 4, 0, 2, 4], [0, 0, 1, 2, 0, 1, 2, 0, 4, 0, 2, 4], [0, 0, 1, 2, 0, 2, 1, 0, 4, 0, 2, 4], [0, 0, 2, 2, 0, 2, 1, 0, 4, 0, 1, 4], [0, 0, 2, 1, 0, 2, 2, 0, 4, 0, 1, 4], [0, 0, 2, 1, 0, 1, 2, 0, 4, 0, 2, 4]] \$$$

$$[0, 0, -y_1 - y_2 - y_3 - y_4 + 2y_5 + 4y_6, y_1, 0, y_2, y_3, y_6, y_5, y_6, y_4, y_5 + 2y_6]$$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7 \quad p'' = -s^3 + s^8$$

1294 . Coloring, {3, 4, 5, 7, 8, 11}

R: [7, 7, 8, 7, 3, A, A, B, B, C, 4, 5]

B: [6, 8, 7, 6, A, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 10

Omega Rank for R : cycles: {{3, 4, 5, 7, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 0, 2, 2, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 0, 1, 2, 0, 2, 2, 2] , [0, 0, 3, 2, 2, 0, 1, 3, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 3, 0, 1, 3, 1] , [0, 0, 2, 3, 1, 0, 2, 2, 0, 2, 3, 1] , [0, 0, 1, 3, 1, 0, 3, 2, 0, 2, 2, 2]] \$

$$[0, 0, y_5, y_4, y_3, 0, -y_5 + y_4 + y_3, y_2, 0, y_4 + y_3 - y_2, y_1, y_4 + y_3 - y_1]$$

$$p = -s + s^4 - s^5 + s^8 \quad p = -s + s^3 - s^5 + s^7 \quad p = -s + s^2 - s^5 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 2, 2] , [2, 1, 2, 0, 0, 2, 1, 2, 2, 0, 1, 3] , [1, 0, 2, 0, 0, 2, 2, 1, 3, 0, 1, 4] , [1, 0, 2, 0, 0, 1, 2, 0, 4, 0, 2, 4] , [2, 0, 1, 0, 0, 1, 2, 0, 4, 0, 2, 4] , [2, 0, 1, 0, 0, 2, 1, 0, 4, 0, 2, 4] , [2, 0, 2, 0, 0, 2, 1, 0, 4, 0, 1, 4] , [1, 0, 2, 0, 0, 2, 2, 0, 4, 0, 1, 4] , [1, 0, 2, 0, 0, 1, 2, 0, 4, 0, 2, 4] , [2, 0, 1, 0, 0, 1, 2, 0, 4, 0, 2, 4]] \$

$$[-y_1 - y_2 - y_3 + 2y_4 + 2y_5 + 2y_6 - y_7, y_4 + y_5 + y_6 - y_8, y_1, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p' = -s^4 + s^9 \quad p = s^4 - s^9$$

1295 . Coloring, {3, 4, 5, 7, 8, 12}

R: [7, 7, 8, 7, 3, A, A, B, B, C, 1, 9]

B: [6, 8, 7, 6, A, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	5 vs 10

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 1, 2, 3, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 0, 3, 2, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 2, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 3, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 3, 2, 3] , [2, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 3] , [2, 0, 0, 0, 0, 0, 2, 0, 3, 3, 3, 3]] \$

$$[y_1, 0, y_1 - y_2 + y_3 + y_4 + y_5 - y_6 - y_7, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}, {2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 2, 2] , [0, 1, 2, 2, 2, 2, 1, 2, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 2, 2, 1, 0, 2, 1, 2] , [0, 2, 2, 1, 2, 2, 0, 1, 2, 1] , [0, 1, 1, 2, 1, 1, 2, 2, 0, 2, 2, 2] , [0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 2, 2] , [0, 1, 2, 2, 2, 2, 1, 2, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 2, 2, 1, 0, 2, 1, 2] , [0, 2, 2, 1, 2, 1, 2, 2, 0, 1, 2, 1] , [0, 1, 1, 2, 1, 1, 2, 2, 0, 2, 2, 2]] \$

$$[0, y_1 + y_2 - y_3, y_2 + y_1 - y_5, -y_2 + y_3 + y_4, y_1 - y_5 + y_4, y_1, y_2, y_3 - y_5 + y_4, 0, y_3, y_4, y_5]$$

$$p' = s - s^6 \quad p' = s^2 - s^7 \quad p' = s^4 - s^9 \quad p = s - s^6 \quad p' = s^3 - s^8$$

1296 . Coloring, {3, 4, 5, 7, 9, 10}

R: [7, 7, 8, 7, 3, A, A, C, C, 2, 1, 5]

B: [6, 8, 7, 6, A, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{3, 5, 8, 12\}\}$ order: 12

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 4, 1, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 2, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 4, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 3, 1, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 3, 2, 0, 3, 0, 1], [0, 3, 1, 0, 1, 0, 4, 2, 0, 3, 0, 2]] \$$

$[-3 y_1 + 10 y_2 - 3 y_3 + 10 y_4 - 3 y_5, 3 y_1, 3 y_2 + 3 y_4 - 3 y_6, 0, 3 y_2, 0, 3 y_3, 3 y_4, 0, 3 y_5, 0, 3 y_6]$

$$p = -s^2 - s^4 + s^5 + s^7 \quad p' = -s^2 - s^4 + s^5 + s^7$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 4, 2], [0, 0, 2, 4, 0, 2, 1, 0, 2, 0, 4, 1], [0, 0, 2, 4, 0, 4, 2, 0, 1, 0, 3, 0], [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 3, 4, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0]] \$$

$[0, 0, y_2, y_1, 0, y_3, y_4, y_6, y_5, y_6, y_7, y_8]$

$$p = -s^4 + s^9$$

1297 . Coloring, $\{3, 4, 5, 7, 9, 11\}$

R: [7, 7, 8, 7, 3, A, A, C, C, C, 4, 5]

B: [6, 8, 7, 6, A, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	8 vs 9

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 1, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 2, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$

$$[0, 0, y_4 - y_2, -y_1 + y_4, y_1, 0, y_2, y_4 - y_3, 0, y_3, 0, y_4]$$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 4, 0] , [4, 1, 2, 0, 0, 2, 1, 2, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 2, 1, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0]] \$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_8, 2y_6, y_6, y_7, 0]$$

$$p = -s^4 + s^9$$

1298 . Coloring, {3, 4, 5, 7, 9, 12}

R: [7, 7, 8, 7, 3, A, A, C, C, C, 1, 9]

B: [6, 8, 7, 6, A, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 1, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[2y_1 - 4y_2 - 4y_3 + 4y_4, 0, y_1 - 2y_2 - 2y_3 + 2y_4, 0, 0, 0, y_1, y_2 + y_3 - y_4, y_2, y_3, 0, y_4]$$

$$p = -s^4 + s^6 \quad p = -s^4 + s^5 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 4, 0], [0, 1, 2, 4, 0, 2, 1, 2, 0, 2, 2, 0], [0, 2, 2, 2, 0, 4, 2, 1, 0, 0, 3, 0], [0, 0, \\ & 4, 3, 0, 2, 2, 2, 0, 0, 3, 0], [0, 0, 2, 3, 0, 3, 4, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 3, 2, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 4, \\ & 3, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 3, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 2, 4, 0, 0, 0, 3, 0]] \$ \end{aligned}$$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_7, 0, y_8, y_9, 0]$$

1299 . Coloring, {3, 4, 5, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, A, C, B, 2, 4, 5]

B: [6, 8, 7, 6, A, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 9

Omega Rank for R : cycles: {{2, 7, 10}, {3, 5, 8, 12}} order: 12

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 1, 1], [0, 3, 2, 1, 1, 0, 4, 1, 0, 3, 0, 1], [0, 3, 1, 0, 1, 0, 4, 2, 0, 4, 0, 1], [0, 4, \\ & 1, 0, 1, 0, 3, 1, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 4, 1, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 4, 1, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, \\ & 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 4, 1, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 4, 1, 0, 4, 0, 1]] \$ \end{aligned}$$

$$[0, 5y_2, 5y_1, -5y_2 + 11y_1 + 11y_5 - 5y_4 + 11y_3 - 5y_7 - 5y_6 + 11y_8, 5y_5, 0, 5y_4, 5y_3, 0, 5y_7, 5y_6, 5y_8]$$

$$p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 3, 3] , [3, 0, 2, 0, 0, 2, 1, 0, 3, 0, 2, 3] , [2, 0, 2, 0, 0, 3, 2, 0, 3, 0, 1, 3] , [1, 0, 3, 0, 0, 2, 2, 0, 3, 0, 2, 3] , [2, 0, 2, 0, 0, 1, 3, 0, 3, 0, 2, 3] , [2, 0, 1, 0, 0, 2, 2, 0, 3, 0, 3, 3] , [3, 0, 2, 0, 0, 2, 1, 0, 3, 0, 2, 3] , [2, 0, 2, 0, 0, 3, 2, 0, 3, 0, 1, 3] , [1, 0, 3, 0, 0, 2, 2, 0, 3, 0, 2, 3]] \$

$$[-3y_1 - 3y_3 - 3y_2 + 3y_5 + 7y_6 - 3y_4, 0, 3y_1, 0, 0, 3y_3, 3y_2, -3y_5 + 3y_6, 3y_5, -3y_5 + 3y_6, 3y_4, 3y_6]$$

$$p' = -s^2 + s^7 \quad p' = -s^3 + s^8 \quad p = -s^2 + s^7$$

1300 . Coloring, {3, 4, 5, 7, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, A, C, B, 2, 1, 9]

B: [6, 8, 7, 6, A, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 0, 4, 1, 1, 3, 2, 1] , [2, 3, 0, 0, 0, 0, 4, 0, 1, 4, 1, 1] , [1, 4, 0, 0, 0, 0, 5, 0, 1, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 5, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, y_3, 0, 0, 0, y_7, y_8, y_9, y_4, y_5, y_6]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}, {5, 10, 12}}

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 2, 1, 0, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 3, 2, 0, 0, 3, 1, 2] , [0, 0, 3, 1, 2, 2, 0, 0, 1, 2, 3] , [0, 0, 2, 2, 3, 1, 3, 0, 0, 2, 2, 1] , [0, 0, 1, 2, 1, 2, 2, 0, 0, 3, 3, 2] , [0, 0, 2, 3, 2, 2, 1, 0, 0, 1, 2, 3] , [0, 0, 2, 2, 3, 3, 2, 0, 0, 2, 1, 1] , [0, 0, 3, 1, 1, 2, 2, 0, 0, 3, 2, 2]] \$

$$[0, 0, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7, 3 y_8, 0, 3 y_2, -3 y_3 - 3 y_4 + 5 y_5 - 3 y_6 - 3 y_7 - 3 y_8 + 5 y_2 + 5 y_1, 3 y_1]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1301 . Coloring, {3, 4, 5, 7, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, A, C, B, C, 4, 9]

B: [6, 8, 7, 6, A, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6
See Matrix

$$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 1, 3], [0, 0, 0, 1, 0, 0, 2, 1, 3, 3, 2, 4], [0, 0, 0, 2, 0, 0, 1, 0, 4, 2, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 1, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 2, 4, 1], [0, 0, 0, 4, 0, 0, 4, 0, 1, 3, 2, 2], [0, 0, 0, 2, 0, 0, 4, 0, 2, 4, 1, 3], [0, 0, 0, 1, 0, 0, 2, 0, 3, 4, 2, 4]] \$$$

$$[0, 0, y_7, y_6, 0, 0, y_5, y_4, y_3, y_2, y_1, -y_7 + y_6 - y_5 + y_4 + y_3 + y_2 - y_1]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 10
See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 3, 1], [3, 1, 2, 0, 1, 2, 1, 2, 0, 2, 2, 0], [2, 2, 2, 0, 0, 3, 2, 1, 0, 1, 3, 0], [3, 1, 3, 0, 0, 2, 2, 0, 0, 3, 0], [3, 0, 2, 0, 0, 3, 3, 1, 0, 0, 4, 0], [4, 0, 3, 0, 0, 3, 2, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 4, 3, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 3, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 2, 4, 0, 0, 0, 3, 0], [3, 0, 2, 0, 0, 3, 4, 0, 0, 0, 4, 0]] \$$$

$$[y_1, y_2, y_3, 0, y_4, y_{10}, y_9, y_8, 0, y_6, y_7, y_5]$$

1302 . Coloring, {3, 4, 5, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, B, B, C, 2, 1, 5]

B: [6, 8, 7, 6, A, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 0, 4, 1, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 0, 4, 2, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$[y_1, y_3, y_2, 0, y_3, 0, y_4, y_6, 0, y_7, y_5, y_7]$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 1, 3] , [0, 0, 2, 1, 0, 2, 1, 0, 3, 1, 2, 4] , [0, 0, 2, 2, 0, 1, 2, 0, 4, 1, 3, 1] , [0, 0, 1, 3, 0, 2, 2, 0, 1, 2, 4, 1] , [0, 0, 2, 4, 0, 3, 1, 0, 1, 2, 1, 2] , [0, 0, 3, 1, 0, 4, 2, 0, 2, 1, 1, 2] , [0, 0, 4, 1, 0, 1, 3, 0, 2, 2, 2, 1] , [0, 0, 1, 2, 0, 1, 4, 0, 1, 3, 2, 2] , [0, 0, 1, 2, 0, 2, 1, 0, 2, 4, 1, 3]] \$

$[0, 0, y_8, y_7, 0, y_5, y_4, y_6, y_3, y_2, y_9, y_1]$

1303 . Coloring, {3, 4, 5, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, B, B, C, C, 4, 5]

B: [6, 8, 7, 6, A, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 3, 3], [0, 0, 2, 3, 3, 0, 2, 1, 0, 0, 4, 1], [0, 0, 3, 4, 1, 0, 3, 2, 0, 0, 3, 0], [0, 0, 1, 3, 0, 0, 4, 3, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 3, 1, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0]] \$$

$[0, 0, y_1, y_2, y_6, 0, y_5, y_4, 0, y_3, y_8, y_7]$

Omega Rank for B : cycles: $\{\{1, 2, 3, 6, 7, 8, 9, 10, 11, 12\}\}$ order: 10

See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 1, 1], [1, 3, 2, 0, 0, 2, 1, 2, 1, 1, 2, 1], [2, 1, 2, 0, 0, 1, 2, 3, 1, 1, 1, 2], [1, 1, 1, 0, 0, 2, 2, 1, 2, 2, 1, 3], [1, 2, 2, 0, 0, 1, 1, 1, 3, 2, 2, 1], [2, 2, 1, 0, 0, 1, 2, 2, 1, 1, 3, 1], [3, 1, 1, 0, 0, 2, 1, 2, 1, 2, 1, 2], [1, 2, 2, 0, 0, 3, 1, 1, 2, 1, 1, 2], [1, 1, 3, 0, 0, 1, 2, 2, 2, 1, 2, 1], [2, 1, 1, 0, 0, 1, 3, 1, 1, 2, 2, 2]] \$$

$[y_3, y_2, y_1, 0, 0, y_{10}, y_9, y_8, y_7, y_6, y_5, y_4]$

1304 . Coloring, $\{3, 4, 5, 8, 9, 12\}$

$\Omega p(\Delta)=0: p = -3s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$

R: [7, 7, 8, 7, 3, A, B, B, C, C, 1, 9]

B: [6, 8, 7, 6, A, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6
 See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 2, 1, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3]] \$$

$$[3 y_2, 0, 3 y_5, 0, 0, 0, 3 y_1, -3 y_2 - 3 y_5 - 3 y_1 + 10 y_3 - 3 y_4, -3 y_5 + 3 y_3, 3 y_5, 3 y_4, 3 y_3]$$

$$p' = -s^4 + s^7 \quad p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 10
 See Matrix

$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 1, 2, 0, 3, 0, 1], [0, 3, 2, 0, 1, 1, 2, 3, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 2, 3, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 1, 2, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 2, 0, 4, 0, 3]] \$$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_8, 0, y_7, y_9, y_{10}]$$

1305 . Coloring, $\{3, 4, 5, 8, 10, 11\}$

R: [7, 7, 8, 7, 3, A, B, B, B, 2, 4, 5]

B: [6, 8, 7, 6, A, 3, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6
 See Matrix

$\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 4, 0], [0, 1, 2, 4, 0, 0, 4, 1, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 5, 2, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$$

$$[0, y_4, 2y_4 - 3y_5, y_3, 2y_5, 0, y_1, y_2, 0, y_5, y_6, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 0, 4], [0, 0, 2, 0, 0, 2, 1, 0, 4, 1, 0, 6], [0, 0, 2, 0, 0, 0, 2, 0, 6, 1, 0, 5], [0, 0, 0, 0, 0, 2, 0, 5, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[2y_1, 0, y_4, 0, 0, y_2, y_3, y_1, y_7, y_6, 0, y_5]$$

$$p = -s^6 + s^8$$

1306 . Coloring, {3, 4, 5, 8, 10, 12}

R: [7, 7, 8, 7, 3, A, B, B, B, 2, 1, 9]

B: [6, 8, 7, 6, A, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 4, 0], [4, 1, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[y_1, y_4 + y_3, y_4, 0, 0, 0, y_2, y_3, 2y_4, y_4, y_5, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 2, 1, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 0, 0, 5, 0, 3] , [0, 0, 0, 0, 3, 0, 2, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[0, 0, y_1, 2y_4, y_6, y_7, y_5, y_4, 0, y_3, 0, y_2]$$

$$p = -s^5 + s^8$$

1307 . Coloring, {3, 4, 5, 8, 11, 12}

R: [7, 7, 8, 7, 3, A, B, B, B, C, 4, 9]

B: [6, 8, 7, 6, A, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 1, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, 0, -y_5 + y_2, y_3, 0, 0, y_4, y_5, y_6, -y_5 + y_2, y_1, y_2]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 2, 1, 2, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 2, 3, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 2, 3, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 4, 0, 0, 3, 0] , [0, 3, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3]] \$

$$[y_1, y_4, y_2, 0, y_3, y_8, y_9, y_7, 0, y_6, 0, y_5]$$

1308 . Coloring, {3, 4, 5, 9, 10, 11}

R: [7, 7, 8, 7, 3, A, B, C, C, 2, 4, 5]

B: [6, 8, 7, 6, A, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 2, 2], [0, 1, 2, 2, 2, 0, 4, 1, 0, 0, 3, 1], [0, 0, 2, 3, 1, 0, 3, 2, 0, 0, 4, 1], [0, 0, 1, 4, 1, 0, 3, 2, 0, 0, 3, 2], [0, 0, 1, 3, 2, 0, 4, 1, 0, 0, 3, 2], [0, 0, 2, 3, 2, 0, 3, 1, 0, 0, 4, 1], [0, 0, 2, 4, 1, 0, 3, 2, 0, 0, 3, 1], [0, 0, 1, 3, 1, 0, 4, 2, 0, 0, 3, 2], [0, 0, 1, 3, 2, 0, 3, 1, 0, 0, 4, 2]] \$

[0, -3 y₄ - 3 y₆ + 10 y₃ + 10 y₇ - 3 y₁ - 3 y₂, 3 y₃, 3 y₄, 3 y₅, 0, 3 y₆, 3 y₃ - 3 y₅ + 3 y₇, 0, 3 y₁, 3 y₂, 3 y₇]

$p = -s^3 - s^5 + s^6 + s^8$ $p' = s^3 + s^5 - s^6 - s^8$

Omega Rank for B : cycles: {{1, 3, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 2, 2], [2, 0, 2, 0, 0, 2, 1, 0, 2, 1, 3, 3], [3, 0, 2, 0, 0, 2, 2, 0, 3, 1, 2, 1], [2, 0, 2, 0, 0, 3, 2, 0, 1, 2, 3, 1], [3, 0, 3, 0, 0, 2, 2, 0, 1, 2, 1, 2], [1, 0, 2, 0, 0, 3, 3, 0, 2, 2, 1, 2], [1, 0, 3, 0, 0, 1, 2, 0, 2, 3, 2, 2], [2, 0, 1, 0, 0, 1, 3, 0, 2, 2, 2, 3], [2, 0, 1, 0, 0, 2, 1, 0, 3, 3, 2, 2]] \$

[y₁, 0, y₂, 0, 0, y₈, y₃, y₄, y₅, y₆, y₇, y₉]

1309 . Coloring, {3, 4, 5, 9, 10, 12}

R: [7, 7, 8, 7, 3, A, B, C, C, 2, 1, 9]

B: [6, 8, 7, 6, A, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 2, 2], [2, 1, 0, 0, 0, 0, 4, 1, 2, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3]] \$$

$[y_1, 6y_1 - 7y_2 - 13y_5 + 6y_3 + 6y_4, 3y_1 - 3y_2 - 7y_5 + 3y_3 + 3y_4, 0, 0, 0, y_3, 3y_1 - 4y_2 - 6y_5 + 3y_3 + 3y_4, y_2, 3y_1 - 3y_2 - 7y_5 + 3y_3 + 3y_4, y_4, y_5]$

$$p = -s^3 + s^9 \quad p' = -s^4 + s^7 \quad p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 9

See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 2, 2], [0, 0, 2, 2, 2, 2, 1, 0, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 2, 0, 0, 3, 0, 3], [0, 0, 2, 0, 3, 1, 2, 0, 0, 5, 0, 3], [0, 0, 1, 0, 3, 0, 2, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$

$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$

1310 . Coloring, $\{3, 4, 5, 9, 11, 12\}$

R: [7, 7, 8, 7, 3, A, B, C, C, C, 4, 9]

B: [6, 8, 7, 6, A, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 2, 4], [0, 0, 0, 2, 0, 0, 2, 1, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 2, 5], [0, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 3, 5], [0, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 3, 4]] \$$

$$[0, 0, 7y_3, 7y_6, 0, 0, 7y_5, 7y_4, 7y_2, 7y_3, 7y_1, -14y_3 + 9y_6 + 9y_5 - 7y_4 - 7y_2 + 9y_1]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: $\{\{1, 2, 3, 6, 7, 8, 10, 11\}\}$ order: 8

See Matrix

$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 2, 0], [2, 3, 2, 0, 0, 2, 1, 2, 0, 3, 1, 0], [1, 3, 2, 0, 0, 2, 2, 3, 0, 1, 2, 0], [2, 1, 2, 0, 0, 1, 2, 3, 0, 2, 3, 0], [3, 2, 1, 0, 0, 2, 2, 1, 0, 2, 3, 0], [3, 2, 2, 0, 0, 3, 1, 2, 0, 2, 1, 0], [1, 2, 3, 0, 0, 3, 2, 2, 0, 1, 2, 0], [2, 1, 3, 0, 0, 1, 3, 2, 0, 2, 2, 0], [2, 2, 1, 0, 0, 2, 3, 1, 0, 3, 2, 0]] \$$

$$[y_1, y_2, y_3, 0, y_7, y_6, y_4, y_5, 0, y_9, y_8, 0]$$

1311 . Coloring, $\{3, 4, 5, 10, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, B, C, B, 2, 4, 9]

B: [6, 8, 7, 6, A, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 4, 1, 1, 0, 5, 1], [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 5, 1], [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$$[0, y_5 + y_3, y_5, y_1, 0, 0, y_2, y_3, y_4, y_5, y_7, y_6]$$

$$p = s^5 - s^8 \quad p' = s^5 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

$$\begin{aligned} \$ [& [2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 2, 1, 0, 0, 3, 1, 3], [1, 0, 2, 0, 3, 1, 2, 0, 0, 4, 0, 3], [0, 0, \\ & 1, 0, 3, 1, 2, 0, 0, 5, 0, 4], [0, 0, 1, 0, 4, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, \\ & 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$ \end{aligned}$$

$$[y_4, 0, y_3, 0, y_2, y_1, y_5, y_6, 0, y_8, y_9, y_7]$$

1312 . Coloring, {3, 4, 6, 7, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, A, B, C, C, 1, 5]

B: [6, 8, 7, 6, 3, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 8	10 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 0, 1, 0, 2, 0, 3, 1, 0, 3, 1, 3], [1, 0, 0, 0, 3, 0, 2, 1, 0, 5, 1, 3], [1, 0, 0, 0, 3, 0, 1, 0, 0, 5, 1, 5], [1, 0, \\ & 0, 0, 5, 0, 1, 0, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, \\ & 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$ \end{aligned}$$

$$[y_1, 0, y_2, 0, y_4, 0, y_3, y_5, 0, y_7, y_8, y_6]$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 0, 2, 1, 1, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 1, 2, 1, 2, 3, 1], [0, 2, 0, 3, 0, 3, 0, 1, 1, 2, 2, 2], [0, 2, \\ & 0, 2, 0, 3, 0, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 0, 2, 1, 3, 2, 2], [0, 3, 0, 2, 0, 1, 0, 3, 2, 2, 1, 2], [0, 2, 0, 1, 0, 2, \\ & 0, 3, 2, 1, 2, 3], [0, 1, 0, 2, 0, 1, 0, 2, 3, 2, 2, 3], [0, 2, 0, 2, 0, 2, 0, 1, 3, 1, 3, 2], [0, 1, 0, 3, 0, 2, 0, 2, 2, 2, \\ & 2, 2]] \$ \end{aligned}$$

3, 1]] \$

[0, y₁, y₂, y₃, 0, y₅, y₄, y₆, y₇, y₈, y₉, y₁₀]

1313 . Coloring, {3, 4, 6, 7, 8, 10}

R: [7, 7, 8, 7, A, 3, A, B, B, 2, 1, 5]

B: [6, 8, 7, 6, 3, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 4, 1, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 5, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

[y₁, y₂, y₃, 0, 2 y₃, 0, y₄, y₅, 0, y₆, y₇, 0]

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 2, 4] , [0, 0, 0, 2, 0, 2, 1, 0, 4, 2, 1, 4] , [0, 0, 0, 1, 0, 2, 0, 0, 4, 2, 1, 6] , [0, 0, 0, 1, 0, 1, 0, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[0, 0, y₄, y₁, 0, y₂, y₃, y₄, y₅, y₆, y₇, y₈]

$$p = -s^7 + s^9$$

1314 . Coloring, {3, 4, 6, 7, 8, 11}

R: [7, 7, 8, 7, A, 3, A, B, B, C, 4, 5]

B: [6, 8, 7, 6, 3, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	10 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 2, 2] , [0, 0, 0, 2, 2, 0, 2, 1, 0, 5, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 4, 1, 5] , [0, 0, 0, 1, 5, 0, 1, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

[0, 0, y_6 , y_5 , y_4 , 0, y_3 , y_2 , 0, y_1 , y_7 , y_8]

Omega Rank for B : cycles: {{9, 12}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 2, 2] , [2, 1, 0, 0, 0, 2, 1, 2, 2, 2, 1, 3] , [1, 2, 0, 0, 0, 2, 0, 1, 3, 2, 1, 4] , [1, 2, 0, 0, 0, 1, 0, 2, 4, 2, 0, 4] , [0, 2, 0, 0, 0, 1, 0, 2, 4, 1, 0, 6] , [0, 1, 0, 0, 0, 0, 2, 6, 1, 0, 6] , [0, 1, 0, 0, 0, 0, 0, 1, 6, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 1, 8, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[y_1 , y_2 , y_3 , 0, 0, y_4 , y_5 , y_6 , y_7 , y_8 , y_9 , y_{10}]

1315 . Coloring, {3, 4, 6, 7, 8, 12}

R: [7, 7, 8, 7, A, 3, A, B, B, C, 1, 9]

B: [6, 8, 7, 6, 3, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 2, 2], [2, 0, 0, 0, 0, 0, 2, 1, 2, 3, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 2, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 2, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 3, 3, 2], [3, 0, 0, 0, 0, 0, 3, 0, 2, 3, 2, 3], [2, 0, 0, 0, 0, 0, 3, 0, 3, 3, 2, 3], [2, 0, 0, 0, 0, 0, 2, 0, 3, 3, 3, 3]] \$$

$$[y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: $\{\{2, 3, 4, 5, 6, 7, 8, 10, 11, 12\}\}$ order: 10

See Matrix

$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 2, 2], [0, 1, 2, 2, 2, 2, 1, 2, 0, 2, 1, 1], [0, 2, 2, 1, 1, 2, 2, 1, 0, 2, 1, 2], [0, 2, 1, 1, 2, 1, 2, 0, 2, 2, 1], [0, 2, 2, 2, 1, 1, 1, 2, 0, 1, 2, 2], [0, 1, 1, 2, 2, 2, 2, 0, 1, 1, 2], [0, 1, 2, 1, 2, 2, 1, 1, 0, 2, 2, 2], [0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 1, 1], [0, 2, 2, 1, 1, 2, 2, 2, 0, 1, 2, 1], [0, 1, 1, 2, 1, 1, 2, 2, 0, 2, 2, 2]] \$$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_7, 0, y_8, y_9, y_{10}]$$

1316 . Coloring, $\{3, 4, 6, 7, 9, 10\}$

R: [7, 7, 8, 7, A, 3, A, C, C, 2, 1, 5]

B: [6, 8, 7, 6, 3, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 4, 1, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 3, 0, 0, 6, 0, 1], [0, 6, 0, 0, 1, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]] \$$

6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

[2 y₁, y₂, y₁, 0, y₃, 0, y₄, y₅, 0, y₇, 0, y₆]

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 2, 1, 0, 2, 2, 4, 1] , [0, 0, 0, 4, 0, 4, 0, 0, 1, 2, 3, 2] , [0, 0, 0, 3, 0, 4, 0, 0, 2, 4, 1, 2] , [0, 0, 0, 1, 0, 3, 0, 0, 2, 4, 2, 4] , [0, 0, 0, 2, 0, 1, 0, 0, 4, 3, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 1, 4, 3] , [0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 4, 1] , [0, 0, 0, 4, 0, 4, 0, 0, 1, 2, 3, 2]] \$

[0, 0, y₄, y₁, 0, y₂, y₃, y₄, y₅, y₆, y₇, y₈]

$$p = -s^3 + s^9$$

1317 . Coloring, {3, 4, 6, 7, 9, 11}

R: [7, 7, 8, 7, A, 3, A, C, C, C, 4, 5]

B: [6, 8, 7, 6, 3, A, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 1, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$

[0, 0, y₃, 2 y₃, y₁, 0, y₃ + 2 y₂, y₂, 0, y₄, 0, y₅]

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 4, 0], [4, 1, 0, 0, 0, 2, 1, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 4, 0, 1, 0, 2, 3, 0], [3, 2, 0, 0, 0, 4, 0, 2, 0, 4, 1, 0], [1, 4, 0, 0, 0, 3, 0, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 1, 0, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 0, 4, 0, 1, 4, 0], [4, 1, 0, 0, 0, 2, 0, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 4, 0, 1, 0, 2, 3, 0]] \$$

$$[y_1, y_2, y_3, 0, 0, y_5, y_6, y_4, 2y_3, y_7, y_8, 0]$$

$$p = -s^3 + s^9$$

1318 . Coloring, $\{3, 4, 6, 7, 9, 12\}$

R: $[7, 7, 8, 7, A, 3, A, C, C, C, 1, 9]$

B: $[6, 8, 7, 6, 3, A, B, B, B, 2, 4, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 4

See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 0, 4], [0, 0, 0, 0, 0, 0, 2, 1, 4, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[2y_1 - 4y_2 - 4y_3 + 4y_4, 0, y_1 - 2y_2 - 2y_3 + 2y_4, 0, 0, 0, y_1, y_2 + y_3 - y_4, y_2, y_3, 0, y_4]$$

$$p = -s^4 + s^7 \quad p = -s^4 + s^5 \quad p = -s^4 + s^6$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 4, 0], [0, 1, 2, 4, 0, 2, 1, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 4, 2, 1, 0, 2, 3, 0], [0, 2, 0, 3, 0, 2, 0, 4, 3, 0], [0, 4, 0, 3, 0, 3, 0, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 3, 0, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 2, 0, 3, 4, 0], [0, 3, 0, 4, 0, 2, 0, 3, 0, 2, 2, 0], [0, 2, 0, 2, 0, 4, 0, 3, 0, 2, 3, 0]] \$$

$$[0, y_1, y_2, y_6, y_3, y_4, y_5, y_9, 0, y_7, y_8, 0]$$

1319 . Coloring, {3, 4, 6, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, A, C, B, 2, 4, 5]

B: [6, 8, 7, 6, 3, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 1, 1], [0, 3, 0, 1, 1, 0, 4, 1, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 4, 0, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$$

$$[0, y_1, y_6, y_6 + y_3, y_5, 0, y_4, y_3, 0, y_2, y_6, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 2, 1, 0, 3, 2, 2, 3], [2, 0, 0, 0, 0, 3, 0, 0, 3, 2, 1, 5], [1, 0, 0, 0, 0, 2, 0, 0, 5, 3, 0, 5], [0, 0, 0, 0, 0, 1, 0, 0, 5, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[y_7, 0, y_6, 0, 0, y_5, y_4, y_6, y_3, y_1, y_2, y_8]$$

$$p = s^7 - s^9$$

1320 . Coloring, {3, 4, 6, 7, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, A, C, B, 2, 1, 9]

B: [6, 8, 7, 6, 3, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 0, 4, 1, 1, 3, 2, 1] , [2, 3, 0, 0, 0, 0, 4, 0, 1, 4, 1, 1] , [1, 4, 0, 0, 0, 0, 5, 0, 1, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 5, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

[y₅, y₄, y₃, 0, 0, 0, y₂, y₁, y₉, y₈, y₇, y₆]

Omega Rank for B : cycles: {{3, 4, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 2, 1, 0, 0, 2, 2, 1] , [0, 0, 3, 2, 1, 3, 2, 0, 0, 2, 1, 2] , [0, 0, 1, 1, 2, 2, 3, 0, 0, 3, 2, 2] , [0, 0, 2, 2, 2, 1, 1, 0, 0, 2, 3, 3] , [0, 0, 2, 3, 3, 2, 2, 0, 0, 1, 1, 2] , [0, 0, 3, 1, 2, 3, 2, 0, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 1, 3, 0, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 2, 2, 0, 0, 1, 3, 3]] \$

[0, 0, y₃, y₁, y₂, y₄, y₅, y₆, 0, y₈, y₉, y₇]

1321 . Coloring, {3, 4, 6, 7, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, A, C, B, C, 4, 9]

B: [6, 8, 7, 6, 3, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{4, 7, 9, 10, 11, 12\}\}$ order: 6
See Matrix

$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 1, 3], [0, 0, 0, 1, 0, 0, 2, 1, 3, 3, 2, 4], [0, 0, 0, 2, 0, 0, 1, 0, 4, 2, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 1, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 2, 4, 1], [0, 0, 0, 4, 0, 0, 4, 0, 1, 3, 2, 2], [0, 0, 0, 2, 0, 0, 4, 0, 2, 4, 1, 3], [0, 0, 0, 1, 0, 0, 2, 0, 3, 4, 2, 4]] \$$

$$[0, 0, y_1 - y_2 + y_3 + y_4 + y_5 - y_6 - y_7, y_1, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 3, 1], [3, 1, 2, 0, 1, 2, 1, 2, 0, 2, 2, 0], [2, 2, 1, 0, 0, 3, 2, 1, 0, 2, 3, 0], [3, 2, 0, 0, 2, 1, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 3, 0, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 0, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 0, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 0, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 0, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 2, 0, 3, 0, 3, 3, 0], [3, 0, 0, 0, 0, 3, 0, 3, 0, 2, 3, 0]] \$$

$$[y_2, y_3, y_1, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9, y_{10}]$$

1322 . Coloring, $\{3, 4, 6, 8, 9, 10\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, B, B, C, 2, 1, 5]

B: [6, 8, 7, 6, 3, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 1, 3, 1] , [3, 1, 0, 0, 1, 0, 4, 1, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 0, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$$

$[y_2, y_1, y_3, 0, y_5 + y_3, 0, y_7, y_5, 0, y_6, y_4, y_3]$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{4, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 2, 1, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 1, 0, 0, 4, 3, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 4, 3] , [0, 0, 0, 4, 0, 3, 0, 0, 3, 2, 3, 1] , [0, 0, 0, 3, 0, 4, 0, 0, 1, 3, 3, 2] , [0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 3, 0, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 1, 0, 0, 4, 3, 3, 3]] \$$

$[0, 0, y_3, y_7, 0, y_1, y_2, y_3, y_4, y_5, y_6, y_8]$

$$p = -s^3 + s^9$$

1323 . Coloring, $\{3, 4, 6, 8, 9, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, B, B, C, C, 4, 5]

B: [6, 8, 7, 6, 3, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 1, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 1, 0, 2, 4, 1] , [0, 0, 0, 4, 1, 0, 3, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 3, 3] , [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 4, 1] , [0, 0, 0, 4, 1, 0, 3, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 3, 3] , [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 4, 1]] \$$

$$[0, 0, y_1, y_2, y_3, 0, y_5, 4y_1 + 4y_2 + 5y_3 - y_5 - 6y_4, 0, -2y_1 - 2y_2 - 4y_3 + 5y_4, y_4, 5y_1 + 5y_2 + 6y_3 - 8y_4]$$

$$p = -s^3 + s^6 \quad p' = s^4 - s^7 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 2, 1, 2, 1, 3, 2, 1], [2, 3, 0, 0, 0, 1, 0, 3, 1, 3, 1, 2], [1, 3, 0, 0, 0, 2, 0, 3, 2, 1, 1, 3], [1, 1, 0, 0, 0, 1, 0, 3, 3, 2, 2, 3], [2, 2, 0, 0, 0, 1, 0, 1, 3, 1, 3, 3], [3, 1, 0, 0, 0, 2, 0, 2, 3, 1, 3, 1], [3, 1, 0, 0, 0, 3, 0, 1, 1, 2, 3, 2], [3, 2, 0, 0, 0, 3, 0, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 3, 0, 2, 1, 3, 2, 1]] \$$$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, y_7, y_8, y_9, y_{10}]$$

1324 . Coloring, $\{3, 4, 6, 8, 9, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, B, B, C, C, 1, 9]

B: [6, 8, 7, 6, 3, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 2, 1, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3]] \$$$

$$[-3y_3 - 3y_1 - 3y_2 + 10y_5 - 3y_4, 0, 3y_3, 0, 0, 0, 3y_1, 3y_2, -3y_3 + 3y_5, 3y_3, 3y_4, 3y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{2, 3, 5, 7, 8, 10, 12\}\}$ order: 7

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 2, 1, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 1, 2, 3, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 1, 3, 0, 3, 0, 3] , [0, 3, 2, 0, 3, 0, 1, 3, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 2, 3, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 3, 1, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 3, 1, 0, 3, 0, 1] , [0, 3, 3, 0, 1, 0, 3, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 3, 3, 0, 3, 0, 2]] \$

[0, y₄, y₅, y₆, y₇, y₈, y₉, y₁, 0, y₁₀, y₂, y₃]

1325 . Coloring, {3, 4, 6, 8, 10, 11}

R: [7, 7, 8, 7, A, 3, B, B, B, 2, 4, 5]

B: [6, 8, 7, 6, 3, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	5 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 4, 1, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

[0, y₂, 2 y₅ - y₄, y₁, 4 y₅ - 2 y₄, 0, y₆, y₅, 0, y₄, y₃, 0]

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 2, 1, 0, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[2 y₂, 0, y₂, 0, 0, 2 y₁, y₁, y₂, y₅, y₄, 0, y₃]

$$p' = -s^4 + s^6 \quad p = -s^4 + s^6 \quad p = -s^4 + s^8$$

1326 . Coloring, {3, 4, 6, 8, 10, 12}

R: [7, 7, 8, 7, A, 3, B, B, B, 2, 1, 9]

B: [6, 8, 7, 6, 3, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[y_1, y_4 + y_3, y_4, 0, 0, 0, y_2, y_3, 2y_4, y_4, y_5, 0]$$

$$p' = s^4 - s^7 \quad p = s^3 - s^6 \quad p' = s^3 - s^6$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 2, 1, 0, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2] , [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3]] \$

$$[0, 0, y_1, 2y_5, y_2, y_3, y_4, y_5, 0, y_6, 0, y_7]$$

$$p = -s^3 + s^8$$

1327 . Coloring, {3, 4, 6, 8, 11, 12}

R: [7, 7, 8, 7, A, 3, B, B, B, C, 4, 9]

B: [6, 8, 7, 6, 3, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 1, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_4, y_1, 0, 0, y_6, y_5, y_3, y_4, y_2, y_4 + y_5]$$

$$p = -s^4 + s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 2, 1, 2, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 2, 3, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 2, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 1, 3, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 2, 2, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 3, 2, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 0, 3, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 3, 2, 0, 3, 0, 1]] \$

$$[y_3, y_2, y_1, 0, y_4, y_6, y_5, y_7, 0, y_8, 0, y_9]$$

1328 . Coloring, {3, 4, 6, 9, 10, 11}

R: [7, 7, 8, 7, A, 3, B, C, C, 2, 4, 5]

B: [6, 8, 7, 6, 3, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 9

See Matrix

$\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 2, 2], [0, 1, 0, 2, 2, 0, 4, 1, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 3, 0, 0, 2, 4, 1], [0, 2, 0, 4, 1, 0, 5, 0, 0, 1, 3, 0], [0, 1, 0, 3, 0, 0, 6, 0, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$$

$[0, y_3, y_2, y_1, y_5, 0, y_4, y_9, 0, y_8, y_7, y_6]$

Omega Rank for B : cycles: $\{\{1, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 2, 2], [2, 0, 0, 0, 0, 2, 1, 0, 2, 3, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 3], [2, 0, 0, 0, 0, 3, 0, 0, 3, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 3, 3, 2], [3, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 3], [3, 0, 0, 0, 0, 3, 0, 0, 3, 3, 2, 2], [2, 0, 0, 0, 0, 3, 0, 0, 2, 3, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 3]] \$$

$[y_1, 0, y_4, 0, 0, y_5, y_6, y_4, y_2, y_3, y_8, y_7]$

$$p = s^3 - s^9$$

1329 . Coloring, $\{3, 4, 6, 9, 10, 12\}$

R: [7, 7, 8, 7, A, 3, B, C, C, 2, 1, 9]

B: [6, 8, 7, 6, 3, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 2, 2], [2, 1, 0, 0, 0, 0, 4, 1, 2, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3]] \$$

$$[y_1, 6y_1 - 7y_3 - 13y_5 + 6y_2 + 6y_4, 3y_1 - 3y_3 - 7y_5 + 3y_2 + 3y_4, 0, 0, 0, y_2, 3y_1 - 4y_3 - 6y_5 + 3y_2 + 3y_4, y_3, 3y_1 - 3y_3 - 7y_5 + 3y_2 + 3y_4, y_4, y_5]$$

$$p = -s^3 + s^9 \quad p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 2, 2], [0, 0, 2, 2, 2, 2, 1, 0, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 2, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 1, 2, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3]] \$$$

$$[0, 0, y_1, y_2, y_3, y_8, y_4, y_5, 0, y_6, y_7, y_9]$$

1330 . Coloring, {3, 4, 6, 9, 11, 12}

R: [7, 7, 8, 7, A, 3, B, C, C, C, 4, 9]

B: [6, 8, 7, 6, 3, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 2, 4], [0, 0, 0, 2, 0, 0, 2, 1, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 2, 5], [0, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 3, 5], [0, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 3, 4]] \$$$

$$[0, 0, 7y_6, 7y_5, 0, 0, 7y_4, 7y_3, 7y_2, 7y_6, 7y_1, -14y_6 + 9y_5 + 9y_4 - 7y_3 - 7y_2 + 9y_1]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 2, 0], [2, 3, 2, 0, 0, 2, 1, 2, 0, 3, 1, 0], [1, 3, 0, 0, 0, 2, 2, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 1, 0, 3, 0, 4, 3, 0], [3, 4, 0, 0, 0, 2, 0, 3, 0, 1, 3, 0], [3, 1, 0, 0, 0, 3, 0, 4, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3,$$

0, 1, 0, 3, 4, 0] , [4, 3, 0, 0, 0, 3, 0, 2, 0, 3, 1, 0] , [1, 3, 0, 0, 0, 4, 0, 3, 0, 3, 2, 0]] \$

$[y_9, y_8, y_7, 0, y_6, y_5, y_4, y_3, 0, y_2, y_1, 0]$

1331 . Coloring, {3, 4, 6, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, B, C, B, 2, 4, 9]

B: [6, 8, 7, 6, 3, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 4, 1, 1, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$[0, y_4 + y_2, y_4, y_1, 0, 0, y_7, y_2, y_3, y_4, y_5, y_6]$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 1, 0, 0, 3, 1, 3] , [1, 0, 3, 0, 3, 1, 2, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 1, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3]] \$

$[y_3, 0, y_4, 0, y_1, y_2, y_8, y_9, 0, y_5, y_6, y_7]$

1332 . Coloring, {3, 4, 7, 8, 9, 10}

R: [7, 7, 8, 7, A, A, A, B, C, 2, 1, 5]

B: [6, 8, 7, 6, 3, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 0, 3, 1, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 0, 4, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[y_1, y_2, 0, 0, y_5 + y_6, 0, y_3, y_6, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 0, 2, 1, 1, 2, 0, 3, 3] , [0, 0, 2, 3, 0, 2, 2, 0, 3, 0, 3, 1] , [0, 0, 2, 3, 0, 3, 2, 0, 1, 0, 5, 0] , [0, 0, 3, 5, 0, 3, 2, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 5, 3, 0, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 3, 3, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 2, 5, 0, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 3, 3, 0, 0, 0, 5, 0]] \$

$$[0, 0, y_2, y_1, 0, y_3, y_6, y_5, y_4, 0, y_7, y_8]$$

1333 . Coloring, {3, 4, 7, 8, 9, 11}

R: [7, 7, 8, 7, A, A, A, B, C, C, 4, 5]

B: [6, 8, 7, 6, 3, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 2, 0, 3, 1, 0, 4, 1, 3], [0, 0, 0, 1, 3, 0, 2, 0, 0, 5, 1, 4], [0, 0, 0, 1, 4, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$

$[0, 0, 0, y_1, y_2, 0, y_3, y_4, 0, y_5, y_6, y_7]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[2, 2, 2, 0, 0, 2, 1, 1, 2, 0, 3, 1], [3, 0, 2, 0, 0, 2, 2, 2, 1, 0, 3, 1], [3, 0, 2, 0, 0, 3, 2, 0, 1, 0, 3, 2], [3, 0, 3, 0, 0, 3, 2, 0, 2, 0, 3, 0], [3, 0, 3, 0, 0, 3, 3, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 3, 3, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 4, 3, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 3, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 3, 4, 0, 0, 0, 3, 0]] \$$

$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, y_8, 0, y_9, y_7]$

1334 . Coloring, $\{3, 4, 7, 8, 9, 12\}$

R: $[7, 7, 8, 7, A, A, A, B, C, C, 1, 9]$

B: $[6, 8, 7, 6, 3, 3, B, C, B, 2, 4, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 0, 3, 1, 2, 4, 1, 3], [1, 0, 0, 0, 0, 0, 2, 0, 3, 3, 1, 6], [1, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 6], [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$$[y_1, 0, 0, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 2, 2, 2, 2, 2, 1, 1, 0, 0, 3, 1], [0, 0, 4, 3, 1, 2, 2, 2, 0, 0, 1, 1], [0, 0, 3, 1, 1, 3, 4, 0, 0, 0, 2, 2], [0, 0, 4, 2, 2, 1, 3, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 4, 0, 0, 0, 3, 0], [0, 0, 2, 3, 0, 4, 3, 0, 0, 0, 4, 0], [0, 0, 4, 4, 0, 3, 2, 0, 0, 0, 3, 0], [0, 0, 3, 3, 0, 4, 4, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 3, 3, 0, 0, 0, 4, 0]] \$$$

$$[0, y_1, y_2, y_4, y_3, y_9, y_6, y_7, 0, 0, y_8, y_5]$$

1335 . Coloring, {3, 4, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, A, B, B, 2, 4, 5]

B: [6, 8, 7, 6, 3, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 4, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$$$

$$[0, y_1, 0, y_2, 2y_4, 0, y_3, y_4, 0, y_5, y_6, 0]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}, {1, 3, 6, 7, 11}} order: 10

See Matrix

$$\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 0, 2, 4], [2, 0, 2, 0, 0, 2, 2, 0, 4, 0, 1, 3], [1, 0, 2, 0, 0, 2, 2, 0, 3, 0, 2, 4], [2, 0, 2, 0, 0, 1, 2, 0, 4, 0, 2, 3], [2, 0, 1, 0, 0, 2, 2, 0, 3, 0, 2, 4], [2, 0, 2, 0, 0, 2, 1, 0, 4, 0, 2, 3], [2, 0, 2, 0, 0, 2, 2, 0, 3, 0, 1, 4], [1, 0, 2, 0, 0, 2, 2, 0, 4, 0, 2, 3]] \$$$

$$[-7y_1 - 7y_3 - 7y_4 + 9y_2 + 9y_5 - 7y_7 + 9y_6, 0, 7y_1, 0, 0, 7y_3, 7y_4, 7y_2, 7y_5, 0, 7y_7, 7y_6]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

1336 . Coloring, {3, 4, 7, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, A, B, B, 2, 1, 9]

B: [6, 8, 7, 6, 3, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 4, 2, 0], [2, 4, 0, 0, 0, 0, 4, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$$$

$$[y_2, y_1, 0, 0, 0, 0, y_6, y_5, 2y_5, y_4, y_3, 0]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 0, 2, 4], [0, 0, 4, 2, 4, 2, 2, 0, 0, 0, 1, 1], [0, 0, 6, 1, 1, 2, 4, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 1, 6, 0, 0, 0, 4, 0], [0, 0, 1, 4, 0, 2, 3, 0, 0, 0, 6, 0], [0, 0, 2, 6, 0, 4, 1, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 6, 2, 0, 0, 0, 1, 0], [0, 0, 6, 1, 0, 3, 4, 0, 0, 0, 2, 0]] \$$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, 0, y_7, y_8]$$

1337 . Coloring, {3, 4, 7, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, A, B, B, C, 4, 9]

B: [6, 8, 7, 6, 3, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 4, 2, 2], [0, 0, 0, 2, 0, 0, 2, 0, 2, 3, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 2, 2, 3], [0, 0, 0, 2, 0, 0, 3, 0, 3, 2, 4, 2], [0, 0, 0, 4, 0, 0, 2, 0, 2, 3, 3, 2], [0, 0, 0, 3, 0, 0, 4, 0, 2, 2, 2, 3], [0, 0, 0, 2, 0, 0, 3, 0, 3, 4, 2, 2]] \$$$

$$[0, 0, 0, y_1, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 0, 2, 2], [2, 0, 4, 0, 2, 2, 2, 2, 0, 0, 1, 1], [1, 0, 4, 0, 1, 2, 4, 0, 0, 0, 2, 2], [2, 0, 3, 0, 2, 1, 4, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0]] \$$$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, 0, y_8, y_9]$$

1338 . Coloring, {3, 4, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, A, C, C, 2, 4, 5]

B: [6, 8, 7, 6, 3, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 4, 0, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_4, 0, 2y_1, y_3, 0, y_2, y_1, 0, y_6, 0, y_5]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 0, 4, 2] , [4, 0, 2, 0, 0, 2, 2, 0, 2, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 2, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 4, 2, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 2, 0, 0, 0, 4, 0]] \$

$$[y_2, 0, y_1, 0, 0, y_4, y_5, y_6, y_7, 0, y_3, 2y_6]$$

$$p = -s^3 + s^8$$

1339 . Coloring, {3, 4, 7, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, A, C, C, 2, 1, 9]

B: [6, 8, 7, 6, 3, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 4, 0, 3], [0, 4, 0, 0, 0, 0, 4, 0, 3, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 0, 2, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 4, 0, 2]] \$$

$[10 y_3 + 10 y_2 - 22 y_1 + 10 y_5 - 22 y_4, y_3, 0, 0, 0, 0, y_2, 5 y_3 + 5 y_2 - 11 y_1 + 5 y_5 - 11 y_4, y_1, y_5, 0, y_4]$

$$p = -s^2 - s^3 + s^5 + s^6 \quad p = s^2 - s^4 - s^5 + s^7$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5
See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 0, 4, 2], [0, 0, 4, 4, 2, 2, 2, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 4, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 2, 0, 0, 0, 4, 0], [0, 0, 4, 4, 0, 4, 2, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 4, 0, 0, 0, 2, 0]] \$$

$[0, 0, y_1, y_5, y_3, y_4, y_2, y_6, 0, 0, y_7, 2 y_6]$

$$p = -s^3 + s^8$$

1340 . Coloring, $\{3, 4, 7, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, A, C, C, C, 4, 9]

B: [6, 8, 7, 6, 3, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 0, 4, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[0, 0, 0, 2 y₂, 0, 0, y₁, y₂, y₃, y₄, 0, y₅]

$$p = s^4 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 2, 2, 2, 0, 0, 2, 0] , [2, 0, 2, 0, 0, 4, 4, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 2, 2, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 2, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 2, 4, 0, 0, 0, 2, 0] , [2, 0, 2, 0, 0, 4, 4, 0, 0, 0, 4, 0]] \$

[y₇, y₆, y₅, 0, y₆, y₄, y₃, y₂, 0, 0, y₁, 0]

$$p = -s^3 + s^8$$

1341 . Coloring, {3, 4, 7, 10, 11, 12}

R: [7, 7, 8, 7, A, A, A, C, B, 2, 4, 9]

B: [6, 8, 7, 6, 3, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 4, 0, 1, 3, 2, 1] , [0, 3, 0, 2, 0, 0, 5, 0, 1, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 5, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_1, 0, y_7, 0, 0, y_5, y_6, y_2, y_3, y_4, y_8]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 0, 3, 3], [3, 0, 4, 0, 3, 2, 2, 0, 0, 0, 2, 0], [2, 0, 5, 0, 0, 3, 4, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 2, 5, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 3, 0, 0, 0, 5, 0], [5, 0, 2, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 5, 2, 0, 0, 0, 2, 0], [2, 0, 5, 0, 0, 3, 4, 0, 0, 0, 2, 0]] \$$$

$$[y_1, 0, y_6, 0, y_4, y_5, y_2, y_3, 0, 0, y_7, 3 y_3]$$

$$p = -s^3 + s^8$$

1342 . Coloring, {3, 4, 8, 9, 10, 11}

R: [7, 7, 8, 7, A, A, B, B, C, 2, 4, 5]

B: [6, 8, 7, 6, 3, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 4, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 5, 0, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[0, y_1, 0, y_4, y_3, 0, y_2, y_5, 0, y_6, y_7, y_5]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 2, 1, 3], [1, 0, 2, 0, 0, 2, 2, 0, 3, 1, 2, 3], [2, 0, 2, 0, 0, 1, 2, 0, 3, 2, 3, 1], [3, 0, 1, 0, 0, 2, 2, 0, 1, 2, 3, 2], [3, 0, 2, 0, 0, 3, 1, 0, 2, 2, 1, 2], [1, 0, 3, 0, 0, 3, 2, 0, 2, 1, 2, 2], [2, 0, 3, 0, 0, 1, 3, 0, 2, 2, 2, 1], [2, 0, 1, 0, 0, 2, 3, 0, 1, 3, 2, 2], [2, 0, 2, 0, 0, 2, 1, 0, 2, 3, 1, 3]] \$$$

$$[y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

1343 . Coloring, {3, 4, 8, 9, 10, 12}

R: [7, 7, 8, 7, A, A, B, B, C, 2, 1, 9]

B: [6, 8, 7, 6, 3, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2]] \$

$$[3 y_1, -3 y_1 - 3 y_3 - 9 y_2 + 13 y_6 - 3 y_5 + 13 y_4, 0, 0, 0, 0, 3 y_3, 3 y_2, 3 y_6, 6 y_2, 3 y_5, 3 y_4]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p' = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 2, 1, 3] , [0, 0, 4, 1, 3, 2, 2, 0, 0, 1, 0, 3] , [0, 0, 5, 0, 3, 1, 4, 0, 0, 2, 0, 1] , [0, 0, 4, 0, 1, 0, 5, 0, 0, 4, 0, 2] , [0, 0, 1, 0, 2, 0, 4, 0, 0, 5, 0, 4] , [0, 0, 2, 0, 4, 0, 1, 0, 0, 4, 0, 5] , [0, 0, 4, 0, 5, 0, 2, 0, 0, 1, 0, 4] , [0, 0, 5, 0, 4, 0, 4, 0, 0, 2, 0, 1] , [0, 0, 4, 0, 1, 0, 5, 0, 0, 4, 0, 2]] \$

$$[0, 0, y_7, y_6, y_5, y_4, y_3, y_2, 0, y_1, y_2, y_8]$$

$$p = s^4 - s^9$$

1344 . Coloring, {3, 4, 8, 9, 11, 12}

R: [7, 7, 8, 7, A, A, B, B, C, C, 4, 9]

B: [6, 8, 7, 6, 3, 3, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	10 vs 10

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 0, 4, 4] , [0, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2, 3] , [0, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 4, 0, 4, 0, 3, 3]] \$

$$[0, 0, 0, -7y_1 + 11y_2 + 9y_3 - 7y_4 + 9y_5, 0, 0, 7y_1, 7y_2, 7y_3, 14y_2, 7y_4, 7y_5]$$

$$p = -s^2 - s^3 + s^5 + s^6 \quad p = s^2 - s^4 - s^5 + s^7$$

Omega Rank for B : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 2, 1, 1] , [1, 2, 4, 0, 1, 2, 2, 2, 0, 1, 0, 1] , [0, 1, 3, 0, 1, 1, 4, 2, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 3, 1, 0, 4, 0, 2] , [0, 4, 2, 0, 2, 0, 2, 2, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 2, 4, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 2, 3, 0, 2, 0, 4] , [0, 2, 2, 0, 4, 0, 1, 2, 0, 2, 0, 3] , [0, 2, 4, 0, 3, 0, 2, 2, 0, 1, 0, 2] , [0, 1, 3, 0, 2, 0, 4, 2, 0, 2, 0, 2]] \$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9, y_{10}]$$

1345 . Coloring, {3, 4, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, A, B, B, B, 2, 4, 9]

B: [6, 8, 7, 6, 3, 3, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

$\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 2, 4, 0], [0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$$[0, y_1, 0, y_2, 0, 0, y_3, y_4, 2y_4, 2y_4, y_5, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 2, 0, 4], [0, 0, 4, 0, 4, 2, 2, 0, 0, 1, 0, 3], [0, 0, 6, 0, 3, 0, 4, 0, 0, 2, 0, 1], [0, 0, 3, 0, 1, 0, 6, 0, 0, 4, 0, 2], [0, 0, 1, 0, 2, 0, 3, 0, 0, 6, 0, 4], [0, 0, 2, 0, 4, 0, 1, 0, 0, 3, 0, 6], [0, 0, 4, 0, 6, 0, 2, 0, 0, 1, 0, 3], [0, 0, 6, 0, 3, 0, 4, 0, 0, 2, 0, 1]] \$$

$$[2y_5, 0, y_1, 0, y_2, y_3, y_4, y_5, 0, y_7, 0, y_6]$$

$$p = -s^3 + s^8$$

1346 . Coloring, {3, 4, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, B, C, C, 2, 4, 9]

B: [6, 8, 7, 6, 3, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}, \{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 2, 2, 2], [0, 2, 0, 2, 0, 0, 4, 0, 2, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4, 3], [0, 0, 0, 4, 0, 0, 4, 0, 3, 0, 3, 2], [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 3, 3]] \$$

$[0, y_6, 0, y_5, 0, 0, y_4, 5y_6 + 5y_5 + 5y_4 - 11y_2 + 5y_3 - 11y_1, y_2, 10y_6 + 10y_5 + 10y_4 - 22y_2 + 10y_3 - 22y_1, y_3, y_1]$

$p = s^3 + s^4 - s^6 - s^7 \quad p' = s^3 + s^4 - s^6 - s^7$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 2, 2, 2], [2, 0, 4, 0, 2, 2, 2, 0, 0, 1, 1, 2], [1, 0, 4, 0, 2, 2, 4, 0, 0, 2, 0, 1], [0, 0, 4, 0, 1, 1, 4, 0, 0, 4, 0, 2], [0, 0, 2, 0, 2, 0, 4, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0, 2, 0, 0, 4, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 4, 0, 0, 2, 0, 2], [0, 0, 4, 0, 2, 0, 4, 0, 0, 4, 0, 2]] \$$

$[y_2, 0, y_1, 0, y_4, y_3, y_8, y_7, 0, y_6, y_5, y_9]$

1347 . Coloring, $\{3, 5, 6, 7, 8, 9\}$

R: $[7, 7, 8, 6, 3, 3, A, B, C, C, 1, 5]$

B: $[6, 8, 7, 7, A, A, B, C, B, 2, 4, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{1, 3, 5, 7, 8, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 1, 3], [1, 0, 3, 0, 3, 0, 2, 2, 0, 2, 1, 2], [1, 0, 3, 0, 2, 0, 1, 3, 0, 2, 2, 2], [2, 0, 2, 0, 2, 0, 1, 3, 0, 1, 3, 2], [3, 0, 2, 0, 2, 0, 2, 2, 0, 1, 3, 1], [3, 0, 2, 0, 1, 0, 3, 2, 0, 2, 2, 1], [2, 0, 1, 0, 1, 0, 3, 2, 0, 3, 2, 2], [2, 0, 1, 0, 2, 0, 2, 1, 0, 3, 2, 3], [2, 0, 2, 0, 3, 0, 2, 1, 0, 2, 1, 3]] \$$

$$[y_8, 0, y_7, 0, y_6, y_5, y_4, y_3, 0, y_2, y_1, y_8 - y_7 + y_6 + y_5 - y_4 + y_3 + y_2 - y_1]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 9

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 3, 1], [0, 2, 0, 3, 0, 0, 2, 2, 1, 1, 4, 1], [0, 1, 0, 4, 0, 0, 3, 2, 1, 0, 3, 2], [0, 0, 0, 3, 0, 0, 4, 1, 2, 0, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 6, 1], [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[0, y_2, 0, y_1, 0, y_5, y_6, y_3, y_4, y_7, y_8, y_9]$$

1348 . Coloring, {3, 5, 6, 7, 8, 10}

R: [7, 7, 8, 6, 3, 3, A, B, B, 2, 1, 5]

B: [6, 8, 7, 7, A, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	3 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 2, 0], [2, 2, 3, 0, 0, 0, 4, 2, 0, 2, 1, 0], [1, 2, 0, 0, 0, 0, 4, 3, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 3, 0, 0, 4, 3, 0], [3, 4, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0], [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 3, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0], [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0]] \$$$

$$[y_1, y_2, y_3, 0, 2y_4, y_4, y_5, y_6, 0, y_7, y_8, 0]$$

$$p = s^6 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 1, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5]] \$$$

$$[0, 0, 0, 2y_2, 0, 5y_2 - 2y_3, 2y_2, 5y_2 - 2y_3, -2y_1 + 2y_3, 2y_1, 2y_2, 2y_3]$$

$$p' = s^6 - s^7 \quad p' = s^5 - s^7 \quad p' = s^4 - s^7 \quad p' = s^3 - s^7 \quad p = s^3 - s^8$$

1349 . Coloring, {3, 5, 6, 7, 8, 11}

R: [7, 7, 8, 6, 3, 3, A, B, B, C, 4, 5]

B: [6, 8, 7, 7, A, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	9 vs 9	9 vs 9	9 vs 9	9 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 2, 2], [0, 0, 3, 2, 2, 2, 0, 2, 0, 2, 1, 2], [0, 0, 4, 1, 2, 2, 0, 3, 0, 0, 2, 2], [0, 0, 4, 2, 2, 1, 0, 4, 0, 0, 3, 0], [0, 0, 3, 3, 0, 2, 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 3, 0, 3, 0, 0, 4, 0], [0, 0, 3, 4, 0, 4, 0, 2, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 0, 3, 0, 0, 2, 0], [0, 0, 4, 2, 0, 3, 0, 4, 0, 0, 3, 0]] \$$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 2, 2], [2, 2, 0, 0, 0, 2, 0, 2, 2, 1, 2, 3], [2, 1, 0, 0, 0, 2, 0, 2, 3, 2, 0, 4], [0, 2, 0, 0, 0, 2, 0, 1, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 0, 2, 5, 2, 0, 5], [0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[y_1, y_2, 0, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

1350 . Coloring, {3, 5, 6, 7, 8, 12}

R: [7, 7, 8, 6, 3, 3, A, B, B, C, 1, 9]

B: [6, 8, 7, 7, A, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	6 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 2, 2], [2, 0, 1, 0, 0, 0, 2, 2, 2, 2, 3, 2], [3, 0, 0, 0, 0, 0, 2, 1, 2, 2, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 2, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 3, 2, 2], [2, 0, 0, 0, 0, 0, 3, 0, 2, 4, 2, 3], [2, 0, 0, 0, 0, 0, 2, 0, 3, 3, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 2, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 2, 4, 2]] \$$

$[y_1, 0, y_1 + y_3 - y_2 + y_4 + y_5 + y_6 - y_8 - y_7, 0, 0, y_3, y_2, y_4, y_5, y_6, y_8, y_7]$

$$p = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}, {4, 7, 11}}

See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 2, 2, 0, 3, 2, 1], [0, 3, 0, 2, 1, 0, 2, 2, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 2, 3, 0, 1, 2, 2], [0, 1, 0, 2, 2, 0, 2, 2, 0, 2, 2, 3], [0, 2, 0, 2, 3, 0, 2, 1, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 2, 2, 0, 3, 2, 1], [0, 3, 0, 2, 1, 0, 2, 2, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 2, 3, 0, 1, 2, 2]] \$$

$[0, 5y_5 - y_1 - y_2 - y_3 - y_4 - y_6, 0, y_5, y_1, y_2, y_5, y_3, 0, y_4, y_5, y_6]$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7 \quad p'' = -s^3 + s^8$$

1351 . Coloring, {3, 5, 6, 7, 9, 10}

R: [7, 7, 8, 6, 3, 3, A, C, C, 2, 1, 5]

B: [6, 8, 7, 7, A, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{3, 5, 8, 12\}\}$ order: 12

See Matrix

$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 4, 2, 0, 2, 0, 1], [0, 2, 2, 0, 1, 0, 2, 3, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 2, 2, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 4, 1, 0, 2, 0, 2], [0, 2, 3, 0, 2, 0, 2, 2, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 2, 3, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 4, 2, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 2, 1, 0, 4, 0, 2]] \$$

$$[2y_1, 2y_3 + 2y_4 - y_2 - y_5, y_3 + y_1 + y_4 - y_6, 0, y_3, y_1, y_2, y_4, 0, y_5, 0, y_6]$$

$$p' = s^2 + s^4 - s^5 - s^7 \quad p' = -s^3 - s^5 + s^6 + s^8 \quad p = s^2 + s^4 - s^5 - s^7$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 4, 2], [0, 0, 0, 4, 0, 0, 2, 0, 2, 1, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$$

$$[0, 0, 0, y_7, 0, y_6, y_5, y_6, y_4, y_3, y_2, y_1]$$

$$p = s^5 - s^8$$

1352 . Coloring, $\{3, 5, 6, 7, 9, 11\}$

R: $[7, 7, 8, 6, 3, 3, A, C, C, C, 4, 5]$

B: $[6, 8, 7, 7, A, A, B, B, B, 2, 1, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}\}$ order: 4

See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 0, 4], [0, 0, 3, 0, 4, 2, 0, 2, 0, 2, 0, 3], [0, 0, 6, 0, 3, 0, 0, 3, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 6, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 3, 0, 0, 0, 6], [0, 0, 3, 0, 6, 0, 0, 4, 0, 0, 0, 3], [0, 0, 6, 0, 3, 0, 0, 3, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 6, 0, 0, 0, 3]] \$$

$$[0, 0, y_3, -2y_2 + 2y_4, y_1, y_2, -2y_2 + 2y_4, y_5, 0, y_4, 0, y_6]$$

$$p = -s^3 + s^7 \quad p' = -s^3 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 4, 0], [4, 2, 0, 0, 0, 2, 0, 2, 0, 1, 5, 0], [5, 1, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 5, 0, 1, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 0, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0], [2, 2, 0, 0, 0, 1, 0, 5, 0, 2, 4, 0], [4, 2, 0, 0, 0, 2, 0, 2, 0, 1, 5, 0]] \$$$

$$[y_1, y_2, 0, 0, 0, y_3, y_5, y_4, y_5, y_6, y_7, 0]$$

$$p = s^2 - s^8$$

1353 . Coloring, {3, 5, 6, 7, 9, 12}

R: [7, 7, 8, 6, 3, 3, A, C, C, C, 1, 9]

B: [6, 8, 7, 7, A, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	4 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 0, 4], [0, 0, 1, 0, 0, 0, 2, 2, 4, 2, 0, 5], [0, 0, 0, 0, 0, 0, 0, 1, 5, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[2y_2, 0, y_1, 0, 0, y_2, 2y_1 - 2y_2, y_3, 5y_1 - 9y_2 - 3y_3 + y_4, -2y_1 + 4y_2 + 2y_3, 0, y_4]$$

$$p = s^4 - s^8 \quad p' = s^6 - s^7 \quad p' = s^5 - s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 2, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 4, 2, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 3, 3, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[0, y_1, 0, y_2, 2y_4, y_4, y_3, y_5, 0, y_6, y_7, 0]$$

$$p = -s^5 + s^8$$

1354 . Coloring, {3, 5, 6, 7, 10, 11}

R: [7, 7, 8, 6, 3, 3, A, C, B, 2, 4, 5]

B: [6, 8, 7, 7, A, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 10	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}, {2, 7, 10}} order: 12

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 1, 1] , [0, 2, 3, 1, 1, 2, 2, 2, 0, 2, 0, 1] , [0, 2, 3, 0, 1, 1, 2, 3, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 2, 2, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 2, 2, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 0, 2, 3, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 2, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 2, 2, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 2, 2, 0, 2, 0, 2, 0, 2]] \$

$$[0, 2y_4, 2y_2, 5y_4 - 2y_2 - 2y_5, 5y_4 - 2y_1 - 2y_3 - 2y_6, 2y_1, 2y_4, 2y_3, 0, 2y_4, 2y_6, 2y_5]$$

$$p' = -s^5 + s^9 \quad p = -s^4 - s^6 + s^7 + s^9 \quad p = -s^4 + s^5 - s^6 + s^7 \quad p = -s^4 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 3, 4] , [3, 0, 0, 0, 0, 3, 0, 0, 4, 2, 0, 4] , [0, 0, 0, 0, 3, 0, 0, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[y_1, 0, 0, 0, 0, y_7, 2y_6, y_6, y_5, y_4, y_3, y_2]$$

$$p = s^6 - s^8$$

1355 . Coloring, {3, 5, 6, 7, 10, 12}

R: [7, 7, 8, 6, 3, 3, A, C, B, 2, 1, 9]

B: [6, 8, 7, 7, A, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	4 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 1, 1] , [1, 2, 1, 0, 0, 0, 4, 2, 1, 2, 2, 1] , [2, 2, 0, 0, 0, 0, 3, 1, 1, 4, 1, 2] , [1, 4, 0, 0, 0, 0, 4, 0, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 0, 5, 0, 1, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 4, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$

$$[y_{10}, y_9, y_8, 0, 0, y_7, y_6, y_5, y_4, y_3, y_2, y_1]$$

Omega Rank for B : cycles: {{5, 10, 12}, {4, 7, 11}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2]] \$

$$[0, 0, 0, y_2, -y_1 + y_3, y_1, -y_1 + y_4, y_1, 0, y_2, y_3, y_4]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6 \quad p''' = -s^2 + s^5$$

1356 . Coloring, {3, 5, 6, 7, 11, 12}

R: [7, 7, 8, 6, 3, 3, A, C, B, C, 4, 9]
B: [6, 8, 7, 7, A, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 1, 3] , [0, 0, 1, 1, 0, 2, 0, 2, 3, 2, 2, 3] , [0, 0, 2, 2, 0, 1, 0, 1, 3, 0, 3, 4] , [0, 0, 1, 3, 0, 2, 0, 2, 4, 0, 3, 1] , [0, 0, 2, 3, 0, 3, 0, 1, 1, 0, 4, 2] , [0, 0, 3, 4, 0, 3, 0, 2, 2, 0, 1, 1] , [0, 0, 3, 1, 0, 4, 0, 3, 1, 0, 2, 2] , [0, 0, 4, 2, 0, 1, 0, 3, 2, 0, 1, 3] , [0, 0, 1, 1, 0, 2, 0, 4, 3, 0, 2, 3]] \$

$$[0, 0, y_1, y_8, 0, y_9, y_5, y_6, y_7, y_2, y_3, y_4]$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 2, 0, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 0, 2, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 0, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 0, 3, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 0, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 0, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 0, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 0, 2, 0, 3, 2, 0]] \$

$$[y_1 + y_2 + y_3 - y_4 - y_5 + y_6 - 3 y_7, y_1, 0, 0, y_2, y_3, 2 y_7, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

1357 . Coloring, {3, 5, 6, 8, 9, 10}

R: [7, 7, 8, 6, 3, 3, B, B, C, 2, 1, 5]
B: [6, 8, 7, 7, A, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 3, 1], [3, 0, 3, 0, 1, 0, 4, 2, 0, 0, 3, 0], [3, 0, 1, 0, 0, 0, 3, 3, 0, 0, 6, 0], [6, 0, 0, 0, 0, 3, 1, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 0, 4, 0, 0, 0, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$$[y_1, 2y_6, y_2, 0, y_3, y_6, y_5, y_4, 0, 0, y_7, y_6]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{4, 7, 9, 10, 11, 12\}\}$ order: 6
See Matrix

$\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 1, 3], [0, 0, 0, 1, 0, 0, 2, 0, 3, 3, 2, 5], [0, 0, 0, 2, 0, 0, 1, 0, 5, 2, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 5, 2], [0, 0, 0, 5, 0, 0, 3, 0, 2, 2, 3, 1], [0, 0, 0, 3, 0, 0, 5, 0, 1, 3, 2, 2], [0, 0, 0, 2, 0, 0, 3, 0, 2, 5, 1, 3], [0, 0, 0, 1, 0, 0, 2, 0, 3, 3, 2, 5]] \$$

$$[0, 0, 0, y_1, 0, y_4, y_6, y_4, y_5, y_2, y_3, y_7]$$

$$p = -s^2 + s^8$$

1358 . Coloring, $\{3, 5, 6, 8, 9, 11\}$

R: [7, 7, 8, 6, 3, 3, B, B, C, C, 4, 5]

B: [6, 8, 7, 7, A, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5
See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 3, 3] , [0, 0, 3, 3, 3, 2, 0, 2, 0, 0, 3, 0] , [0, 0, 5, 3, 0, 3, 0, 3, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 0, 5, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 2, 0, 3, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 3, 0, 3, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 5, 0, 2, 0, 0, 3, 0] , [0, 0, 5, 3, 0, 3, 0, 3, 0, 0, 2, 0]] \$

[0, 0, 2 y₃, 2 y₂, 2 y₁, 2 y₄, 2 y₅, 2 y₆, 0, 0, 2 y₇, 3 y₅]

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 2, 0, 2, 1, 3, 2, 1] , [2, 3, 0, 0, 0, 1, 0, 4, 1, 2, 1, 2] , [1, 2, 0, 0, 0, 2, 0, 3, 2, 1, 1, 4] , [1, 1, 0, 0, 0, 1, 0, 2, 4, 2, 2, 3] , [2, 2, 0, 0, 0, 1, 0, 1, 3, 1, 4, 2] , [4, 1, 0, 0, 0, 2, 0, 2, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 4, 0, 1, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 3, 0, 1, 2, 4, 1, 1]] \$

[y₁, y₂, 0, 0, 0, y₄, y₃, y₉, y₅, y₆, y₇, y₈]

1359 . Coloring, {3, 5, 6, 8, 9, 12}

R: [7, 7, 8, 6, 3, 3, B, B, C, C, 1, 9]

B: [6, 8, 7, 7, A, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 3, 3] , [3, 0, 1, 0, 0, 0, 2, 2, 3, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 1, 2, 0, 4, 3] , [4, 0, 0, 0, 0, 3, 0, 3, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 2]] \$

[5 y₆, 0, 5 y₅, 0, 0, 5 y₄, 5 y₂, 5 y₃, 5 y₁, 0, -5 y₆ - 5 y₅ - 5 y₄ - 5 y₂ - 5 y₃ + 11 y₁ + 11 y₇, 5 y₇]

$$p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 1, 1], [0, 4, 0, 1, 1, 0, 2, 2, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 1, 4, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5], [0, 2, 0, 0, 5, 0, 0, 2, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2], [0, 5, 0, 0, 2, 0, 0, 4, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4]] \$$

$[0, y_1, 0, y_2, y_3, y_7, y_4, y_5, 0, y_6, y_7, y_8]$

$$p = -s^4 + s^9$$

1360 . Coloring, $\{3, 5, 6, 8, 10, 11\}$

R: $[7, 7, 8, 6, 3, 3, B, B, B, 2, 4, 5]$

B: $[6, 8, 7, 7, A, A, A, C, C, C, 1, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	5 vs 7

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 2, 2, 0, 0, 3, 0], [0, 0, 2, 3, 0, 4, 0, 3, 0, 0, 4, 0], [0, 0, 4, 4, 0, 3, 0, 2, 0, 0, 3, 0], [0, 0, 3, 3, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 3, 0, 3, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 0, 4, 0, 0, 3, 0], [0, 0, 2, 3, 0, 4, 0, 3, 0, 0, 4, 0]] \$$

$[0, y_3, y_1, y_2, y_3, y_4, y_5, y_6, 0, 0, y_7, 0]$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 4

See Matrix

$\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 0, 4], [0, 0, 0, 0, 0, 2, 0, 0, 4, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$$[2 y_2, 0, 0, 0, 0, y_1, 2 y_2, y_2, y_3, y_4, 0, y_5]$$

$$p' = s^4 - s^6 \quad p = s^4 - s^6$$

1361 . Coloring, {3, 5, 6, 8, 10, 12}

R: [7, 7, 8, 6, 3, 3, B, B, B, 2, 1, 9]

B: [6, 8, 7, 7, A, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 4, 0] , [4, 0, 1, 0, 0, 0, 4, 2, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_1, 2 y_3, y_2, 0, 0, y_3, y_4, y_5, 2 y_3, 0, y_6, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[0, 0, 0, 2 y_3, y_2, y_3, y_1, y_3, 0, y_4, 0, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

1362 . Coloring, {3, 5, 6, 8, 11, 12}

R: [7, 7, 8, 6, 3, 3, B, B, B, C, 4, 9]
B: [6, 8, 7, 7, A, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 4, 2] , [0, 0, 1, 4, 0, 2, 0, 2, 2, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 0, 1, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 5, 0, 2, 0, 0, 1, 0] , [0, 0, 5, 1, 0, 4, 0, 4, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 1, 0, 5, 0, 0, 4, 0] , [0, 0, 1, 4, 0, 2, 0, 4, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 0, 1, 0, 0, 4, 0]] \$

[0, 0, y_2 , y_3 , 0, y_1 , y_6 , y_4 , y_5 , 0, y_7 , y_6]

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 2, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 5, 0, 1, 0, 4] , [0, 1, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 1, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2]] \$

[y_3 , y_4 , 0, 0, y_1 , y_2 , y_3 , y_5 , 0, y_6 , 0, y_7]

$$p = s^3 - s^8$$

1363 . Coloring, {3, 5, 6, 9, 10, 11}

R: [7, 7, 8, 6, 3, 3, B, C, C, 2, 4, 5]
B: [6, 8, 7, 7, A, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8
See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 2, 2] , [0, 0, 3, 2, 2, 2, 2, 2, 0, 0, 2, 1] , [0, 0, 4, 2, 1, 2, 0, 3, 0, 0, 2, 2] , [0, 0, 3, 2, 2, 2, 0, 4, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 2, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4]] \$

$[0, y_2, y_2 - y_1 + y_8 + y_5 - y_6 + y_7 + y_3 - y_4, y_1, y_8, y_5, y_6, y_7, 0, 0, y_3, y_4]$

$$p = -s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 2, 0, 0, 2, 3, 3, 4] , [3, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 3] , [2, 0, 0, 0, 0, 3, 0, 0, 3, 2, 4, 2] , [4, 0, 0, 0, 0, 2, 0, 0, 2, 3, 3, 2] , [3, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 3] , [2, 0, 0, 0, 0, 3, 0, 0, 3, 4, 2, 2] , [2, 0, 0, 0, 0, 2, 0, 0, 2, 3, 3, 4]] \$

$[y_1, 0, 0, 0, 0, y_2, 2y_3, y_3, y_6, y_5, y_4, y_7]$

$$p = -s^2 + s^8$$

1364 . Coloring, {3, 5, 6, 9, 10, 12}

R: [7, 7, 8, 6, 3, 3, B, C, C, 2, 1, 9]

B: [6, 8, 7, 7, A, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 2, 2], [2, 0, 1, 0, 0, 0, 4, 2, 2, 0, 2, 3], [2, 0, 0, 0, 0, 0, 2, 1, 3, 0, 4, 4], [4, 0, 0, 0, 0, 2, 0, 4, 0, 2, 4], [2, 0, 0, 0, 0, 0, 4, 0, 4, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 4, 4], [4, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 4], [2, 0, 0, 0, 0, 0, 4, 0, 4, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 4, 4]] \$$

$$[-y_2 + 2y_3 + 2y_6 - y_4, 2y_1, y_1 + y_3 + y_6 - y_5, 0, 0, y_1, y_2, y_3, y_6, 0, y_4, y_5]$$

$$p' = s^4 - s^7 \quad p = -s^4 + s^7 \quad p' = s^5 - s^8$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 2, 2], [0, 0, 0, 2, 2, 0, 2, 0, 0, 5, 1, 4], [0, 0, 0, 1, 4, 0, 2, 0, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 6, 0, 6]] \$$

$$[0, 0, 0, y_2, y_1, y_3, y_4, y_3, 0, y_7, y_5, y_6]$$

$$p = s^5 - s^8$$

1365 . Coloring, $\{3, 5, 6, 9, 11, 12\}$

R: [7, 7, 8, 6, 3, 3, B, C, C, C, 4, 9]

B: [6, 8, 7, 7, A, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 2, 4], [0, 0, 1, 2, 0, 2, 0, 2, 4, 0, 2, 3], [0, 0, 2, 2, 0, 2, 0, 1, 3, 0, 0, 6], [0, 0, 2, 0, 0, 2, 0, 2, 6, 0, 0, 4], [0, 0, 2, 0, 0, 0, 0, 2, 4, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$$

$$[0, 0, y_7, y_6, 0, y_5, y_3, y_2, y_4, 0, y_1, y_8]$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 0, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0], [2, 2, 0, 0, 0, 1, 0, 5, 0, 2, 4, 0], [4, 2, 0, 0, 0, 2, 0, 2, 0, 1, 5, 0], [5, 1, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 5, 0, 1, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 0, 2, 0, 5, 1, 0]] \$$$

$$[y_7, y_6, 0, 0, y_5, y_4, y_5, y_2, 0, y_3, y_1, 0]$$

$$p = s^2 - s^8$$

1366 . Coloring, {3, 5, 6, 10, 11, 12}

R: [7, 7, 8, 6, 3, 3, B, C, B, 2, 4, 9]

B: [6, 8, 7, 7, A, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 3, 1], [0, 0, 1, 3, 0, 2, 2, 2, 1, 0, 4, 1], [0, 0, 2, 4, 0, 3, 0, 1, 1, 0, 3, 2], [0, 0, 3, 3, 0, 4, 0, 2, 2, 0, 1, 1], [0, 0, 4, 1, 0, 3, 0, 3, 1, 0, 2, 2], [0, 0, 3, 2, 0, 1, 0, 4, 2, 0, 1, 3], [0, 0, 1, 1, 0, 2, 0, 3, 3, 0, 2, 4], [0, 0, 2, 2, 0, 1, 0, 1, 4, 0, 3, 3], [0, 0, 1, 3, 0, 2, 0, 2, 3, 0, 4, 1]] \$$$

$$[0, y_2, y_1, y_3, 0, y_7, y_6, y_5, y_4, 0, y_8, y_9]$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 1, 3], [1, 0, 0, 0, 3, 2, 0, 0, 0, 5, 1, 4], [1, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$$

$$[y_1, 0, 0, 0, y_5, y_3, 2y_4, y_4, 0, y_2, y_6, y_7]$$

$$p = -s^5 + s^8$$

1367 . Coloring, {3, 5, 7, 8, 9, 10}

R: [7, 7, 8, 6, 3, A, A, B, C, 2, 1, 5]

B: [6, 8, 7, 7, A, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	6 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 0, 4, 1, 0, 3, 1, 0] , [1, 3, 1, 0, 0, 0, 4, 2, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 4, 1, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 5, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[y_1, y_2, y_3, 0, y_4, y_7, y_5, y_6, 0, y_8, y_9, y_7]$$

$$p = s^7 - s^{10}$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3] , [0, 0, 1, 3, 0, 0, 3, 0, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_1, y_2, 0, -2y_1 + y_6, y_3, -2y_1 + y_6, y_4, -2y_1 + y_6, y_5, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

1368 . Coloring, {3, 5, 7, 8, 9, 11}

R: [7, 7, 8, 6, 3, A, A, B, C, C, 4, 5]

B: [6, 8, 7, 7, A, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	10 vs 10

Omega Rank for R : cycles: {{3, 4, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 2, 0, 1, 0, 3, 1, 3] , [0, 0, 3, 1, 3, 1, 0, 2, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 1, 0, 3, 0, 1, 2, 2] , [0, 0, 3, 2, 2, 1, 0, 3, 0, 1, 3, 1] , [0, 0, 2, 3, 1, 2, 0, 3, 0, 1, 3, 1] , [0, 0, 1, 3, 1, 3, 0, 2, 0, 2, 3, 1] , [0, 0, 1, 3, 1, 3, 0, 1, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 3, 0, 1, 0, 3, 1, 3]] \$

[0, 0, $y_4 + y_6 - y_1 - y_2$, y_3 , $-y_3 + y_4 + y_6$, y_1 , y_2 , y_5 , 0, $-y_5 + y_4 + y_6$, y_4 , y_6]

$$p' = -s^2 + s^4 - s^6 + s^8 \quad p = s^2 - s^3 + s^6 - s^7 \quad p' = -s^2 + s^3 - s^6 + s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1] , [3, 1, 1, 0, 0, 2, 1, 2, 1, 0, 4, 1] , [4, 0, 2, 0, 0, 3, 1, 1, 1, 0, 2, 2] , [2, 0, 3, 0, 0, 4, 2, 0, 2, 0, 2, 1] , [2, 0, 4, 0, 0, 2, 3, 0, 1, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 2, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 4, 2, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 4, 0, 0, 0, 4, 0]] \$

[y_1 , y_2 , y_3 , 0, 0, y_{10} , y_7 , y_8 , y_9 , y_4 , y_5 , y_6]

1369 . Coloring, {3, 5, 7, 8, 9, 12}

R: [7, 7, 8, 6, 3, A, A, B, C, C, 1, 9]

B: [6, 8, 7, 7, A, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 8
See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3], [1, 0, 0, 0, 0, 0, 2, 1, 3, 3, 1, 5], [1, 0, 0, 0, 0, 0, 1, 0, 5, 2, 1, 6], [1, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 7], [0, 0, 0, 0, 0, 0, 1, 0, 7, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[2y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, 0, 0, y_1, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p' = s^7 - s^8 \quad p = s^7 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {2, 5, 8, 10, 12}}
See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1], [0, 1, 1, 3, 1, 0, 3, 2, 0, 2, 2, 1], [0, 2, 0, 2, 1, 0, 4, 1, 0, 1, 3, 2], [0, 1, 0, 3, 2, 0, 2, 2, 0, 1, 4, 1], [0, 1, 0, 4, 1, 0, 3, 1, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 4, 1, 0, 1, 3, 1], [0, 1, 0, 3, 1, 0, 2, 2, 0, 2, 4, 1], [0, 2, 0, 4, 1, 0, 3, 1, 0, 1, 2, 2], [0, 1, 0, 2, 2, 0, 4, 2, 0, 1, 3, 1], [0, 1, 0, 3, 1, 0, 2, 1, 0, 2, 4, 2]] \$$

$$[0, 7y_1, 9y_1 - 7y_2 + 9y_3 - 7y_4 - 7y_5 + 9y_6 + 9y_8 - 7y_7 + 9y_9, 7y_2, 7y_3, 7y_4, 7y_5, 7y_6, 0, 7y_8, 7y_7, 7y_9]$$

$$p = -s^3 - s^4 - s^5 + s^8 + s^9 + s^{10}$$

1370 . Coloring, {3, 5, 7, 8, 10, 11}

R: [7, 7, 8, 6, 3, A, A, B, B, 2, 4, 5]

B: [6, 8, 7, 7, A, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 9
 See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 2, 2, 1, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 2, 3, 2, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 1, 3, 0, 0, 5, 2, 0] , [0, 5, 0, 2, 0, 1, 4, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 2, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0]] \$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_7, 0, y_8, y_9, 0]$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}, \{9, 12\}\}$ order: 10
 See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 2, 4] , [2, 0, 1, 0, 0, 2, 1, 0, 4, 0, 2, 4] , [2, 0, 2, 0, 0, 2, 1, 0, 4, 0, 1, 4] , [1, 0, 2, 0, 0, 2, 2, 0, 4, 0, 1, 4] , [1, 0, 2, 0, 0, 1, 2, 0, 4, 0, 2, 4] , [2, 0, 1, 0, 0, 1, 2, 0, 4, 0, 2, 4] , [2, 0, 1, 0, 0, 2, 1, 0, 4, 0, 2, 4] , [2, 0, 2, 0, 0, 2, 1, 0, 4, 0, 1, 4] , [1, 0, 2, 0, 0, 2, 2, 0, 4, 0, 1, 4]] \$

$$[-y_6 - y_5 - y_3 + 4y_4 + 2y_2 - y_1, 0, y_6, 0, 0, y_5, y_3, y_4, y_2, y_4, y_1, 2y_4 + y_2]$$

$$p' = -s^3 + s^8 \quad p' = -s^2 + s^7 \quad p = -s^2 + s^7$$

1371 . Coloring, $\{3, 5, 7, 8, 10, 12\}$

R: [7, 7, 8, 6, 3, A, A, B, B, 2, 1, 9]

B: [6, 8, 7, 7, A, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6
 See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 4, 1, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 5, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, y_3, 0, 0, y_3, y_4, y_7, 2y_3, y_5, y_6, 0]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 2, 4], [0, 0, 1, 2, 4, 0, 3, 0, 0, 2, 2, 2], [0, 0, 0, 2, 2, 0, 3, 0, 0, 4, 3, 2], [0, 0, 0, 3, 2, 0, 2, 0, 0, 2, 3, 4], [0, 0, 0, 3, 4, 0, 3, 0, 0, 2, 2, 2], [0, 0, 0, 2, 2, 0, 3, 0, 0, 4, 3, 2], [0, 0, 0, 3, 2, 0, 2, 0, 0, 2, 3, 4], [0, 0, 0, 3, 4, 0, 3, 0, 0, 2, 2, 2], [0, 0, 0, 2, 2, 0, 3, 0, 0, 4, 3, 2]] \$$$

$$[0, 0, -y_1 + y_2 - y_3 + y_4, y_1, -2y_3 + 2y_4 - y_5 + 2y_2, y_3 - 2y_4 + y_5, y_2, y_3 - 2y_4 + y_5, 0, y_3, y_4, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p = -s^3 + s^9$$

1372 . Coloring, {3, 5, 7, 8, 11, 12}

R: [7, 7, 8, 6, 3, A, A, B, B, C, 4, 9]

B: [6, 8, 7, 7, A, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 10

Omega Rank for R : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 2, 2], [0, 0, 0, 2, 0, 2, 0, 1, 2, 3, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3, 3], [0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 3, 2], [0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 3, 2], [0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 2, 3], [0, 0, 0, 2, 0, 3, 0, 0, 3, 3, 2, 3], [0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3, 3]] \$$$

$$[0, 0, y_7, y_6, 0, -3y_7 + y_6 + y_1 + y_5 + y_4 - y_2 - y_3, 2y_7, y_1, y_5, y_4, y_2, y_3]$$

$$p = -s^3 + s^9 \quad p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 2, 2] , [2, 1, 1, 0, 2, 2, 1, 2, 0, 2, 2, 1] , [2, 2, 2, 0, 1, 2, 1, 1, 0, 2, 1, 2] , [1, 2, 2, 0, 2, 2, 2, 0, 1, 1, 1] , [1, 1, 2, 0, 1, 1, 2, 2, 0, 2, 2, 2] , [2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 2, 2] , [2, 1, 1, 0, 2, 2, 1, 2, 0, 2, 2, 1] , [2, 2, 2, 0, 1, 2, 1, 1, 0, 2, 1, 2] , [1, 2, 2, 0, 2, 2, 2, 2, 0, 1, 1, 1] , [1, 1, 2, 0, 1, 1, 2, 2, 0, 2, 2, 2]] \$

$$[y_1 - y_4 + y_3, y_1 - y_2 + y_5, y_4 + y_5 - y_3, 0, y_1 + y_3 - y_2, y_1, y_4 - y_2 + y_5, y_4, 0, y_2, y_3, y_5]$$

$$p' = -s^2 + s^7 \quad p' = -s^3 + s^8 \quad p' = -s^4 + s^9 \quad p = -s + s^6 \quad p' = -s + s^6$$

1373 . Coloring, {3, 5, 7, 9, 10, 11}

R: [7, 7, 8, 6, 3, A, A, C, C, 2, 4, 5]

B: [6, 8, 7, 7, A, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 2, 2, 1, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 3, 2, 0, 4, 0, 1] , [0, 4, 1, 0, 1, 0, 3, 2, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 4, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 3, 1, 0, 4, 0, 1] , [0, 4, 2, 0, 1, 0, 3, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 4, 2, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 3, 1, 0, 4, 0, 2]] \$

$$[0, -3y_1 + 10y_2 - 3y_3 - 3y_4 + 10y_5 - 3y_6, 3y_2 + 3y_5 - 3y_7, 3y_1, 3y_2, 3y_3, 3y_4, 3y_5, 0, 3y_6, 0, 3y_7]$$

$$p' = s^3 + s^5 - s^6 - s^8 \quad p = s^3 + s^4 + s^5 - s^7 - s^8 - s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 4, 2] , [4, 0, 1, 0, 0, 2, 1, 0, 2, 0, 5, 1] , [5, 0, 2, 0, 0, 4, 1, 0, 1, 0, 3, 0] , [3, 0, 4, 0, 0, 5, 2, 0, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 3, 4, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 2, 5, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 3, 0, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 2, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 5, 2, 0, 0, 0, 2, 0]] \$

$$[y_1, 0, y_3, 0, 0, y_2, y_4, y_6, y_5, y_6, y_7, y_8]$$

$$p = -s^4 + s^9$$

1374 . Coloring, {3, 5, 7, 9, 10, 12}

R: [7, 7, 8, 6, 3, A, A, C, C, 2, 1, 9]

B: [6, 8, 7, 7, A, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	5 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 1, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3]] \$$$

$$[6y_1 + 6y_4 - 20y_5 + 6y_2, y_1, 3y_1 + 3y_4 - 10y_5 + 3y_2, 0, 0, 3y_1 + 3y_4 - 10y_5 + 3y_2, y_4, y_3, 3y_1 + 3y_4 - 9y_5 + 3y_2 - y_3, y_2, 0, y_5]$$

$$p = -s^3 + s^9 \quad p' = -s^4 + s^7 \quad p'' = -s^3 + s^6 \quad p''' = -s^3 + s^6$$

Omega Rank for B : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 4, 2], [0, 0, 1, 4, 2, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 5, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 5, 2], [0, 0, 0, 5, 2, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 5, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 5, 2], [0, 0, 0, 5, 2, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 5, 0, 0, 2, 3, 2]] \$$$

$$[0, 0, -3y_1 - 7y_3 - 7y_2 + 14y_4 + 8y_5, 3y_1, -5y_3 - 5y_2 + 7y_4 + 7y_5, 3y_3, 3y_2, 3y_3, 0, 3y_4, -10y_3 - 7y_2 + 8y_4 + 14y_5, 3y_5]$$

$$p'' = -s^4 + s^7 \quad p''' = -s^3 + s^9 \quad p'''' = -s^3 + s^6 \quad p'''' = -s^3 + s^6$$

1375 . Coloring, {3, 5, 7, 9, 11, 12}

R: [7, 7, 8, 6, 3, A, A, C, C, C, 4, 9]

B: [6, 8, 7, 7, A, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 1, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$[0, 0, -y_1 + 2y_2 + 2y_3 - 2y_4, -2y_1 + 4y_2 + 4y_3 - 4y_4, 0, y_1, -2y_1 + 4y_2 + 4y_3 - 4y_4, y_2 + y_3 - y_4, y_2, y_3, 0, y_4]$

$p = -s^4 + s^6 \quad p = -s^4 + s^7 \quad p = -s^4 + s^8 \quad p = -s^4 + s^5$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 4, 0] , [4, 1, 1, 0, 0, 2, 1, 2, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 4, 1, 1, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 2, 2, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0]] \$

$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9, 0]$

1376 . Coloring, {3, 5, 7, 10, 11, 12}

R: [7, 7, 8, 6, 3, A, A, C, B, 2, 4, 9]

B: [6, 8, 7, 7, A, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	8 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 9

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 2, 1, 1, 3, 2, 1], [0, 3, 0, 2, 0, 1, 3, 0, 1, 4, 1, 1], [0, 4, 0, 1, 0, 2, 3, 0, 1, 4, 1, 0], [0, 4, 0, 1, 0, 1, 4, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 1, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 1, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$[0, y_1, y_2, y_4, 0, y_5, y_3, y_6, y_7, y_8, y_{10}, y_9]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}, \{5, 10, 12\}\}$

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3], [3, 0, 1, 0, 3, 2, 1, 0, 0, 2, 3, 1], [3, 0, 2, 0, 1, 3, 1, 0, 0, 3, 1, 2], [1, 0, 3, 0, 2, 3, 2, 0, 0, 1, 1, 3], [1, 0, 3, 0, 3, 1, 3, 0, 0, 2, 2, 1], [2, 0, 1, 0, 1, 1, 3, 0, 0, 3, 3, 2], [3, 0, 1, 0, 2, 2, 1, 0, 0, 1, 3, 3], [3, 0, 2, 0, 3, 3, 1, 0, 0, 2, 1, 1], [1, 0, 3, 0, 1, 3, 2, 0, 0, 3, 1, 2]] \$$

$[-3 y_8 + 5 y_1 - 3 y_7 - 3 y_5 - 3 y_6 + 5 y_3 - 3 y_2 + 5 y_4, 0, 3 y_8, 0, 3 y_1, 3 y_7, 3 y_5, 3 y_6, 0, 3 y_3, 3 y_2, 3 y_4]$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1377 . Coloring, $\{3, 5, 8, 9, 10, 11\}$

R: [7, 7, 8, 6, 3, A, B, B, C, 2, 4, 5]

B: [6, 8, 7, 7, A, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	9 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 6, 7, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1], [0, 1, 2, 3, 1, 2, 2, 1, 0, 1, 3, 0], [0, 1, 1, 3, 0, 3, 1, 2, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 1, 1, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 2, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 3, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 3, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 3, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 3, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 2, 0, 0, 3, 3, 0]] \$$

$[0, -y_1 + y_2 + y_3 - y_4 + y_5 + y_6 + y_7 - y_8 - y_9, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$

$$p = -s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3], [1, 0, 1, 0, 0, 2, 1, 0, 3, 2, 2, 4], [2, 0, 2, 0, 0, 1, 1, 0, 4, 1, 3, 2], [3, 0, 1, 0, 0, 2, 2, 0, 2, 1, 4, 1], [4, 0, 2, 0, 0, 3, 1, 0, 1, 2, 2, 1], [2, 0, 3, 0, 0, 4, 2, 0, 1, 1, 1, 2], [1, 0, 4, 0, 0, 2, 3, 0, 2, 2, 1, 1], [1, 0, 2, 0, 0, 1, 4, 0, 1, 3, 2, 2], [2, 0, 1, 0, 0, 1, 2, 0, 2, 4, 1, 3]] \$$

$[y_1, 0, y_2, 0, 0, y_6, y_7, y_8, y_9, y_3, y_4, y_5]$

1378 . Coloring, $\{3, 5, 8, 9, 10, 12\}$

R: $[7, 7, 8, 6, 3, A, B, B, C, 2, 1, 9]$

B: $[6, 8, 7, 7, A, 3, A, C, B, C, 4, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	6 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 4, 1, 1, 1, 3, 2], [3, 1, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2]] \$$

$$[3 y_1, -3 y_1 - 6 y_7 - 3 y_6 + 13 y_4 - 6 y_5 - 3 y_3 + 13 y_2, 3 y_7, 0, 0, 3 y_7, 3 y_6, 3 y_5, 3 y_4, 3 y_5, 3 y_3, 3 y_2]$$

$$p = -s^4 + s^{10} \quad p = s^4 - s^6 - s^7 + s^9 \quad p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3], [0, 0, 1, 1, 3, 0, 3, 0, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$$$

$$[0, 0, y_1 - y_4, y_1, y_6, y_4, y_5, y_4, 0, y_3, y_4, y_2]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p' = -s^5 + s^8$$

1379 . Coloring, {3, 5, 8, 9, 11, 12}

R: [7, 7, 8, 6, 3, A, B, B, C, C, 4, 9]

B: [6, 8, 7, 7, A, 3, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	10 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3], [0, 0, 0, 3, 0, 2, 0, 1, 3, 1, 3, 3], [0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 1, 4], [0, 0, 0, 1, 0, 3, 0, 0, 4, 3, 0, 5], [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 0], [0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[0, 0, -y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7, y_1, 0, y_2, -2 y_1 + 2 y_2 - 2 y_3 - 2 y_4 - 2 y_5 + 2 y_6 + 2 y_7, y_3, y_4, y_5, y_6, y_7]$$

$$p' = s^7 - s^8 \quad p = s^7 - s^9$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1] , [1, 3, 1, 0, 1, 2, 1, 2, 0, 4, 0, 1] , [0, 4, 2, 0, 1, 1, 1, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 2, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 1, 2, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 2, 0, 4, 0, 4]] \$

$$[y_2, y_1, y_3, 0, y_4, y_7, y_6, y_5, 0, y_{10}, y_9, y_8]$$

1380 . Coloring, {3, 5, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -s + s^2 + 2s^3 - 3s^4 + 4s^5 + 8s^6 - 8s^7 + 16s^8$$

R: [7, 7, 8, 6, 3, A, B, B, B, 2, 4, 9]

B: [6, 8, 7, 7, A, 3, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 4, 0] , [0, 1, 0, 4, 0, 2, 2, 1, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 4, 1, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 5, 1, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 3, 2, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 1, 4, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 1, 5, 0, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 2, 3, 0, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 4, 1, 0, 0, 2, 3, 0]] \$

$$[0, y_1 + y_5 - y_2 + y_4 + y_3 + y_6 - y_7, y_1, y_5, 0, y_2, y_4, y_3, 2y_1, y_6, y_7, 0]$$

$$p' = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 2, 1, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 1, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[2y_5, 0, y_1, 0, y_2, y_3, y_4, y_5, 0, y_6, 0, y_7]$$

$$p = -s^5 + s^8$$

1381 . Coloring, {3, 5, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -s + s^2 + 2s^3 + 3s^4 - 8s^5 + 8s^7 - 16s^8$$

R: [7, 7, 8, 6, 3, A, B, C, C, 2, 4, 9]

B: [6, 8, 7, 7, A, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 10	9 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 2, 2], [0, 1, 0, 2, 0, 2, 2, 1, 2, 1, 2, 3], [0, 1, 0, 2, 0, 2, 1, 0, 3, 2, 2, 3], [0, 2, \\ 0, 2, 0, 2, 1, 0, 3, 2, 1, 3], [0, 2, 0, 1, 0, 2, 2, 0, 3, 2, 1, 3], [0, 2, 0, 1, 0, 1, 2, 0, 3, 2, 2, 3], [0, 2, 0, 2, 0, 1, \\ 2, 0, 3, 1, 2, 3], [0, 1, 0, 2, 0, 2, 2, 0, 3, 1, 2, 3], [0, 1, 0, 2, 0, 2, 1, 0, 3, 2, 2, 3], [0, 2, 0, 2, 0, 2, 1, 0, 3, 2, \\ 1, 3]] \$ \end{aligned}$$

$$[0, 5y_3 + 5y_1 - 3y_4 - 3y_7, 3y_3 + 3y_1 - 3y_6, 5y_3 + 5y_1 - 3y_5 - 3y_2, 0, 3y_4, 3y_5, 3y_3, 3y_1, 3y_2, 3y_7, 3y_6]$$

$$p' = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p' = -s^3 + s^9 \quad p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

$$\begin{aligned} \$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 2, 2], [2, 0, 1, 0, 2, 2, 1, 0, 0, 4, 1, 3], [1, 0, 2, 0, 3, 2, 1, 0, 0, 3, 0, 4], [0, 0, \\ 2, 0, 4, 1, 2, 0, 0, 4, 0, 3], [0, 0, 1, 0, 3, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, \\ 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$ \end{aligned}$$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, 0, y_8, y_7, y_9]$$

1382 . Coloring, {3, 6, 7, 8, 9, 10}

R: [7, 7, 8, 6, A, 3, A, B, C, 2, 1, 5]

B: [6, 8, 7, 7, 3, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	7 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1] , [1, 3, 1, 0, 1, 0, 4, 1, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 4, 1, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 5, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, y_3, 0, y_3 + y_7, y_7, y_8, y_6, 0, y_4, y_5, y_7]$$

$$p' = -s^6 + s^9 \quad p = -s^6 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_3, y_1, 0, y_3, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

1383 . Coloring, {3, 6, 7, 8, 9, 11}

R: [7, 7, 8, 6, A, 3, A, B, C, C, 4, 5]

B: [6, 8, 7, 7, 3, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 10

Omega Rank for R : cycles: $\{\{5, 10, 12\}, \{3, 4, 6, 8, 11\}\}$

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3], [0, 0, 1, 1, 3, 2, 0, 1, 0, 4, 1, 3], [0, 0, 2, 1, 3, 1, 0, 1, 0, 3, 1, 4], [0, 0, 1, 1, 4, 1, 0, 2, 0, 3, 1, 3], [0, 0, 1, 1, 3, 1, 0, 1, 0, 4, 2, 3], [0, 0, 1, 2, 3, 1, 0, 1, 0, 3, 1, 4], [0, 0, 1, 1, 4, 2, 0, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 1, 0, 1, 0, 4, 1, 3], [0, 0, 1, 1, 3, 1, 0, 2, 0, 3, 1, 4]] \$$

$[0, 0, 3 y_1, 3 y_2, 5 y_1 + 5 y_2 + 5 y_3 - 3 y_4 + 5 y_6 - 3 y_5 + 5 y_7 - 3 y_8, 3 y_3, 3 y_4, 3 y_6, 0, 3 y_5, 3 y_7, 3 y_8]$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1], [3, 1, 0, 0, 0, 2, 1, 2, 1, 1, 4, 1], [4, 1, 0, 0, 0, 3, 0, 1, 1, 2, 2, 2], [2, 2, 0, 0, 0, 4, 0, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 2, 0, 2, 1, 4, 2, 1], [2, 4, 0, 0, 0, 1, 0, 3, 1, 2, 1, 2], [1, 2, 0, 0, 0, 2, 0, 4, 2, 1, 1, 3], [1, 1, 0, 0, 0, 1, 0, 2, 3, 2, 2, 4], [2, 2, 0, 0, 0, 1, 0, 1, 4, 1, 3, 2], [3, 1, 0, 0, 0, 2, 0, 2, 2, 1, 4, 1]] \$$

$[y_2, y_1, y_2 - y_1 - y_3 + y_4 + y_7 + y_6 + y_5 - y_9 - y_8, 0, 0, y_3, y_4, y_7, y_6, y_5, y_9, y_8]$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

1384 . Coloring, $\{3, 6, 7, 8, 9, 12\}$

R: $[7, 7, 8, 6, A, 3, A, B, C, C, 1, 9]$

B: $[6, 8, 7, 7, 3, A, B, C, B, 2, 4, 5]$

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	10 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 8
See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3], [1, 0, 1, 0, 0, 0, 2, 1, 3, 2, 1, 5], [1, 0, 0, 0, 0, 0, 1, 1, 5, 2, 1, 5], [1, 0, 0, 0, 0, 1, 0, 5, 1, 1, 7], [1, 0, 0, 0, 0, 0, 1, 0, 7, 1, 0, 6], [0, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$[y_1, 0, y_2, 0, 0, y_6, y_7, y_8, y_9, y_5, y_3, y_4]$

Omega Rank for B : cycles: {{4, 7, 11}} order: 9
See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1], [0, 1, 2, 3, 1, 0, 3, 2, 0, 1, 2, 1], [0, 1, 1, 2, 1, 0, 5, 1, 0, 0, 3, 2], [0, 0, 1, 3, 2, 0, 3, 1, 0, 0, 5, 1], [0, 0, 2, 5, 1, 0, 4, 0, 0, 0, 3, 1], [0, 0, 1, 3, 1, 0, 7, 0, 0, 0, 4, 0], [0, 0, 1, 4, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0]] \$

$[0, y_1, y_4, y_5, y_2, y_8, y_3, y_7, 0, y_{10}, y_6, y_9]$

1385 . Coloring, {3, 6, 7, 8, 10, 11}

R: [7, 7, 8, 6, A, 3, A, B, B, 2, 4, 5]

B: [6, 8, 7, 7, 3, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{2, 7, 10}, {3, 4, 6, 8, 11}}
See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 2, 0], [0, 3, 1, 2, 0, 2, 2, 1, 0, 4, 1, 0], [0, 4, 2, 1, 0, 2, 3, 1, 0, 2, 1, 0], [0, 2, 2, 1, 0, 1, 4, 2, 0, 3, 1, 0], [0, 3, 1, 1, 0, 1, 2, 2, 0, 4, 2, 0], [0, 4, 1, 2, 0, 1, 3, 1, 0, 2, 2, 0], [0, 2, 1, 2, 0, 2,

4, 1, 0, 3, 1, 0], [0, 3, 2, 1, 0, 2, 2, 1, 0, 4, 1, 0], [0, 4, 2, 1, 0, 1, 3, 2, 0, 2, 1, 0]] \$

[0, 9 y₁ + 9 y₇ - 7 y₆ + 9 y₃ - 7 y₄ + 9 y₅ - 7 y₂ + 9 y₈, 7 y₁, 7 y₇, 7 y₆, 7 y₃, 7 y₄, 7 y₅, 0, 7 y₂, 7 y₈, 0]

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 2, 4], [2, 0, 0, 0, 0, 2, 1, 0, 4, 1, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 1, 5], [1, 0, 0, 0, 0, 2, 0, 0, 5, 2, 0, 6], [0, 0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

[y₂, 0, y₅, 0, 0, y₂ + y₁ + y₆ + y₇ - y₃ - y₄, y₁, y₅, y₆, y₇, y₃, y₄]

$$p = -s^7 + s^8 \quad p = -s^7 + s^9$$

1386 . Coloring, {3, 6, 7, 8, 10, 12}

R: [7, 7, 8, 6, A, 3, A, B, B, 2, 1, 9]

B: [6, 8, 7, 7, 3, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 2, 0], [2, 3, 1, 0, 0, 0, 4, 1, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 5, 1, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 5, 0, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

[y₁, y₂, y₃, 0, 0, y₆, y₄, y₅, 2 y₆, y₇, y₈, 0]

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 2, 4] , [0, 0, 2, 2, 4, 0, 3, 0, 0, 1, 2, 2] , [0, 0, 4, 2, 2, 0, 4, 0, 0, 0, 3, 1] , [0, 0, 2, 3, 1, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 1, 4, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$[0, 0, y_1, y_2, y_3, y_4, y_6, y_4, 0, y_5, y_7, y_8]$

$$p = -s^6 + s^9$$

1387 . Coloring, $\{3, 6, 7, 8, 11, 12\}$

R: $[7, 7, 8, 6, A, 3, A, B, B, C, 4, 9]$

B: $[6, 8, 7, 7, 3, A, B, C, C, 2, 1, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 10

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 2, 2] , [0, 0, 1, 2, 0, 2, 0, 1, 2, 2, 3, 3] , [0, 0, 2, 3, 0, 2, 0, 1, 3, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 0, 2, 2, 0, 4, 0] , [0, 0, 3, 4, 0, 3, 0, 2, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 4, 0, 3, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 0, 3, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 2, 0, 4, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 3, 0, 4, 0, 0, 4, 0]] \$$

$[0, 0, y_1, y_3, 0, y_2, y_4, y_5, y_6, y_7, y_8, y_9]$

Omega Rank for B : cycles: $\{\{1, 2, 3, 5, 6, 7, 8, 10, 11, 12\}\}$ order: 10

See Matrix

$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 2, 1, 2, 0, 1, 2, 1] , [2, 1, 2, 0, 1, 2, 2, 1, 0, 2, 1, 2] , [1, 2, 1, 0, 2, 2, 1, 0, 2, 2, 1] , [2, 2, 2, 0, 1, 1, 1, 2, 0, 2, 2, 1] , [2, 2, 1, 0, 1, 2, 2, 2, 0, 1, 1, 2] , [1, 1, 1, 0, 2, 2, 1, 2, 0, 2, 2, 2] , [2, 2, 2, 0, 2, 1, 1, 1, 0, 2, 1, 2] , [1, 2, 2, 0, 2, 2, 2, 2, 0, 1, 1, 1] , [1, 1, 2, 0, 1, 1, 2, 2, 0, 2, 2, 2]] \$$

$$[y_3, y_2, y_1, 0, -y_3 + y_2 + y_1 + y_7 - y_8 - y_6 - y_4 + y_5 + y_9, y_7, y_8, y_6, 0, y_4, y_5, y_9]$$

$$p = s - s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9 - s^{10}$$

1388 . Coloring, {3, 6, 7, 9, 10, 11}

R: [7, 7, 8, 6, A, 3, A, C, C, 2, 4, 5]

B: [6, 8, 7, 7, 3, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

$$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 0, 2], [0, 3, 1, 0, 2, 2, 2, 1, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 3, 1, 0, 4, 0, 1], [0, 4, 0, 0, 1, 0, 4, 2, 0, 4, 0, 1], [0, 4, 0, 0, 1, 0, 4, 0, 0, 5, 0, 2], [0, 5, 0, 0, 2, 0, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[0, y_1, y_2, y_3, y_5, y_4, y_6, y_7, 0, y_9, 0, y_8]$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 4, 2], [4, 0, 0, 0, 0, 2, 1, 0, 2, 1, 5, 1], [5, 0, 0, 0, 0, 4, 0, 0, 1, 2, 3, 1], [3, 0, 0, 0, 0, 5, 0, 0, 1, 4, 1, 2], [1, 0, 0, 0, 0, 3, 0, 0, 2, 5, 1, 4], [1, 0, 0, 0, 0, 1, 0, 0, 4, 3, 2, 5], [2, 0, 0, 0, 0, 1, 0, 0, 5, 1, 4, 3], [4, 0, 0, 0, 0, 2, 0, 0, 3, 1, 5, 1], [5, 0, 0, 0, 0, 4, 0, 0, 1, 2, 3, 1]] \$$$

$$[y_3 - y_1 - y_6 - y_4 + y_5 + y_7, 0, y_2, 0, 0, y_3, y_1, y_2, y_6, y_4, y_5, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

1389 . Coloring, {3, 6, 7, 9, 10, 12}

R: [7, 7, 8, 6, A, 3, A, C, C, 2, 1, 9]

B: [6, 8, 7, 7, 3, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 0, 2], [0, 3, 1, 0, 0, 0, 4, 1, 2, 2, 0, 3], [0, 2, 0, 0, 0, 0, 3, 1, 3, 4, 0, 3], [0, 4, 0, 0, 0, 0, 2, 0, 3, 3, 0, 4], [0, 3, 0, 0, 0, 0, 4, 0, 4, 2, 0, 3], [0, 2, 0, 0, 0, 0, 3, 0, 3, 4, 0, 4], [0, 4, 0, 0, 0, 0, 2, 0, 4, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 2, 0, 4], [0, 2, 0, 0, 0, 0, 3, 0, 4, 4, 0, 3]] \$$

$[-14 y_1 + 18 y_2 - 14 y_3 + 18 y_4 + 18 y_5 - 14 y_6 + 18 y_7, 5 y_1, 5 y_2, 0, 0, -7 y_1 + 9 y_2 - 7 y_3 + 9 y_4 + 9 y_5 - 7 y_6 + 9 y_7, 5 y_3, 5 y_4, 5 y_5, 5 y_6, 0, 5 y_7]$

$$p = s^4 - s^6 - s^7 + s^9 \quad p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 4, 2], [0, 0, 2, 4, 2, 0, 3, 0, 0, 1, 3, 1], [0, 0, 2, 3, 1, 0, 6, 0, 0, 0, 3, 1], [0, 0, 1, 3, 1, 0, 5, 0, 0, 0, 6, 0], [0, 0, 1, 6, 0, 0, 4, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0]] \$$

$[0, 0, y_5, y_4, y_2, y_3, y_1, y_3, 0, y_8, y_6, y_7]$

$$p = -s^6 + s^9$$

1390 . Coloring, $\{3, 6, 7, 9, 11, 12\}$

R: [7, 7, 8, 6, A, 3, A, C, C, C, 4, 9]

B: [6, 8, 7, 7, 3, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 0, 4] , [0, 0, 1, 0, 0, 2, 0, 1, 4, 2, 0, 6] , [0, 0, 2, 0, 0, 0, 0, 1, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$[0, 0, y_4, y_3, 0, -y_3 + y_6, y_3, y_2, y_1, y_6, 0, y_5]$

$$p' = -s^5 + s^7 \quad p = -s^5 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 4, 0] , [4, 1, 2, 0, 0, 2, 1, 2, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 4, 2, 1, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 0, 1, 0, 4, 3, 0] , [3, 4, 0, 0, 0, 3, 0, 2, 0, 3, 1, 0] , [1, 3, 0, 0, 0, 3, 0, 4, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 1, 0, 3, 0, 3, 4, 0] , [4, 3, 0, 0, 0, 2, 0, 3, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 4, 0, 3, 0, 2, 3, 0]] \$

$[y_1 + y_2 - y_3 + y_6 - y_4 - y_5 - y_7 + y_8, y_1, y_2, 0, y_3, y_6, y_4, y_5, 0, y_7, y_8, 0]$

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

1391 . Coloring, {3, 6, 7, 10, 11, 12}

R: [7, 7, 8, 6, A, 3, A, C, B, 2, 4, 9]

B: [6, 8, 7, 7, 3, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}, {3, 4, 6, 8, 9, 11, 12}}

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1] , [0, 3, 1, 1, 0, 2, 2, 1, 1, 2, 2, 1] , [0, 2, 2, 2, 0, 1, 3, 1, 1, 2, 1, 1] , [0, 2, 1, 1, 0, 2, 2, 1, 3, 1, 1] , [0, 3, 2, 1, 0, 1, 2, 1, 1, 2, 1, 2] , [0, 2, 1, 1, 0, 1, 3, 2, 2, 2, 1, 1] , [0, 2, 1, 1, 0, 1, 2, 1, 1, 3, 2, 2] , [0, 3, 1, 2, 0, 1, 2, 1, 2, 2, 1, 1] , [0, 2, 1, 1, 0, 2, 3, 1, 1, 2, 2, 1] , [0, 2, 2, 2, 0, 1, 2, 1, 1, 3, 1, 1]] \$

$$[0, 7y_1, 9y_1 - 7y_2 - 7y_3 + 9y_8 - 7y_4 - 7y_5 + 9y_6 - 7y_7 - 7y_9, 7y_2, 0, 7y_3, 7y_8, 7y_4, 7y_5, 7y_6, 7y_7, 7y_9]$$

$$p = -s - s^2 - s^3 + s^8 + s^9 + s^{10}$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 7, 10, 11, 12}} order: 8
See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 2, 1, 0, 0, 1, 3, 1] , [3, 0, 3, 0, 1, 3, 2, 0, 0, 2, 1, 1] , [1, 0, 1, 0, 1, 3, 3, 0, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 1, 1, 0, 0, 3, 3, 3] , [3, 0, 2, 0, 3, 2, 1, 0, 0, 1, 1, 3] , [1, 0, 3, 0, 3, 3, 2, 0, 0, 2, 1, 1] , [1, 0, 3, 0, 1, 1, 3, 0, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 3, 3]] \$

$$[y_1 - y_2 + y_3 - y_4 - y_5 - y_6 + y_7 + y_8, 0, y_1, 0, y_2, y_3, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

1392 . Coloring, {3, 6, 8, 9, 10, 11}

R: [7, 7, 8, 6, A, 3, B, B, C, 2, 4, 5]

B: [6, 8, 7, 7, 3, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	8 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 1, 3, 1] , [0, 1, 1, 3, 1, 2, 2, 1, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 3, 1, 1, 0, 1, 3, 0] , [0, 1, 3, 3, 0, 3, 2, 2, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 1, 3, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 0, 3, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 0, 4, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0]] \$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, y_7, 0, y_8, y_9, y_{10}]$$

Omega Rank for B : cycles: $\{\{1, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 3, 1, 3], [1, 0, 0, 0, 0, 2, 1, 0, 3, 3, 2, 4], [2, 0, 0, 0, 0, 1, 0, 0, 4, 3, 3, 3], [3, 0, 0, 0, 2, 0, 0, 3, 1, 4, 3], [4, 0, 0, 0, 0, 3, 0, 0, 3, 2, 3, 1], [3, 0, 0, 0, 0, 4, 0, 0, 1, 3, 3, 2], [3, 0, 0, 0, 0, 3, 0, 0, 2, 4, 1, 3], [1, 0, 0, 0, 0, 3, 0, 0, 3, 3, 2, 4], [2, 0, 0, 0, 0, 1, 0, 0, 4, 3, 3, 3]] \$$$

$$[y_1, 0, y_4, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p = -s^3 + s^9$$

1393 . Coloring, $\{3, 6, 8, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = 3s^4 - 4s^5 - 8s^7 + 16s^8$$

R: [7, 7, 8, 6, A, 3, B, B, C, 2, 1, 9]

B: [6, 8, 7, 7, 3, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 1, 3, 1], [3, 1, 1, 0, 0, 0, 4, 1, 1, 0, 3, 2], [3, 0, 0, 0, 0, 0, 4, 1, 2, 0, 5, 1], [5, 0, 0, 0, 0, 3, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 5, 0, 2, 0, 3, 1], [3, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 3, 2], [3, 0, 0, 0, 0, 0, 5, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 3, 0, 1, 0, 5, 2]] \$$$

$$[3 y_7, 3 y_6, 3 y_5, 0, 0, 3 y_6 - 3 y_5, 3 y_4, 3 y_3, 3 y_2, 3 y_6 - 3 y_5, -3 y_7 - 9 y_6 + 3 y_5 - 3 y_4 - 3 y_3 + 13 y_2 + 13 y_1, 3 y_1]$$

$$p = s^4 + s^5 - s^7 - s^8 \quad p' = s^4 - s^6 - s^7 + s^9 \quad p'' = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3]] \$

$$[0, 0, y_1, y_3, y_4, y_6, y_2, y_6, 0, y_7, y_6, y_5]$$

$$p' = -s^3 + s^8 \quad p = -s^3 + s^8$$

1394 . Coloring, {3, 6, 8, 9, 11, 12}

R: [7, 7, 8, 6, A, 3, B, B, C, C, 4, 9]

B: [6, 8, 7, 7, 3, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	10 vs 10

Omega Rank for R : cycles: {{9, 12}, {3, 4, 6, 8, 11}} order: 10

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 1, 3, 3] , [0, 0, 1, 3, 0, 2, 0, 1, 3, 0, 3, 3] , [0, 0, 2, 3, 0, 3, 0, 1, 3, 0, 1, 3] , [0, 0, 3, 1, 0, 3, 0, 2, 3, 0, 1, 3] , [0, 0, 3, 1, 0, 1, 0, 3, 3, 0, 2, 3] , [0, 0, 1, 2, 0, 1, 0, 3, 3, 0, 3, 3] , [0, 0, 1, 3, 0, 2, 0, 1, 3, 0, 3, 3] , [0, 0, 2, 3, 0, 3, 0, 1, 3, 0, 1, 3] , [0, 0, 3, 1, 0, 3, 0, 2, 3, 0, 1, 3]] \$

$$[0, 0, -3y_1 - 3y_2 - 3y_3 - 6y_4 + 10y_6 - 3y_5, 3y_1, 0, 3y_2, 6y_4, 3y_3, -3y_4 + 3y_6, 3y_4, 3y_5, 3y_6]$$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7 \quad p' = -s^3 + s^8$$

Omega Rank for B : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 1, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 1, 2, 3, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 1, 3, 0, 3, 0, 3] , [0, 3, 2, 0, 3, 0, 1, 3, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 2, 3, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 3, 1, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 3, 1, 0, 3, 0, 1] , [0, 3, 3, 0, 1, 0, 3, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 3, 3, 0, 3, 0, 2]] \$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9, y_{10}]$$

1395 . Coloring, {3, 6, 8, 10, 11, 12}

R: [7, 7, 8, 6, A, 3, B, B, B, 2, 4, 9]

B: [6, 8, 7, 7, 3, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 4, 0] , [0, 1, 1, 4, 0, 2, 2, 1, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 1, 1, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 5, 0, 2, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 3, 0, 4, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 2, 0, 5, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 0, 3, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 5, 0, 2, 0, 0, 2, 0]] \$

$$[0, y_1, y_2, y_3, 0, y_4, y_5, y_7, 2 y_6, y_6, y_8, 0]$$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 2, 1, 0, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2] , [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3]] \$

$$[2 y_5, 0, y_7, 0, y_6, y_3, y_4, y_5, 0, y_1, 0, y_2]$$

$$p = -s^3 + s^8$$

1396 . Coloring, {3, 6, 9, 10, 11, 12}

R: [7, 7, 8, 6, A, 3, B, C, C, 2, 4, 9]

B: [6, 8, 7, 7, 3, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 10

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 2, 2], [0, 1, 1, 2, 0, 2, 2, 1, 2, 0, 2, 3], [0, 0, 2, 2, 0, 2, 1, 1, 3, 0, 2, 3], [0, 0, 2, 2, 0, 2, 0, 2, 3, 0, 1, 4], [0, 0, 2, 1, 0, 2, 0, 2, 4, 0, 0, 5], [0, 0, 2, 0, 0, 1, 0, 2, 5, 0, 0, 6], [0, 0, 1, 0, 0, 0, 0, 2, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[0, y_1, y_1 - y_2 + y_3 - y_4 + y_5 + y_6 - y_7 + y_8 - y_9, y_2, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

$$p = -s^9 + s^{10}$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 2, 2], [2, 0, 2, 0, 2, 2, 1, 0, 0, 3, 1, 3], [1, 0, 2, 0, 3, 2, 2, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 1, 2, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3]] \$$

$$[y_7, 0, y_6, 0, y_5, y_4, y_3, y_2, 0, y_1, y_9, y_8]$$

1397 . Coloring, {3, 7, 8, 9, 10, 11}

R: [7, 7, 8, 6, A, A, A, B, C, 2, 4, 5]

B: [6, 8, 7, 7, 3, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 2, 2, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_1, 0, y_2, y_7 + y_4, y_5, y_6, y_7, 0, y_3, y_4, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 0, 3, 3] , [3, 0, 1, 0, 0, 2, 2, 0, 3, 0, 4, 1] , [4, 0, 2, 0, 0, 3, 1, 0, 1, 0, 5, 0] , [5, 0, 3, 0, 0, 4, 2, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 5, 3, 0, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 2, 4, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 2, 5, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 2, 0, 0, 0, 5, 0]] \$

$$[y_4, 0, y_1, 0, 0, y_2, y_3, y_5, y_6, 0, y_8, y_7]$$

1398 . Coloring, $\{3, 7, 8, 9, 10, 12\}$

R: [7, 7, 8, 6, A, A, A, B, C, 2, 1, 9]

B: [6, 8, 7, 7, 3, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 0, 4, 0, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1]] \$

$[3 y_1, -3 y_1 - 6 y_7 - 3 y_6 + 13 y_5 - 3 y_4 - 3 y_2 + 13 y_3, 0, 0, 0, 3 y_7, 3 y_6, 3 y_7, 3 y_5, 3 y_4, 3 y_2, 3 y_3]$

$$p = -s^4 - s^5 + s^7 + s^8 \quad p' = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 0, 3, 3], [0, 0, 3, 3, 3, 0, 4, 0, 0, 0, 2, 1], [0, 0, 3, 2, 1, 0, 6, 0, 0, 0, 4, 0], [0, 0, 1, 4, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$

$[0, 0, y_7, y_6, y_5, y_4, y_3, y_4, 0, 0, y_2, y_1]$

$$p = s^5 - s^8$$

1399 . Coloring, $\{3, 7, 8, 9, 11, 12\}$

R: $[7, 7, 8, 6, A, A, A, B, C, C, 4, 9]$

B: $[6, 8, 7, 7, 3, 3, B, C, B, 2, 1, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 4, 1, 3], [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 1, 6], [0, 0, 0, 1, 0, 1, 0, 0, 6, 2, 0, 6], [0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$[0, 0, 0, y_1, 0, y_5, 2 y_6, y_6, y_7, y_4, y_2, y_3]$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 0, 3, 1] , [3, 0, 3, 0, 1, 2, 2, 2, 0, 0, 2, 1] , [2, 0, 3, 0, 1, 3, 3, 0, 0, 0, 2, 2] , [2, 0, 4, 0, 2, 2, 3, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 2, 4, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 3, 4, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 3, 2, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 4, 3, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 3, 0, 0, 0, 3, 0]] \$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, 0, y_8, y_9]$$

1400 . Coloring, {3, 7, 8, 10, 11, 12}

R: [7, 7, 8, 6, A, A, A, B, B, 2, 4, 9]

B: [6, 8, 7, 7, 3, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 2, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 2, 4, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 3, 3, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

$$[0, y_5, 0, y_4, 0, y_3, y_1, y_2, 2y_2, y_6, y_7, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 2, 4] , [2, 0, 3, 0, 4, 2, 2, 0, 0, 0, 2, 1] , [2, 0, 6, 0, 1, 2, 3, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 2, 6, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 2, 3, 0, 0, 0, 6, 0] , [6, 0, 2, 0, 0, 3, 2, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 6, 2, 0, 0, 0, 2, 0] , [2, 0, 6, 0, 0, 3, 3, 0, 0, 0, 2, 0]] \$

$$[y_1, 0, y_2, 0, y_8, y_6, y_7, y_5, 0, 0, y_4, y_3]$$

1401 . Coloring, {3, 7, 9, 10, 11, 12}

R: [7, 7, 8, 6, A, A, A, C, C, 2, 4, 9]

B: [6, 8, 7, 7, 3, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 0, 2], [0, 4, 0, 0, 0, 2, 2, 0, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 4, 0, 3], [0, 4, 0, 0, 0, 0, 4, 0, 3, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 0, 2, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 3, 0, 3]] \$$

$[0, y_1, 0, 10 y_1 + 10 y_2 + 10 y_3 - 22 y_4 + 10 y_5 - 22 y_6, 0, y_2, y_3, 5 y_1 + 5 y_2 + 5 y_3 - 11 y_4 + 5 y_5 - 11 y_6, y_4, y_5, 0, y_6]$

$$p = s^3 + s^4 - s^6 - s^7 \quad p' = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 4, 2], [4, 0, 3, 0, 2, 2, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 3, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 3, 4, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 2, 4, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 3, 3, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 3, 0, 0, 0, 2, 0]] \$$

$[y_2, 0, y_1, 0, y_5, y_6, y_4, y_3, 0, 0, y_7, 2 y_3]$

$$p = -s^3 + s^8$$

1402 . Coloring, $\{3, 8, 9, 10, 11, 12\}$

R: [7, 7, 8, 6, A, A, B, B, C, 2, 4, 9]

B: [6, 8, 7, 7, 3, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 6, 7, 10, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 2, 0, 1, 1, 3, 2], [0, 1, 0, 3, 0, 3, 2, 0, 2, 2, 2, 1], [0, 2, 0, 2, 0, 3, 1, 0, 1, 3, 2, 2], [0, 3, 0, 2, 0, 2, 2, 0, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 3, 0, 1, 2, 2, 2], [0, 2, 0, 2, 0, 1, 3, 0, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 2, 0, 1, 1, 3, 2], [0, 1, 0, 3, 0, 3, 2, 0, 2, 2, 2, 1]] \$$

$[0, 3 y_7, 0, 3 y_6, 0, 3 y_5, 3 y_4, 3 y_3, 3 y_2, -3 y_6 - 3 y_4 - 3 y_3 + 8 y_2 + 5 y_1, -3 y_7 - 3 y_5 + 5 y_2 + 8 y_1, 3 y_1]$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 2, 1, 3], [1, 0, 3, 0, 3, 2, 2, 0, 0, 2, 0, 3], [0, 0, 5, 0, 3, 1, 3, 0, 0, 2, 0, 2], [0, 0, 4, 0, 2, 0, 5, 0, 0, 3, 0, 2], [0, 0, 2, 0, 2, 0, 4, 0, 0, 5, 0, 3], [0, 0, 2, 0, 3, 0, 2, 0, 0, 4, 0, 5], [0, 0, 3, 0, 5, 0, 2, 0, 0, 2, 0, 4], [0, 0, 5, 0, 4, 0, 3, 0, 0, 2, 0, 2], [0, 0, 4, 0, 2, 0, 5, 0, 0, 3, 0, 2]] \$$

$[y_1, 0, y_2, 0, y_3, y_4, y_5, y_7, 0, y_6, y_7, y_8]$

$$p = -s^4 + s^9$$

1403 . Coloring, $\{4, 5, 6, 7, 8, 9\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, B, C, C, 1, 5]

B: [6, 8, 8, 6, A, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[2, 0, 2, 0, 2, 0, 4, 0, 0, 2, 1, 3], [1, 0, 2, 0, 3, 0, 4, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2]] \$$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, 0, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 2, 0, 2, 0, 2, 0, 2, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 0, 2, 1, 2, 2, 2], [0, 2, 0, 2, 0, 3, 0, 2, 2, 2, 1, 2], [0, 2, 0, 1, 0, 2, 0, 2, 2, 3, 2, 2], [0, 3, 0, 2, 0, 1, 0, 2, 2, 2, 2, 2], [0, 2, 0, 2, 0, 2, 0, 3, 2, 1, 2, 2], [0, 1, 0, 2, 0, 2, 0, 2, 2, 2, 2, 3], [0, 2, 0, 2, 0, 2, 0, 1, 3, 2, 2, 2]] \$$

$$[0, y_1, 0, y_1 + y_2 - y_5 - y_3 - y_4 + y_7 + y_6, 0, y_2, 0, y_5, y_3, y_4, y_7, y_6]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1404 . Coloring, $\{4, 5, 6, 7, 8, 10\}$

$$\Omega p(\Delta)=0: \quad p = 3s^2 - 14s^3 + 24s^5 + 32s^6 + 32s^7 - 128s^8 \quad p' = -3s^2 + 2s^3 + 8s^4 + 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, 3, A, B, B, 2, 1, 5]

B: [6, 8, 8, 6, A, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 7	5 vs 7

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 3

See Matrix

\$ [[2, 2, 2, 0, 2, 0, 4, 0, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

$$[y_1, y_2, y_1, 0, y_5, 0, y_3, 0, 0, y_4, y_5, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 2, 0, 2, 2, 2, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 0, 6] , [0, 0, 0, 0, 0, 2, 0, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, 0, y_4, 0, y_5, 0, y_3, y_1, y_2, y_3, y_4 - y_5 + y_1 + y_2]$$

$$p' = -s^5 + s^6 \quad p = s^5 - s^6$$

1405 . Coloring, {4, 5, 6, 7, 8, 11}

$$\Omega p(\Delta)=0: \quad p' = 3s^2 + 2s^3 - 8s^4 + 8s^5 - 32s^7 \quad p = 3s^2 + 14s^3 - 24s^5 + 32s^6 - 32s^7 - 128s^8$$

R: [7, 7, 7, 7, 3, 3, A, B, B, C, 4, 5]

B: [6, 8, 8, 6, A, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 0, 4, 0, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 4, 0, 0, 4, 0, 2] , [0, 0, 2, 0, 2, 0, 4, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 0, 0, 4, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 0, 4, 0, 0, 2, 0, 2] , [0, 0, 4, 0, 2, 0, 4, 0, 0, 4, 0, 2]] \$

$$[0, 0, y_1, y_2, y_3, 0, y_4, 0, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[2, 2, 0, 0, 0, 2, 0, 2, 2, 2, 2, 2], [2, 2, 0, 0, 0, 2, 0, 2, 2, 2, 0, 4], [0, 2, 0, 0, 0, 2, 0, 2, 4, 2, 0, 4], [0, 2, 0, 0, 0, 0, 2, 4, 2, 0, 6], [0, 2, 0, 0, 0, 0, 2, 6, 0, 0, 6], [0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[y_1 + y_2 - y_3 - y_5 - y_6 + y_4 + y_7, y_1, 0, 0, 0, y_2, 0, y_3, y_5, y_6, y_4, y_7]$$

$$p = -s^7 + s^8$$

1406 . Coloring, {4, 5, 6, 7, 8, 12}

$$\Omega p(\Delta)=0: \quad p = -9s^2 + 4s^4 - 24s^5 + 16s^6 - 96s^7 + 64s^8 \quad p = 3s^2 + 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, 3, A, B, B, C, 1, 9]

B: [6, 8, 8, 6, A, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 2, 0, 0, 0, 4, 0, 2, 2, 2, 2], [2, 0, 0, 0, 0, 0, 4, 0, 2, 4, 2, 2], [2, 0, 0, 0, 0, 0, 2, 0, 2, 4, 2, 4], [2, 0, 0, 0, 0, 2, 0, 4, 2, 2, 4], [2, 0, 0, 0, 0, 2, 0, 4, 2, 4, 2], [4, 0, 0, 0, 0, 0, 2, 0, 2, 2, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 2, 2, 2]] \$$$

$$[y_6, 0, y_5, 0, 0, 0, y_4, 0, y_3, y_2, y_1, y_6 + y_5 - y_4 + y_3 + y_2 - y_1]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 0, 2, 0, 2, 2, 2] , [0, 2, 0, 2, 2, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 2, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 4, 0, 2]] \$

$$[0, y_3, 0, y_1, y_2, y_6, 0, y_7, 0, y_4, y_5, y_8]$$

1407 . Coloring, {4, 5, 6, 7, 9, 10}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 - 32s^7 \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 - 32s^7 - 64s^8$$

R: [7, 7, 7, 7, 3, 3, A, C, C, 2, 1, 5]

B: [6, 8, 8, 6, A, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 7	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 2, 0, 4, 0, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$

$$[y_6, y_1, y_2, 0, y_3, 0, y_4, 0, 0, y_5, 0, y_6]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 2, 0, 2, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 4, 0, 0, 2, 2, 2, 2] , [0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 4, 2]] \$

$$[0, 0, 0, y_2 - y_1 - y_3 - y_4 + y_6 + y_5, 0, y_2, 0, y_1, y_3, y_4, y_6, y_5]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

1408 . Coloring, {4, 5, 6, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, 3, A, C, C, C, 4, 5]

B: [6, 8, 8, 6, A, A, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 6	6 vs 7

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 0, 4, 0, 0, 2, 0, 4], [0, 0, 2, 0, 4, 0, 4, 0, 0, 4, 0, 2], [0, 0, 4, 0, 2, 0, 2, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0, 4, 0, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 4, 0, 2], [0, 0, 4, 0, 2, 0, 4, 0, 0, 2, 0, 4]] \$$$

$$[0, 0, y_2, y_1, y_6, 0, y_5, 0, 0, y_4, 0, y_3]$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 2, 0, 2, 2, 2, 4, 0], [4, 2, 0, 0, 0, 2, 0, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 4, 0, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 0, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0], [2, 2, 0, 0, 0, 2, 0, 4, 0, 2, 4, 0]] \$$$

$$[y_1 + y_2 - y_4 - y_3 - y_5 + y_6, y_1, 0, 0, 0, y_2, 0, y_4, y_3, y_5, y_6, 0]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1409 . Coloring, {4, 5, 6, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, 3, A, C, C, C, 1, 9]
B: [6, 8, 8, 8, 6, A, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 6	7 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 4
 See Matrix

\$ [[2, 0, 2, 0, 0, 0, 4, 0, 2, 2, 0, 4] , [0, 0, 0, 0, 0, 0, 4, 0, 4, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 0, 0, 4, 4, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_1, 0, y_1, 0, 0, 0, 2y_1 + y_2 + y_3 - y_4, 0, y_2, y_3, 0, y_4]$$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6
 See Matrix

\$ [[0, 2, 0, 2, 2, 2, 0, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 4, 0, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 4, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 0, 2, 0, 2, 4, 0]] \$

$$[0, y_3, 0, y_4, y_2, y_1, 0, y_7, 0, y_6, y_5, 0]$$

1410 . Coloring, {4, 5, 6, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, C, B, 2, 4, 5]
B: [6, 8, 8, 8, 6, A, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 6
See Matrix

\$ [[0, 2, 2, 2, 2, 0, 4, 0, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[0, y_1, y_2, y_3, y_3, 0, y_4, 0, 0, y_5, y_6, y_6]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6
See Matrix

\$ [[2, 0, 0, 0, 0, 2, 0, 2, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 2, 4] , [2, 0, 0, 0, 0, 3, 0, 0, 4, 2, 0, 5] , [0, 0, 0, 0, 2, 0, 0, 5, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_1, 0, 0, 0, 0, y_1 + y_2 + y_3 + y_4 - y_5 - y_6, 0, y_2, y_3, y_4, y_5, y_6]$$

$$p = -s^6 + s^7$$

1411 . Coloring, {4, 5, 6, 7, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, C, B, 2, 1, 9]

B: [6, 8, 8, 6, A, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 0, 4, 0, 2, 2, 1, 1] , [1, 2, 0, 0, 0, 0, 6, 0, 1, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 3, 0, 0, 6, 1, 0] , [1, 6, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0] , [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 3, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0] , [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0]] \$

$[y_1, y_2, 2y_7, 0, 0, 0, y_3, 0, y_6, y_4, y_5, y_7]$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 0, 2, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 2, 0, 0, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 3, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$[0, 0, 0, y_1, y_2, y_3, 0, y_4, 0, y_5, y_6, y_7]$

1412 . Coloring, {4, 5, 6, 7, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, C, B, C, 4, 9]

B: [6, 8, 8, 6, A, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 4, 0, 2, 2, 1, 3] , [0, 0, 0, 1, 0, 0, 4, 0, 3, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 1, 0, 2, 4, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 1, 2, 4] , [0, 0, 0, 2, 0, 0, 3, 0, 4, 2, 4, 1] , [0, 0, 0, 4, 0, 0, 2, 0, 1, 3, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 2, 1, 3]] \$

$$[0, 0, -y_3 + y_1 - y_2 - y_5 + y_6 + y_4, y_3, 0, 0, y_1, 0, y_2, y_5, y_6, y_4]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 2, 0, 2, 0, 2, 3, 1], [3, 2, 0, 0, 1, 2, 0, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 3, 0, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 0, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 0, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 2, 0, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 4, 0, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 0, 2, 0, 4, 2, 0]] \$$$

$$[y_2, y_1, 0, 0, y_3, y_6, 0, y_4, 0, y_5, y_8, y_7]$$

1413 . Coloring, {4, 5, 6, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, B, C, 2, 1, 5]

B: [6, 8, 8, 6, A, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 2, 0, 4, 0, 0, 0, 3, 1], [3, 0, 2, 0, 1, 0, 6, 0, 0, 0, 4, 0], [4, 0, 1, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[y_4, 2y_5, y_3, 0, y_2, 0, y_1, 0, 0, 0, y_6, y_5]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 2, 0, 2, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 2, 2, 6] , [0, 0, 0, 2, 0, 1, 0, 0, 6, 2, 3, 2] , [0, 0, 0, 3, 0, 2, 0, 0, 2, 1, 6, 2] , [0, 0, 0, 6, 0, 3, 0, 0, 2, 2, 2, 1] , [0, 0, 0, 2, 0, 6, 0, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 6, 1, 3]] \$

[0, 0, 0, y_1 , 0, y_2 , 0, y_3 , y_6 , y_7 , y_4 , y_5]

1414 . Coloring, {4, 5, 6, 8, 9, 11}

$\Omega p(\Delta)=0$: $p = s^3 + 2s^4 - 8s^6 - 32s^8$

R: [7, 7, 7, 7, 3, 3, B, B, C, C, 4, 5]

B: [6, 8, 8, 6, A, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 6	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 2, 0, 4, 0, 0, 0, 3, 3] , [0, 0, 2, 3, 3, 0, 4, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$

[0, 0, y_1 , y_3 , y_2 , 0, y_4 , 0, 0, 0, y_6 , y_5]

Omega Rank for B : cycles: {{1, 2, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 2, 0, 0, 0, 2, 0, 2, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 2, 0, 2, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 1, 0, 4, 2, 2, 1, 2] , [1, 2, 0, 0, 0, 2, 0, 2, 2, 1, 2, 4] , [2, 1, 0, 0, 0, 1, 0, 2, 4, 2, 2, 2] , [2, 2, 0, 0, 0, 2, 0, 1, 2, 1, 4, 2] , [4, 1, 0, 0, 0, 2, 0, 2, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 4, 0, 1, 1, 2, 2, 2]] \$

[y_1 , y_2 , 0, 0, 0, y_3 , 0, y_4 , y_5 , y_6 , y_7 , y_8]

1415 . Coloring, {4, 5, 6, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, B, C, C, 1, 9]

B: [6, 8, 8, 8, 6, A, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 0, 4, 0, 2, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 2]] \$

$$[5 y_1, 0, -5 y_1 - 5 y_5 + 11 y_4 - 5 y_2 + 11 y_3, 0, 0, 0, 5 y_5, 0, 5 y_4, 0, 5 y_2, 5 y_3]$$

$$p = -s^2 - s^3 + s^5 + s^6$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 0, 2, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 1, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2]] \$

$$[0, y_2, 0, y_1, y_3, y_8, 0, y_4, 0, y_6, y_7, y_5]$$

1416 . Coloring, {4, 5, 6, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, 3, B, B, B, 2, 4, 5]

B: [6, 8, 8, 8, 6, A, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	5 vs 6

Omega Rank for R : cycles: {{4, 7, 11}} order: 3
See Matrix

\$ [[0, 2, 2, 2, 2, 0, 4, 0, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

[0, y_3 , y_1 , y_2 , y_3 , 0, y_4 , 0, 0, 0, y_5 , 0]

$$p = s^3 - s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 4
See Matrix

\$ [[2, 0, 0, 0, 0, 2, 0, 2, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 0, 4, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$

[y_2 , 0, 0, 0, 0, 0, y_1 , 0, y_2 , y_4 , y_5 , 0, y_3]

$$p = s^4 - s^6$$

1417 . Coloring, {4, 5, 6, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7 \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 + 32s^7 - 64s^8$$

R: [7, 7, 7, 7, 3, 3, B, B, B, 2, 1, 9]

B: [6, 8, 8, 6, A, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 6	5 vs 6

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

\$ [[2, 2, 2, 0, 0, 0, 4, 0, 2, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[y_1, y_4, y_4, 0, 0, 0, y_2, 0, y_4, 0, y_3, 0]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 0, 2, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

$$[0, 0, 0, y_3, y_1, y_2, 0, y_3, 0, y_4, 0, y_5]$$

$$p = -s^3 + s^6$$

1418 . Coloring, {4, 5, 6, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, 3, B, B, B, C, 4, 9]

B: [6, 8, 8, 6, A, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	7 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 4, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_3, y_2, 0, 0, y_1, 0, y_5, 0, y_4, y_3]$$

$$p = s^3 - s^6$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[2, 2, 0, 0, 2, 2, 0, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 2, 0, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 4, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 2, 0, 4, 0, 4], [0, 4, 0, 0, 4, 0, 0, 2, 0, 4, 0, 2]] \$$$

$$[y_1, y_2, 0, 0, y_3, y_4, 0, y_5, 0, y_6, 0, y_7]$$

1419 . Coloring, {4, 5, 6, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, 3, B, C, C, 2, 4, 5]

B: [6, 8, 8, 6, A, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 7	7 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 2, 0, 4, 0, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 6, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$$$

$$[0, y_5, y_4, y_3, y_2, 0, y_1, 0, 0, 0, y_6, y_5]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 2, 0, 2, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 2, 0, 0, 2, 2, 4, 4] , [4, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 2] , [2, 0, 0, 0, 0, 4, 0, 0, 2, 2, 4, 2] , [4, 0, 0, 0, 0, 2, 0, 0, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 4, 2, 2]] \$

$$[y_1, 0, 0, 0, 0, y_5, 0, y_2, y_3, y_4, y_6, y_7]$$

1420 . Coloring, {4, 5, 6, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, 3, B, C, C, 2, 1, 9]

B: [6, 8, 8, 6, A, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	7 vs 7

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 0, 4, 0, 2, 0, 2, 2] , [2, 0, 0, 0, 0, 0, 6, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 0, 2, 0, 6, 2] , [6, 0, 0, 0, 0, 4, 0, 2, 0, 2, 2] , [2, 0, 0, 0, 0, 0, 6, 0, 2, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 0, 2, 0, 6, 2] , [6, 0, 0, 0, 0, 0, 4, 0, 2, 0, 2, 2]] \$

$$[-2y_1 - y_3 + 6y_4 - y_2, y_1, y_1, 0, 0, 0, y_3, 0, y_4, 0, y_2, y_4]$$

$$p' = s^3 - s^6 \quad p' = -s^2 + s^5 \quad p = -s^2 + s^5$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 0, 2, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 2, 0, 0, 0, 4, 2, 4] , [0, 0, 0, 2, 4, 2, 0, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

$$[0, 0, 0, y_1, y_7, y_6, 0, y_5, 0, y_4, y_3, y_2]$$

1421 . Coloring, {4, 5, 6, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 - 32s^7 \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 - 32s^7 + 64s^8$$

R: [7, 7, 7, 7, 3, 3, B, C, C, C, 4, 9]

B: [6, 8, 8, 6, A, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	6 vs 7

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 0, 0, 4, 0, 2, 0, 2, 4], [0, 0, 0, 2, 0, 0, 4, 0, 4, 0, 4, 2], [0, 0, 0, 4, 0, 0, 2, 0, 2, 0, 4, 4], [0, 0, 0, 4, 0, 0, 4, 0, 4, 0, 2, 2], [0, 0, 0, 2, 0, 0, 4, 0, 2, 0, 4, 4], [0, 0, 0, 4, 0, 0, 2, 0, 4, 0, 4, 2]] \$$$

$$[0, 0, -3y_1 - 3y_2 + 5y_3 - 3y_4 + 5y_5, 3y_1, 0, 0, 3y_2, 0, 3y_3, 0, 3y_4, 3y_5]$$

$$p = s^2 + s^3 - s^5 - s^6$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 2, 0, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 0, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0], [2, 2, 0, 0, 2, 0, 4, 0, 2, 4, 0], [4, 2, 0, 0, 0, 2, 0, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 4, 0, 2, 0, 4, 2, 0]] \$$$

$$[y_1 + y_2 + y_3 - y_4 - y_5 + y_6, y_1, 0, 0, y_2, y_3, 0, y_4, 0, y_5, y_6, 0]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1422 . Coloring, {4, 5, 6, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, C, B, 2, 4, 9]
B: [6, 8, 8, 6, A, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 3
 See Matrix

\$ [[0, 2, 2, 2, 0, 0, 4, 0, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 6, 0, 1, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 6, 0, 0, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 7, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 3, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 6, 0, 0, 0, 3, 0]] \$

$$[0, 2 y_5, 2 y_5, y_1, 0, 0, y_2, 0, y_3, 0, y_4, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
 See Matrix

\$ [[2, 0, 0, 0, 2, 2, 0, 2, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 4, 2, 4] , [2, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_1, 0, 0, 0, y_3, y_4, 0, y_2, 0, y_6, y_7, y_5]$$

1423 . Coloring, {4, 5, 7, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 + 32s^7 \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 + 32s^7 + 64s^8$$

R: [7, 7, 7, 7, 3, A, A, B, C, 2, 1, 5]
B: [6, 8, 8, 6, A, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6
See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 3, 1, 1], [1, 3, 2, 0, 1, 0, 5, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$

$[y_4, y_3, y_2, 0, y_4, 0, y_1, 0, 0, y_6, y_5, y_5]$

$$p = -s^4 + s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7
See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 1, 3, 3], [0, 0, 2, 3, 0, 2, 0, 1, 3, 0, 2, 3], [0, 0, 2, 2, 0, 3, 0, 2, 3, 0, 3, 1], [0, 0, 3, 3, 0, 2, 0, 2, 1, 0, 3, 2], [0, 0, 2, 3, 0, 3, 0, 3, 2, 0, 1, 2], [0, 0, 3, 1, 0, 3, 0, 2, 2, 0, 2, 3], [0, 0, 3, 2, 0, 1, 0, 3, 3, 0, 2, 2], [0, 0, 1, 2, 0, 2, 0, 3, 2, 0, 3, 3]] \$$

$[0, 0, y_1, y_2, 0, y_3, 0, y_4, y_5, y_6, y_7, y_8]$

1424 . Coloring, {4, 5, 7, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, A, A, B, C, C, 4, 5]

B: [6, 8, 8, 6, A, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3]] \$$

$[0, 0, y_4, y_2, y_3, 0, y_1, 0, 0, y_6, y_7, y_5]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 1, 3, 1] , [3, 1, 2, 0, 0, 2, 0, 3, 1, 0, 2, 2] , [2, 0, 2, 0, 0, 3, 0, 3, 2, 0, 1, 3] , [1, 0, 3, 0, 0, 2, 0, 2, 3, 0, 2, 3] , [2, 0, 2, 0, 0, 1, 0, 3, 3, 0, 3, 2] , [3, 0, 1, 0, 0, 2, 0, 2, 2, 0, 3, 3] , [3, 0, 2, 0, 0, 3, 0, 1, 3, 0, 2, 2] , [2, 0, 3, 0, 0, 3, 0, 2, 2, 0, 3, 1] , [3, 0, 3, 0, 0, 2, 0, 3, 1, 0, 2, 2]] \$$

$[y_1, y_2, y_3, 0, 0, y_7, 0, y_4, y_5, y_6, y_8, y_9]$

1425 . Coloring, $\{4, 5, 7, 8, 9, 12\}$

$\Omega p(\Delta)=0: p = s^2 - 4s^4 - 8s^5 + 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 - 8s^5 + 32s^7$

R: $[7, 7, 7, 7, 3, A, A, B, C, C, 1, 9]$

B: $[6, 8, 8, 6, A, 3, B, C, B, 2, 4, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 7	9 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 4, 0, 5] , [0, 0, 0, 0, 0, 0, 1, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[y_5 - y_4 - y_3 + y_2, 0, y_1, 0, 0, 0, y_5, 0, y_4, y_3, y_1, y_2]$$

$$p = -s^5 + s^7 \quad p = -s^5 + s^6$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 1, 3, 1], [0, 1, 2, 3, 1, 2, 0, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 3, 0, 3, 0, 1, 0, 3], [0, 1, 3, 0, 3, 0, 0, 4, 0, 2, 0, 3], [0, 2, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 2, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 4, 0, 2, 0, 3]] \$$$

$$[0, y_1, y_6, y_7, y_8, y_4, 0, y_5, 0, y_2, y_3, y_9]$$

1426 . Coloring, {4, 5, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, A, B, B, 2, 4, 5]

B: [6, 8, 8, 6, A, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

$$\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 3, 2, 0], [0, 3, 2, 2, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0]] \$$$

$$[0, y_1, y_2, y_3, -2y_2 + 2y_3, 0, y_4, 0, 0, y_5, -2y_2 + 2y_3, 0]$$

$$p' = s^3 - s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 1, 2, 4] , [2, 0, 2, 0, 0, 2, 0, 1, 4, 0, 0, 5] , [0, 0, 2, 0, 0, 2, 0, 2, 5, 0, 0, 5] , [0, 0, 2, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[y_1, 0, y_2, 0, 0, y_3, 0, y_4, y_6, y_5, 2y_5, y_7]$$

$$p = -s^6 + s^8$$

1427 . Coloring, {4, 5, 7, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, A, B, B, 2, 1, 9]

B: [6, 8, 8, 6, A, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 5, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_2, y_1, y_3, 0, 0, 0, y_4, 0, 2y_3, y_5, y_6, 0]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 1, 2, 4] , [0, 0, 2, 2, 4, 2, 0, 1, 0, 2, 0, 3] , [0, 0, 2, 0, 3, 2, 0, 2, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 0, 0, 2, 0, 3, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 2, 0, 3, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[0, 0, y_1, y_2, y_3, y_4, 0, y_5, 0, y_6, y_7, y_8]$$

1428 . Coloring, {4, 5, 7, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, A, B, B, C, 4, 9]

B: [6, 8, 8, 6, A, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 3, 2, 2], [0, 0, 0, 2, 0, 0, 3, 0, 2, 4, 2, 3], [0, 0, 0, 2, 0, 0, 2, 0, 3, 3, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 2, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 2, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 2, 3, 2], [0, 0, 0, 3, 0, 0, 4, 0, 2, 3, 2, 2]] \$$$

$$[0, 0, -y_1 + y_2 - y_3 - y_4 + y_5 + y_6, y_1, 0, 0, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 1, 2, 2], [2, 1, 2, 0, 2, 2, 0, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 2, 0, 3, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 0, 4, 0, 2, 0, 3], [0, 2, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 2, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 4, 0, 2, 0, 3]] \$$$

$$[y_1, y_2, y_3, 0, y_4, y_5, 0, y_6, 0, y_7, y_8, y_9]$$

1429 . Coloring, {4, 5, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, A, C, C, 2, 4, 5]

B: [6, 8, 8, 8, 6, A, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 5, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$[0, y_6, y_1, y_5, y_2, 0, y_3, 0, 0, y_4, 0, y_5]$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 1, 4, 2], [4, 0, 2, 0, 0, 2, 0, 1, 2, 0, 4, 1], [4, 0, 2, 0, 0, 4, 0, 2, 1, 0, 3, 0], [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 0, 4, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 0, 3, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0]] \$$

$[y_1, 0, y_2, 0, 0, y_3, 0, y_4, y_5, y_6, y_8, y_7]$

1430 . Coloring, {4, 5, 7, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, A, C, C, 2, 1, 9]

B: [6, 8, 8, 8, 6, A, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2]] \$$

$$[2 y_1, -3 y_1 - y_4 - y_2 + 6 y_3, y_1, 0, 0, 0, y_4, 0, y_3, y_2, 0, y_3]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 11\}, \{5, 10, 12\}\}$
See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 1, 4, 2], [0, 0, 2, 4, 2, 2, 0, 1, 0, 2, 2, 1], [0, 0, 2, 2, 1, 4, 0, 2, 0, 2, 1, 2], [0, 0, 4, 1, 2, 2, 0, 2, 0, 1, 2, 2], [0, 0, 2, 2, 2, 1, 0, 4, 0, 2, 2, 1], [0, 0, 1, 2, 1, 2, 0, 2, 0, 2, 4, 2], [0, 0, 2, 4, 2, 2, 0, 1, 0, 1, 2, 2], [0, 0, 2, 2, 2, 4, 0, 2, 0, 2, 1, 1]] \$$

$$[0, 0, 5 y_7, 5 y_5, 5 y_6, 5 y_4, 0, 5 y_3, 0, 5 y_2, -5 y_7 - 5 y_5 + 11 y_6 - 5 y_4 - 5 y_3 + 11 y_2 + 11 y_1, 5 y_1]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

1431 . Coloring, $\{4, 5, 7, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, A, A, C, C, C, 4, 9]

B: [6, 8, 8, 6, A, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 6	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 3, 0, 4, 4, 0, 5] , [0, 0, 0, 0, 0, 0, 0, 0, 5, 3, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_1, 2y_1, 0, 0, 3y_1 + y_3 + y_2 - y_4, 0, y_3, y_2, 0, y_4]$$

$$p = s^4 - s^6 \quad p' = s^4 - s^5$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 1, 4, 0] , [4, 1, 2, 0, 0, 2, 0, 3, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 2, 0, 4, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 3, 0, 4, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 3, 0, 2, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 4, 0, 3, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 0, 3, 0, 0, 3, 0]] \$

$$[y_1, y_2, y_3, 0, y_4, y_5, 0, y_7, 0, y_8, y_6, 0]$$

1432 . Coloring, {4, 5, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^5 - 32s^7 \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 - 32s^7 + 64s^8$$

R: [7, 7, 7, 7, 3, A, A, C, B, 2, 4, 9]

B: [6, 8, 8, 6, A, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 0, 5, 0, 1, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 4, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[0, y_2, y_7, y_1, 0, 0, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 8, 11}}

See Matrix

$$\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 0, 1, 0, 2, 2, 1], [2, 0, 2, 0, 1, 3, 0, 2, 0, 3, 1, 2], [1, 0, 3, 0, 2, 2, 0, 2, 0, 1, 2, 3], [2, 0, 2, 0, 3, 1, 0, 3, 0, 2, 2, 1], [2, 0, 1, 0, 1, 2, 0, 2, 0, 3, 3, 2], [3, 0, 2, 0, 2, 2, 0, 1, 0, 1, 2, 3], [2, 0, 2, 0, 3, 3, 0, 2, 0, 2, 1, 1]] \$$$

$$[3y_7, 0, 3y_6, 0, 3y_5, 3y_4, 0, 3y_3, 0, 3y_2, -3y_7 - 3y_6 + 5y_5 - 3y_4 - 3y_3 + 5y_2 + 5y_1, 3y_1]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

1433 . Coloring, {4, 5, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, A, B, B, C, 2, 4, 5]

B: [6, 8, 8, 6, A, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 1, 3, 1], [0, 1, 2, 3, 1, 0, 5, 0, 0, 0, 4, 0], [0, 0, 1, 4, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[0, y_5, y_4, y_3, y_5, 0, y_2, 0, 0, y_6, y_1, y_6]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 3, 1, 3] , [1, 0, 2, 0, 0, 2, 0, 1, 3, 0, 2, 5] , [2, 0, 2, 0, 0, 1, 0, 2, 5, 0, 3, 1] , [3, 0, 1, 0, 0, 2, 0, 2, 1, 0, 5, 2] , [5, 0, 2, 0, 0, 3, 0, 1, 2, 0, 1, 2] , [1, 0, 3, 0, 0, 5, 0, 2, 2, 0, 2, 1] , [2, 0, 5, 0, 0, 1, 0, 3, 1, 0, 2, 2] , [2, 0, 1, 0, 0, 2, 0, 5, 2, 0, 1, 3]] \$

$$[y_1, 0, y_2, 0, 0, y_3, 0, y_4, y_5, y_6, y_7, y_8]$$

1434 . Coloring, {4, 5, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 6s^3 + 40s^5 - 32s^6 - 32s^7 + 128s^8 \quad p' = -s^2 + 2s^3 + 8s^4 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, A, B, B, C, 2, 1, 9]

B: [6, 8, 8, 6, A, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1] , [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2] , [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2]] \$

$$[3 y_1, -3 y_1 - 6 y_4 - 3 y_2 + 13 y_5 - 3 y_3 + 13 y_6, 3 y_4, 0, 0, 0, 3 y_2, 0, 3 y_5, 3 y_4, 3 y_3, 3 y_6]$$

$$p = s^3 - s^5 - s^6 + s^8 \quad p' = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 2, 0, 1, 0, 2, 0, 5] , [0, 0, 2, 0, 5, 1, 0, 2, 0, 3, 0, 3] , [0, 0, 1, 0, 3, 0, 0, 2, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 1, 0, 3, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$

$$[0, 0, y_5, y_4, y_3, y_2, 0, y_1, 0, y_8, y_7, y_6]$$

1435 . Coloring, {4, 5, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = -s^2 - 2s^3 + 8s^4 + 8s^5 - 32s^7 \quad p = s^2 + 2s^3 - 8s^4 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, A, B, B, C, C, 4, 9]

B: [6, 8, 8, 6, A, 3, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 7	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 1, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3]] \$$$

$$[0, 0, 3 y_2, 3 y_1, 0, 0, -3 y_2 - 3 y_1 + 10 y_4 - 3 y_3, 0, -3 y_2 + 3 y_4, 3 y_2, 3 y_3, 3 y_4]$$

$$p' = -s^3 + s^6 \quad p = -s^2 + s^5 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 3, 1, 1], [1, 3, 2, 0, 1, 2, 0, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 1, 0, 5, 0, 1, 0, 3], [0, 1, 1, 0, 3, 0, 0, 4, 0, 2, 0, 5], [0, 2, 0, 0, 5, 0, 0, 2, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 2, 0, 5, 0, 2], [0, 5, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 5, 0, 2, 0, 3], [0, 2, 0, 0, 3, 0, 0, 4, 0, 2, 0, 5]] \$$$

$$[y_9, y_8, y_7, 0, y_6, y_5, 0, y_4, 0, y_3, y_2, y_1]$$

1436 . Coloring, {4, 5, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, B, B, B, 2, 4, 9]

B: [6, 8, 8, 6, A, 3, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, y_1, y_5, y_2, 0, 0, y_3, 0, 2y_5, y_5, y_4, 0]$$

$$p = s^3 - s^6 \quad p' = s^3 - s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 2, 0, 1, 0, 2, 0, 5] , [0, 0, 2, 0, 5, 0, 0, 2, 0, 4, 0, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 3, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 6, 0, 3] , [0, 0, 0, 0, 3, 0, 0, 0, 0, 7, 0, 6]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, 0, y_5, 0, y_6, 0, y_7]$$

1437 . Coloring, {4, 5, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, B, C, C, 2, 4, 9]

B: [6, 8, 8, 6, A, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 1, 2, 2], [0, 1, 0, 2, 0, 0, 5, 0, 2, 0, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 3, 2], [0, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 3, 2], [0, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4, 2]] \$$

$$[0, y_1, y_3, -y_1 - 2y_3 - y_2 - y_5 + 6y_4, 0, 0, y_2, 0, y_4, y_3, y_5, y_4]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}, \{5, 10, 12\}\}$

See Matrix

$\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 3, 2, 2], [2, 0, 2, 0, 2, 2, 0, 1, 0, 2, 2, 3], [2, 0, 2, 0, 3, 2, 0, 2, 0, 2, 1, 2], [1, 0, 2, 0, 2, 2, 0, 2, 0, 3, 2, 2], [2, 0, 2, 0, 2, 1, 0, 2, 0, 2, 2, 3], [2, 0, 1, 0, 3, 2, 0, 2, 0, 2, 2, 2], [2, 0, 2, 0, 2, 2, 0, 1, 0, 3, 2, 2], [2, 0, 2, 0, 2, 2, 0, 2, 0, 2, 1, 3]] \$$

$$[7y_7, 0, 7y_6, 0, 7y_5, 7y_4, 0, 7y_3, 0, 7y_2, -7y_7 - 7y_6 + 9y_5 - 7y_4 - 7y_3 + 9y_2 + 9y_1, 7y_1]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

1438 . Coloring, $\{4, 6, 7, 8, 9, 10\}$

$$\Omega p(\Delta)=0: \quad p = 3s^2 - 2s^3 - 8s^5 - 32s^7 \quad p' = -3s^2 + 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, 3, A, B, C, 2, 1, 5]

B: [6, 8, 8, 6, 3, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	8 vs 9	5 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 3

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 4, 0, 0, 3, 1, 1], [1, 3, 0, 0, 1, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$$

$$[y_1, y_2, y_5, 0, y_1, 0, y_3, 0, 0, y_4, y_5, y_5]$$

$$p' = -s^4 + s^7 \quad p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 2, 0, 2, 2, 1, 3, 3], [0, 0, 0, 3, 0, 2, 0, 1, 3, 2, 2, 3], [0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 3, 2], [0, 0, 0, 3, 0, 3, 0, 0, 2, 2, 3, 3], [0, 0, 0, 3, 0, 3, 0, 0, 3, 3, 2, 2], [0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2, 3]] \$$$

$$[0, 0, y_2, y_1, 0, y_3, 0, y_5, y_4, y_6, y_7, y_8]$$

1439 . Coloring, {4, 6, 7, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 9s^2 - 4s^4 + 24s^5 - 16s^6 + 96s^7 - 64s^8 \quad p' = 3s^2 + 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, 3, A, B, C, C, 4, 5]

B: [6, 8, 8, 6, 3, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	8 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 0, 4, 0, 0, 3, 1, 3], [0, 0, 0, 1, 3, 0, 3, 0, 0, 6, 0, 3], [0, 0, 0, 0, 3, 0, 1, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$$$

$$[0, 0, y_5, y_1, y_2, 0, y_3, 0, 0, y_4, y_5, y_6]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 0, 2, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 0, 3, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 3, 0, 1, 2, 2, 1, 3] , [1, 2, 0, 0, 0, 2, 0, 2, 3, 3, 2, 1] , [2, 3, 0, 0, 0, 1, 0, 2, 1, 2, 3, 2] , [3, 2, 0, 0, 0, 2, 0, 3, 2, 1, 1, 2] , [1, 1, 0, 0, 0, 3, 0, 2, 2, 2, 2, 3] , [2, 2, 0, 0, 0, 1, 0, 1, 3, 3, 2, 2] , [2, 3, 0, 0, 0, 2, 0, 2, 2, 1, 3, 1]] \$

$$[y_1, y_2, y_3, 0, 0, y_4, 0, y_5, y_6, y_7, y_8, y_9]$$

1440 . Coloring, {4, 6, 7, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p' = 3s^2 + 2s^3 - 8s^4 + 8s^5 - 32s^7 \quad p = 3s^2 + 14s^3 - 24s^5 + 32s^6 - 32s^7 - 128s^8$$

R: [7, 7, 7, 7, A, 3, A, B, C, C, 1, 9]

B: [6, 8, 8, 6, 3, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 4, 0, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 4, 0, 5] , [0, 0, 0, 0, 0, 0, 1, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_5 - y_4 - y_3 + y_1, 0, y_2, 0, 0, 0, y_5, 0, y_4, y_3, y_2, y_1]$$

$$p = -s^5 + s^7 \quad p = -s^5 + s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 0, 2, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 0, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 3, 0, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 0, 3, 0, 3, 0, 3] , [0, 3, 3, 0, 3, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3]] \$

$$[0, y_1, y_6, y_7, y_8, y_9, 0, y_5, 0, y_2, y_3, y_4]$$

1441 . Coloring, {4, 6, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, 3, A, B, B, 2, 4, 5]

B: [6, 8, 8, 6, 3, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

$$\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[0, y_1, y_2, y_3, 2y_2, 0, y_4, 0, 0, y_5, 2y_2, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 1, 2, 4], [2, 0, 0, 0, 0, 2, 0, 1, 4, 2, 0, 5], [0, 0, 0, 0, 0, 2, 0, 0, 5, 2, 0, 7], [0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[-2y_3 + 2y_2, 0, y_3, 0, 0, y_1, 0, y_2, y_4, y_5, 2y_3, y_6]$$

$$p = -s^5 + s^7 \quad p' = -s^5 + s^7$$

1442 . Coloring, {4, 6, 7, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, A, B, B, 2, 1, 9]

B: [6, 8, 8, 6, 3, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 5, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, y_3, 0, 0, 0, y_5, 0, 2y_3, y_6, y_4, 0]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 1, 2, 4] , [0, 0, 2, 2, 4, 2, 0, 1, 0, 2, 0, 3] , [0, 0, 4, 0, 3, 2, 0, 2, 0, 2, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 4, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4]] \$

$$[0, 0, y_1, y_4, y_2, y_3, 0, y_8, 0, y_7, y_5, y_6]$$

1443 . Coloring, {4, 6, 7, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, A, B, B, C, 4, 9]

B: [6, 8, 8, 6, 3, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 4, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 3, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 3, 2, 2]] \$

$$[0, 0, y_3, y_4, 0, 0, y_2, 0, -y_3 - y_4 + y_2 - y_1 + y_6 + y_5, y_1, y_6, y_5]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8
See Matrix

\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 2, 0, 3, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 2, 0, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 0, 4, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$

$$[y_3, y_2, y_1, 0, y_5, y_4, 0, y_8, 0, y_9, y_7, y_6]$$

1444 . Coloring, {4, 6, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, 3, A, C, C, 2, 4, 5]

B: [6, 8, 8, 6, 3, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 3

See Matrix

$\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 3, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0] , [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 3, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0]] \$$

$$[0, y_2, y_1, 2y_1, y_3, 0, y_4, 0, 0, y_5, 0, 2y_1]$$

$$p = s^3 - s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: $\{\{1, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 1, 4, 2] , [4, 0, 0, 0, 0, 2, 0, 1, 2, 2, 4, 1] , [4, 0, 0, 0, 0, 4, 0, 0, 1, 2, 3, 2] , [3, 0, 0, 0, 0, 4, 0, 0, 2, 4, 1, 2] , [1, 0, 0, 0, 0, 3, 0, 0, 2, 4, 2, 4] , [2, 0, 0, 0, 0, 1, 0, 0, 4, 3, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 1, 4, 3] , [4, 0, 0, 0, 0, 2, 0, 0, 3, 2, 4, 1]] \$$

$$[y_2, 0, y_1, 0, 0, y_5, 0, y_4, y_3, y_6, y_7, y_8]$$

1445 . Coloring, $\{4, 6, 7, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, A, C, C, 2, 1, 9]

B: [6, 8, 8, 6, 3, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	8 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2]] \$$

$$[2y_3, y_4, y_3, 0, 0, 0, y_2, 0, y_1, -y_4 - 3y_3 - y_2 + 6y_1, 0, y_1]$$

$$p = -s^2 + s^5 \quad p' = s^3 - s^6 \quad p'' = -s^2 + s^5$$

Omega Rank for B : cycles: {{3, 4, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 1, 4, 2], [0, 0, 2, 4, 2, 2, 0, 1, 0, 2, 2, 1], [0, 0, 2, 2, 1, 4, 0, 2, 0, 2, 1, 2], [0, 0, 1, 1, 2, 2, 0, 2, 0, 4, 2, 2], [0, 0, 2, 2, 2, 1, 0, 1, 0, 2, 2, 4], [0, 0, 2, 2, 4, 2, 0, 2, 0, 1, 1, 2], [0, 0, 4, 1, 2, 2, 0, 2, 0, 2, 2, 1], [0, 0, 2, 2, 1, 1, 0, 4, 0, 2, 2, 2]] \$$$

$$[0, 0, y_4, y_3, y_1, y_2, 0, y_8, 0, y_7, y_5, y_6]$$

1446 . Coloring, {4, 6, 7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, 3, A, C, C, C, 4, 9]

B: [6, 8, 8, 6, 3, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 6	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 3, 0, 4], [0, 0, 0, 0, 0, 0, 3, 0, 4, 4, 0, 5], [0, 0, 0, 0, 0, 0, 0, 0, 5, 3, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[0, 0, y_1, 2y_1, 0, 0, 3y_1 + y_2 + y_3 - y_4, 0, y_2, y_3, 0, y_4]$$

$$p = s^4 - s^5 \quad p' = -s^4 + s^5$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 1, 4, 0], [4, 1, 2, 0, 0, 2, 0, 3, 0, 2, 2, 0], [2, 2, 0, 0, 0, 4, 0, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 2, 0, 2, 0, 4, 3, 0], [3, 4, 0, 0, 0, 3, 0, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 3, 0, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 0, 2, 0, 3, 4, 0], [4, 3, 0, 0, 0, 2, 0, 3, 0, 2, 2, 0]] \$$$

$$[y_4, y_3, y_2, 0, y_1, y_6, 0, y_5, 0, y_8, y_7, 0]$$

1447 . Coloring, {4, 6, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, 3, A, C, B, 2, 4, 9]

B: [6, 8, 8, 6, 3, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 5, 0, 1, 4, 2, 0], [0, 4, 0, 2, 0, 0, 4, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$$$

$$[0, y_1, y_7, y_2, 0, 0, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 0, 1, 0, 2, 2, 1], [2, 0, 3, 0, 1, 3, 0, 2, 0, 2, 1, 2], [1, 0, 1, 0, 2, 2, 0, 3, 0, 3, 2, 2], [2, 0, 2, 0, 2, 1, 0, 1, 0, 2, 3, 3], [3, 0, 2, 0, 3, 2, 0, 2, 0, 1, 1, 2], [1, 0, 3, 0, 2, 3, 0, 2, 0, 2, 2, 1], [2, 0, 2, 0, 1, 1, 0, 3, 0, 3, 2, 2]] \$$$

$$[y_1, 0, y_2, 0, y_3, y_4, 0, y_5, 0, y_6, y_7, y_8]$$

1448 . Coloring, {4, 6, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7 \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 + 32s^7 - 64s^8$$

R: [7, 7, 7, 7, A, 3, B, B, C, 2, 4, 5]

B: [6, 8, 8, 6, 3, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 1, 3, 1] , [0, 1, 0, 3, 1, 0, 5, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 4, 0, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[0, y_1, y_7, y_2, y_3, 0, y_4, 0, 0, y_5, y_6, y_7]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 1, 3, 2, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 3, 3] , [3, 0, 0, 0, 2, 0, 0, 3, 1, 5, 2] , [5, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 1] , [3, 0, 0, 0, 0, 5, 0, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 3, 0, 0, 2, 5, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 5]] \$

$$[y_1, 0, y_2, 0, 0, y_3, 0, y_6, y_4, y_5, y_8, y_7]$$

1449 . Coloring, {4, 6, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, 3, B, B, C, 2, 1, 9]

B: [6, 8, 8, 6, 3, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2]] \$$

$$[-3y_1 - 6y_4 - 3y_2 + 13y_3 - 3y_5 + 13y_6, 3y_1, 3y_4, 0, 0, 0, 3y_2, 0, 3y_3, 3y_4, 3y_5, 3y_6]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p' = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8
See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 0, 1, 0, 2, 0, 5], [0, 0, 3, 0, 5, 1, 0, 2, 0, 2, 0, 3], [0, 0, 5, 0, 3, 0, 0, 3, 0, 1, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$$

$$[0, 0, y_1, y_2, y_3, y_4, 0, y_5, 0, y_6, y_7, y_8]$$

1450 . Coloring, $\{4, 6, 8, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, 3, B, B, C, C, 4, 9]

B: [6, 8, 8, 6, 3, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3]] \$

$$[0, 0, -3y_2 + 3y_4, 3y_2 + 7y_4 - 3y_1 - 3y_3, 0, 0, 3y_1, 0, 3y_2, -3y_2 + 3y_4, 3y_3, 3y_4]$$

$$p' = -s^3 + s^6 \quad p' = -s^2 + s^5 \quad p = -s^2 + s^5$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 0, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 1, 0, 5, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 0, 3, 0, 1, 0, 5] , [0, 1, 3, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3]] \$

$$[y_4, y_3, y_1, 0, y_2, y_9, 0, y_7, 0, y_8, y_6, y_5]$$

1451 . Coloring, {4, 6, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, B, B, B, 2, 4, 9]

B: [6, 8, 8, 6, 3, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, y_1, y_4, y_2, 0, 0, y_3, 0, 2y_4, y_4, y_5, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 3, 0, 4], [0, 0, 2, 0, 4, 2, 0, 1, 0, 2, 0, 5], [0, 0, 4, 0, 5, 0, 0, 2, 0, 2, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3]] \$$$

$$[y_1, 0, y_2, 0, y_3, y_4, 0, y_5, 0, y_6, 0, y_7]$$

1452 . Coloring, {4, 6, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, B, C, C, 2, 4, 9]

B: [6, 8, 8, 6, 3, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	8 vs 8

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 1, 2, 2], [0, 1, 0, 2, 0, 0, 5, 0, 2, 0, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 3, 2], [0, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 3, 2], [0, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4, 2]] \$$$

$$[0, -2y_3 - y_1 - y_2 + 6y_5 - y_4, y_3, y_1, 0, 0, y_2, 0, y_5, y_3, y_4, y_5]$$

$$p' = -s^4 + s^7 \quad p' = s^3 - s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 2, 0, 1, 0, 2, 2, 3] , [2, 0, 2, 0, 3, 2, 0, 2, 0, 2, 1, 2] , [1, 0, 3, 0, 2, 2, 0, 2, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 1, 0, 3, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 2, 0, 2, 0, 1, 3, 2] , [3, 0, 2, 0, 2, 2, 0, 2, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 3, 0, 2, 0, 2, 2, 2]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, 0, y_5, 0, y_6, y_7, y_8]$$

1453 . Coloring, {4, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, A, A, B, C, 2, 4, 5]

B: [6, 8, 8, 6, 3, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[0, 2, 0, 2, 2, 0, 4, 0, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[0, y_3, 0, y_2, y_2, 0, y_1, 0, 0, y_5, y_4, y_4]$$

$$p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[2, 0, 2, 0, 0, 2, 0, 2, 2, 0, 3, 3] , [3, 0, 2, 0, 0, 2, 0, 2, 3, 0, 2, 2] , [2, 0, 2, 0, 0, 3, 0, 2, 2, 0, 3, 2] , [3, 0, 3, 0, 0, 2, 0, 2, 2, 0, 2, 2] , [2, 0, 2, 0, 0, 3, 0, 3, 2, 0, 2, 2] , [2, 0, 3, 0, 0, 2, 0, 2, 2, 0, 2, 3] , [2, 0, 2, 0, 0, 2, 0, 3, 3, 0, 2, 2]] \$

$$[y_6, 0, y_7, 0, 0, y_1, 0, y_2, y_3, 0, y_4, y_5]$$

1454 . Coloring, {4, 7, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, A, B, C, 2, 1, 9]

B: [6, 8, 8, 6, 3, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 7

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [[2, 2, 0, 0, 0, 0, 4, 0, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, \\ 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, \\ 4, 0, 2, 5, 0, 1]] \$ \end{aligned}$$

$$[-3 y_1 - 3 y_2 + 13 y_4 - 3 y_5 - 3 y_6 + 13 y_3, 3 y_1, 0, 0, 0, 0, 3 y_2, 0, 3 y_4, 3 y_5, 3 y_6, 3 y_3]$$

$$p = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\begin{aligned} \$ [[0, 0, 2, 2, 2, 2, 0, 2, 0, 0, 3, 3], [0, 0, 4, 3, 3, 2, 0, 2, 0, 0, 0, 2], [0, 0, 5, 0, 2, 3, 0, 4, 0, 0, 0, 2], [0, 0, \\ 5, 0, 2, 0, 0, 5, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 5, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 2, 0, 0, 0, 5], [0, 0, 5, 0, 5, 0, \\ 0, 4, 0, 0, 0, 2]] \$ \end{aligned}$$

$$[0, 0, y_3, y_1, y_2, y_4, 0, y_5, 0, 0, y_6, y_7]$$

1455 . Coloring, {4, 7, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, A, B, C, C, 4, 9]

B: [6, 8, 8, 6, 3, 3, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 0, 4, 0, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 4, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, 0, y_3 - y_1 - y_2 + y_5 + y_4, 0, 0, y_3, 0, y_1, y_2, y_5, y_4]$$

$$p = -s^5 + s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 0, 2, 0, 0, 3, 1] , [3, 0, 4, 0, 1, 2, 0, 4, 0, 0, 0, 2] , [0, 0, 3, 0, 2, 3, 0, 4, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4]] \$

$$[2y_7, 2y_6, 2y_5, 0, 2y_3, 2y_4, 0, 2y_2, 0, 0, 3y_6, 2y_1]$$

$$p = -s^4 + s^8$$

1456 . Coloring, {4, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, A, A, B, B, 2, 4, 9]

B: [6, 8, 8, 6, 3, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 6	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 0, 4, 0, 2, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 4, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$

$$[0, y_1, 0, y_2, 0, 0, y_3, 0, y_4, y_5, y_6, 0]$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 0, 2, 0, 0, 2, 4] , [2, 0, 4, 0, 4, 2, 0, 2, 0, 0, 0, 2] , [0, 0, 6, 0, 2, 2, 0, 4, 0, 0, 0, 2] , [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4] , [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4] , [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2]] \$

$$[-y_1 + y_2 + y_5 + y_3 + y_4 - y_6, 0, y_1, 0, y_2, y_5, 0, y_3, 0, 0, y_4, y_6]$$

$$p = s^4 - s^5 + s^6 - s^7$$

1457 . Coloring, {4, 7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, A, A, C, C, 2, 4, 9]

B: [6, 8, 8, 6, 3, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	2 vs 6	7 vs 7

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2]] \$

$$[0, -y_2 + 2y_1, 0, y_2, 0, 0, 2y_1, 0, y_1, 2y_1, 0, y_1]$$

$$p' = s^2 - s^5 \quad p' = s^3 - s^5 \quad p' = s^4 - s^5 \quad p = s^2 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 2, 0, 2, 0, 0, 4, 2], [4, 0, 4, 0, 2, 2, 0, 2, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 0, 4, 0, 0, 2, 0], [2, 0, 4, 0, 0, 2, 0, 4, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 0, 2, 0, 0, 4, 0], [4, 0, 4, 0, 0, 4, 0, 2, 0, 0, 2, 0]] \$$$

$$[y_7, 0, y_6, 0, y_5, y_4, 0, y_3, 0, 0, y_2, y_1]$$

1458 . Coloring, {4, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, B, B, C, 2, 4, 9]

B: [6, 8, 8, 6, 3, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 0, 4, 0, 2, 2, 3, 1], [0, 2, 0, 3, 0, 0, 4, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1]] \$$$

$$[0, -3y_1 - 3y_2 + 13y_3 - 3y_4 - 3y_5 + 13y_6, 0, 3y_1, 0, 0, 3y_2, 0, 3y_3, 3y_4, 3y_5, 3y_6]$$

$$p = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 0, 2, 0, 2, 1, 3] , [1, 0, 4, 0, 3, 2, 0, 2, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 1, 0, 4, 0, 0, 0, 2] , [0, 0, 5, 0, 2, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 2, 0, 4, 0, 0, 5, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 2, 0, 0, 0, 5] , [0, 0, 5, 0, 5, 0, 0, 4, 0, 0, 0, 2] , [0, 0, 5, 0, 2, 0, 0, 5, 0, 0, 0, 4]] \$

$$[y_5, 0, y_4, 0, y_3, y_2, 0, y_1, 0, 2 y_7, y_7, y_6]$$

$$p = -s^4 + s^8$$

1459 . Coloring, {5, 6, 7, 8, 9, 10}

R: [7, 7, 7, 6, 3, 3, A, B, C, 2, 1, 5]

B: [6, 8, 8, 7, A, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 2, 1, 1] , [1, 2, 3, 0, 1, 0, 6, 0, 0, 3, 0, 0] , [0, 3, 1, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[y_2, y_1, y_3, 0, y_2, y_6, y_4, 0, 0, y_5, y_6, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$

$$[0, 0, 0, y_4, 0, y_3, y_1, 2 y_3, y_2, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

1460 . Coloring, {5, 6, 7, 8, 9, 11}

R: [7, 7, 7, 6, 3, 3, A, B, C, C, 4, 5]

B: [6, 8, 8, 7, A, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 2, 2, 0, 0, 3, 0, 2] , [0, 0, 5, 0, 2, 1, 3, 0, 0, 2, 0, 3] , [0, 0, 3, 0, 3, 0, 5, 0, 0, 3, 0, 2] , [0, 0, 3, 0, 2, 0, 3, 0, 0, 5, 0, 3] , [0, 0, 2, 0, 3, 0, 3, 0, 0, 3, 0, 5] , [0, 0, 3, 0, 5, 0, 2, 0, 0, 3, 0, 3] , [0, 0, 5, 0, 3, 0, 3, 0, 0, 2, 0, 3]] \$

[0, 0, y_2 , y_1 , y_4 , y_3 , y_5 , 0, 0, y_7 , y_6 , y_8]

Omega Rank for B : cycles: {{1, 2, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 0, 2, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 3, 0, 2, 2, 2, 1, 2] , [1, 2, 0, 0, 0, 3, 0, 1, 2, 3, 2, 2] , [2, 3, 0, 0, 0, 1, 0, 2, 2, 3, 2, 1] , [2, 3, 0, 0, 0, 2, 0, 3, 1, 1, 2, 2] , [2, 1, 0, 0, 0, 2, 0, 3, 2, 2, 1, 3] , [1, 2, 0, 0, 0, 2, 0, 1, 3, 2, 2, 3] , [2, 2, 0, 0, 0, 1, 0, 2, 3, 2, 3, 1]] \$

[y_2 , y_3 , 0, 0, 0, y_1 , y_4 , y_5 , y_6 , y_7 , y_8 , y_9]

1461 . Coloring, {5, 6, 7, 8, 9, 12}

R: [7, 7, 7, 6, 3, 3, A, B, C, C, 1, 9]

B: [6, 8, 8, 7, A, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6
See Matrix

\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 2, 1, 3], [1, 0, 1, 0, 0, 0, 4, 0, 3, 3, 0, 4], [0, 0, 0, 0, 0, 0, 2, 0, 4, 4, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_2, 0, y_2, 0, 0, y_4, y_3, 0, -2y_2 + 2y_4 + y_3 - y_1 + y_5, y_1, y_4, y_5]$$

$$p = s^5 - s^6 \quad p' = -s^5 + s^6 \quad p'' = -s^5 + s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}, {4, 7, 11}}
See Matrix

\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 2, 3, 1], [0, 2, 0, 3, 1, 0, 2, 2, 0, 3, 1, 2], [0, 3, 0, 1, 2, 0, 3, 2, 0, 1, 2, 2], [0, 1, 0, 2, 2, 0, 1, 3, 0, 2, 3, 2], [0, 2, 0, 3, 2, 0, 2, 1, 0, 2, 1, 3], [0, 2, 0, 1, 3, 0, 3, 2, 0, 2, 2, 1], [0, 2, 0, 2, 1, 0, 1, 2, 0, 3, 3, 2], [0, 3, 0, 3, 2, 0, 2, 2, 0, 1, 1, 2], [0, 1, 0, 1, 2, 0, 3, 3, 0, 2, 2, 2]] \$

$$[0, 5y_1 - 3y_2 - 3y_3 + 5y_4 - 3y_5 - 3y_6 + 5y_7 - 3y_8, 0, 3y_1, 3y_2, 3y_3, 3y_4, 3y_5, 0, 3y_6, 3y_7, 3y_8]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1462 . Coloring, {5, 6, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 9s^3 - 2s^4 - 16s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, B, B, 2, 4, 5]

B: [6, 8, 8, 7, A, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 2, 2, 0] , [0, 2, 3, 2, 0, 2, 4, 0, 0, 3, 0, 0] , [0, 3, 2, 0, 0, 2, 5, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

[0, y_1 , y_2 , y_3 , y_7 , y_4 , y_5 , 0, 0, y_6 , y_7 , 0]

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 2, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 1, 1, 6] , [1, 0, 0, 0, 0, 2, 0, 0, 6, 2, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[y_1 , 0, 0, 0, 0, y_4 , y_3 , 2 y_3 , y_2 , y_7 , y_5 , y_6]

$$p = s^6 - s^8$$

1463 . Coloring, {5, 6, 7, 8, 10, 12}

$$\Omega p(\Delta)=0: p = 6s^2 - 5s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, B, B, 2, 1, 9]

B: [6, 8, 8, 7, A, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	4 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 2, 2, 0], [2, 2, 1, 0, 0, 0, 6, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$$[y_2, y_3, y_1, 0, 0, y_5, y_4, 0, 2y_5, y_6, 2y_1 - 2y_5, 0]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}, \{4, 7, 11\}\}$ order: 3
See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 1, 4], [0, 0, 0, 1, 4, 0, 2, 0, 0, 4, 2, 3], [0, 0, 0, 2, 3, 0, 1, 0, 0, 4, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 1, 4], [0, 0, 0, 1, 4, 0, 2, 0, 0, 4, 2, 3], [0, 0, 0, 2, 3, 0, 1, 0, 0, 4, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 1, 4]] \$$

$$[0, 0, 0, -4y_3 - 2y_1 + 2y_2 + 2y_4, 16y_3 + 9y_1 - 11y_2 - 2y_4, 2y_3, 14y_3 + 7y_1 - 9y_2 - 2y_4, 4y_3, 0, 2y_1, 2y_2, 2y_4]$$

$$p = s^2 - s^8 \quad p' = s^2 - s^5 \quad p' = s^3 - s^6 \quad p' = s^4 - s^7$$

1464 . Coloring, $\{5, 6, 7, 8, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = 6s^2 + 5s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, B, B, C, 4, 9]

B: [6, 8, 8, 7, A, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 9, 10, 11, 12\}\}$ order: 8
See Matrix

$\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 2, 2, 2], [0, 0, 1, 2, 0, 2, 2, 0, 2, 3, 2, 2], [0, 0, 2, 2, 0, 2, 1, 0, 2, 2, 2, 3], [0, 0, 2, 2, 0, 2, 2, 0, 3, 1, 2, 2], [0, 0, 2, 2, 0, 2, 2, 0, 2, 2, 3, 1], [0, 0, 2, 3, 0, 2, 2, 0, 1, 2, 2, 2], [0, 0, 2, 2, 0, 3, 1, 2, 2, 2, 2, 2]] \$$

$$2, 0, 2, 2, 1, 2], [0, 0, 3, 1, 0, 2, 2, 0, 2, 2, 2, 2]] \$$$

$$[0, 0, -y_1 + y_2 + y_3 - y_4 - y_5 + y_6 + y_7, y_1, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 2, 2, 2], [2, 2, 0, 0, 2, 2, 0, 2, 0, 3, 1, 2], [1, 3, 0, 0, 2, 2, 0, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 1, 0, 3, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 2, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2]] \$$$

$$[y_2, y_3, 0, 0, y_1, y_4, y_5, y_6, 0, y_7, y_9, y_8]$$

1465 . Coloring, {5, 6, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 - 2s^4 + 16s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, C, C, 2, 4, 5]

B: [6, 8, 8, 7, A, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 2, 0, 2], [0, 2, 3, 0, 2, 2, 4, 0, 0, 3, 0, 0], [0, 3, 4, 0, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 7, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0]] \$$$

$$[0, y_1, y_2, 2y_3 - 2y_4, y_3, y_4, y_5, 0, 0, y_6, 0, 2y_3 - 2y_4]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{1, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 2, 4, 2], [4, 0, 0, 0, 0, 2, 0, 0, 2, 1, 5, 2], [5, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 1], [2, 0, 0, 0, 0, 5, 0, 0, 1, 4, 2, 2], [2, 0, 0, 0, 0, 2, 0, 0, 2, 5, 1, 4], [1, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 5], [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 4, 2], [4, 0, 0, 0, 0, 2, 0, 0, 2, 1, 5, 2]] \$$

$$[y_1, 0, 0, 0, 0, y_6, y_7, 2y_7, y_4, y_5, y_3, y_2]$$

$$p = -s^2 + s^8$$

Â» SYNC'D !RANK'D

1466 . Coloring, $\{5, 6, 7, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = 2s^2 + s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, C, C, 2, 1, 9]

B: [6, 8, 8, 7, A, A, B, B, B, C, 4, 5]

' See graph

' ' See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	5 vs 8	4 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 2, 0, 2], [0, 2, 1, 0, 0, 0, 6, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 3, 0, 2, 6, 0, 2], [0, 6, 0, 0, 0, 0, 3, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 6, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 3, 0, 2, 6, 0, 2], [0, 6, 0, 0, 0, 0, 3, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 6, 0, 2, 3, 0, 2]] \$$

$$[2y_1, -y_2 - 3y_1 - y_5 + 6y_3 - y_4, y_2, 0, 0, y_1, y_5, 0, y_3, y_4, 0, y_3]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}, \{4, 7, 11\}\}$ order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 0, 2, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 2, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 0, 2, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 2, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 0, 2, 0, 0, 3, 3, 2]] \$

$[0, 0, 0, y_3, y_4, -10y_3 - 7y_4 + 16y_1 + 3y_2, y_2, -20y_3 - 14y_4 + 32y_1 + 6y_2, 0, y_1, -8y_3 - 4y_4 + 2y_2 + 13y_1, -11y_3 + 18y_1 - 8y_4 + 4y_2]$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6 \quad p = -s^2 + s^8$$

Â» SYNC'D !RANK'D

1467 . Coloring, {5, 6, 7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + s^3 - 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, C, C, C, 4, 9]

B: [6, 8, 8, 7, A, A, B, B, B, 2, 1, 5]

' See graph

' ' See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 2, 0, 4] , [0, 0, 1, 0, 0, 2, 2, 0, 4, 3, 0, 4] , [0, 0, 2, 0, 0, 0, 1, 0, 4, 2, 0, 7] , [0, 0, 0, 0, 0, 2, 0, 7, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$[0, 0, -y_1 + y_2 + y_3 - y_4 - y_5 + y_6, y_1, 0, y_2, y_3, 0, y_4, y_5, 0, y_6]$

$$p = -s^6 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 0, 3, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 0, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 3, 3, 0]] \$

$$[y_6, y_5, 0, 0, 2y_3, y_4, y_3, y_2, 0, y_1, y_7, 0]$$

$$p = -s^2 + s^8$$

1468 . Coloring, {5, 6, 7, 10, 11, 12}

R: [7, 7, 7, 6, 3, 3, A, C, B, 2, 4, 9]

B: [6, 8, 8, 7, A, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 2, 1, 1] , [0, 2, 1, 1, 0, 2, 4, 0, 1, 3, 2, 0] , [0, 3, 2, 2, 0, 1, 3, 0, 0, 4, 1, 0] , [0, 4, 1, 1, 0, 2, 5, 0, 0, 3, 0, 0] , [0, 3, 2, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 1, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_9, y_8, y_7, 0, y_6, y_5, 0, y_4, y_3, y_2, y_1]$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 2, 0, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 3, 0, 0, 0, 5, 0, 3] , [0, 0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[y_3, 0, 0, 0, y_2, y_1, y_7, 2y_7, 0, y_5, y_6, y_4]$$

$$p = -s^5 + s^8$$

1469 . Coloring, {5, 6, 8, 9, 10, 11}

R: [7, 7, 7, 6, 3, 3, B, B, C, 2, 4, 5]
B: [6, 8, 8, 7, A, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5
 See Matrix

\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 0, 3, 1] , [0, 0, 3, 3, 1, 2, 4, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 3, 3, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 3, 3, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 4, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 3, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 3, 4, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 3, 0, 0, 0, 3, 0, 3] , [0, 0, 3, 3, 0, 3, 0, 3, 0, 3, 3, 0, 0, 0, 4, 0]] \$

$$[0, 2 y_7, y_4, y_1, y_2, y_3, y_5, 0, 0, 0, y_6, y_7]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6
 See Matrix

\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 2, 2, 6] , [2, 0, 0, 0, 0, 1, 0, 0, 6, 2, 3, 2] , [3, 0, 0, 0, 0, 2, 0, 0, 2, 1, 6, 2] , [6, 0, 0, 0, 0, 3, 0, 0, 2, 2, 2, 1] , [2, 0, 0, 0, 0, 6, 0, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 2, 0, 0, 2, 6, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 2, 2, 6]] \$

$$[y_1, 0, 0, 0, 0, y_3, y_2, 2 y_2, y_4, y_7, y_6, y_5]$$

$$p = -s^2 + s^8$$

1470 . Coloring, {5, 6, 8, 9, 10, 12}

R: [7, 7, 7, 6, 3, 3, B, B, C, 2, 1, 9]
B: [6, 8, 8, 7, A, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 0, 3, 1], [3, 0, 1, 0, 0, 0, 6, 0, 1, 0, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 6, 1], [6, 0, 0, 0, 0, 3, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 6, 0, 2, 0, 3, 1], [3, 0, 0, 0, 0, 0, 4, 0, 1, 0, 6, 2], [6, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 6, 0, 1, 0, 3, 2]] \$$

$$[-3y_1 - 9y_2 - 3y_4 + 13y_5 - 3y_3 + 13y_6, 6y_2, 3y_1, 0, 0, 3y_2, 3y_4, 0, 3y_5, 0, 3y_3, 3y_6]$$

$$p = s^3 + s^4 - s^6 - s^7 \quad p' = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6
See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 4, 1, 3], [0, 0, 0, 1, 3, 0, 2, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 1, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$$

$$[0, 0, 0, y_1, y_2, y_5, y_4, 2y_5, 0, y_3, y_5, y_6]$$

$$p' = s^4 - s^7 \quad p = -s^4 + s^7$$

1471 . Coloring, $\{5, 6, 8, 9, 11, 12\}$

R: [7, 7, 7, 6, 3, 3, B, B, C, C, 4, 9]

B: [6, 8, 8, 7, A, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	8 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}, \{9, 12\}\}$ order: 10
See Matrix

$\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 0, 3, 3], [0, 0, 1, 3, 0, 2, 2, 0, 3, 0, 3, 2], [0, 0, 2, 3, 0, 3, 1, 0, 2, 0, 2, 3], [0, 0, 3, 2, 0, 3, 2, 0, 3, 0, 1, 2], [0, 0, 3, 1, 0, 2, 3, 0, 2, 0, 2, 3], [0, 0, 2, 2, 0, 1, 3, 0, 3, 0, 3, 2], [0, 0, 1, 3, 0, 2, 2, 0, 2, 0, 3, 3]] \$$

$$[0, 0, -5y_1 - 5y_2 - 5y_3 + 11y_4 - 5y_5 + 11y_6, 5y_1, 0, 5y_2, 5y_3, 0, 5y_4, 0, 5y_5, 5y_6]$$

$$p = -s - s^2 + s^6 + s^7$$

Omega Rank for B : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5
See Matrix

$\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 4, 1, 1], [1, 4, 0, 0, 1, 2, 0, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 1, 0, 4, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3], [0, 2, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4]] \$$

$$[y_2, y_1, 0, 0, y_8, y_7, y_6, y_5, 0, y_4, y_6, y_3]$$

$$p = -s^4 + s^9$$

1472 . Coloring, $\{5, 6, 8, 10, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 + 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, B, B, 2, 4, 9]

B: [6, 8, 8, 7, A, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 7	5 vs 7

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5
See Matrix

$\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 0, 4, 0], [0, 0, 1, 4, 0, 2, 4, 0, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 1, 0, 0, 0, 4, 0], [0, 0, 4, 4, 0, 5, 2, 0, 0, 0, 1, 0], [0, 0, 5, 1, 0, 4, 4, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 1, 5, 0, 0, 0, 4, 0], [0, 0, 1, 4, 0, 2, 4, 0, 0, 0, 5, 0]] \$$

$$[0, y_6, y_5, y_4, 0, y_3, y_2, 0, y_6, 0, y_1, 0]$$

$$p = s^2 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 4, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$$$

$$[2 y_5, 0, 0, 0, y_1, y_2, y_5, 2 y_5, 0, y_3, 0, y_4]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Â» SYNC'D !RANK'D

1473 . Coloring, {5, 6, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 5s^3 - 2s^4 + 16s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, B, C, C, 2, 4, 9]

B: [6, 8, 8, 7, A, A, A, B, B, C, 1, 5]

' See graph

' ' See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 0, 2, 2], [0, 0, 1, 2, 0, 2, 4, 0, 2, 0, 3, 2], [0, 0, 2, 3, 0, 2, 1, 0, 2, 0, 4, 2], [0, 0, 2, 4, 0, 3, 2, 0, 2, 0, 1, 2], [0, 0, 3, 1, 0, 4, 2, 0, 2, 0, 2, 2], [0, 0, 4, 2, 0, 1, 3, 0, 2, 0, 2, 2], [0, 0, 1, 2, 0, 2, 4, 0, 2, 0, 3, 2], [0, 0, 2, 3, 0, 2, 1, 0, 2, 0, 4, 2]] \$$$

$$[0, y_6, y_5, y_4, 0, y_3, y_2, 0, y_1, 0, -y_6 - y_5 - y_4 - y_3 - y_2 + 6y_1, y_1]$$

$$p' = -s^2 + s^7 \quad p = -s^2 + s^7$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6
See Matrix

$\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 4, 2, 2], [2, 0, 0, 0, 2, 2, 0, 0, 0, 4, 2, 4], [2, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$$

$$[y_1, 0, 0, 0, y_4, y_2, y_3, 2y_3, 0, y_6, y_7, y_5]$$

$$p = -s^5 + s^8$$

1474 . Coloring, $\{5, 7, 8, 9, 10, 11\}$

$$\Omega p(\Delta)=0: \quad p = -2s^2 + 5s^3 + 2s^4 + 16s^5 - 8s^6 - 32s^8$$

R: $[7, 7, 7, 6, 3, A, A, B, C, 2, 4, 5]$

B: $[6, 8, 8, 7, A, 3, B, C, B, C, 1, 9]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 3, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 1, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$$[0, y_6, y_5, y_4, y_4, y_5, y_3, 0, 0, y_2, y_1, y_1]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7 \quad p' = s^5 - s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7
See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 3, 3], [3, 0, 1, 0, 0, 2, 0, 1, 3, 0, 3, 3], [3, 0, 2, 0, 0, 3, 0, 1, 3, 0, 3, 1], [3, 0, 3, 0, 0, 3, 0, 2, 1, 0, 3, 1], [3, 0, 3, 0, 0, 3, 0, 3, 1, 0, 1, 2], [1, 0, 3, 0, 0, 3, 0, 3, 2, 0, 1, 3], [1, 0, 3, 0, 0, 1, 0, 3, 3, 0, 2, 3], [2, 0, 1, 0, 0, 1, 0, 3, 3, 0, 3, 3], [3, 0, 1, 0, 0, 2, 0, 1, 3, 0, 3, 3]] \$$

$$[y_2, 0, y_1, 0, 0, y_4, y_6, y_3, y_5, y_6, y_7, y_8]$$

$$p = -s^2 + s^9$$

Â» SYNC'D !RANK'D

1475 . Coloring, {5, 7, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, A, B, C, 2, 1, 9]

B: [6, 8, 8, 7, A, 3, B, C, B, C, 4, 5]

' See graph

' ' See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 9

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1]] \$$$

$$[3y_5, 3y_4, 3y_3, 0, 0, 3y_3, 3y_1, 0, 3y_2, -3y_5 - 3y_4 - 9y_3 - 3y_1 + 13y_2 + 13y_6, 3y_3, 3y_6]$$

$$p' = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 + s^4 - s^6 - s^7 \quad p' = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 3, 3], [0, 0, 1, 3, 3, 0, 2, 1, 0, 2, 1, 3], [0, 0, 0, 1, 3, 0, 3, 1, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 1, 0, 0, 3, 3, 4], [0, 0, 0, 3, 4, 0, 2, 0, 0, 3, 1, 3], [0, 0, 0, 1, 3, 0, 3, 0, 0, 4, 2, 3], [0, 0, 0, 2, 3, 0, 1, 0, 0, 3, 3, 4], [0, 0, 0, 3, 4, 0, 2, 0, 0, 3, 1, 3], [0, 0, 0, 1, 3, 0, 3, 0, 0, 4, 2, 3]] \$$$

$$[0, 0, y_1, y_2, y_3, -6y_1 + 5y_2 - 6y_3 + 4y_4 + 4y_6 - y_5, 5y_1 - 4y_2 + 5y_3 - 2y_4 - 2y_6, y_4, 0, y_6, -8y_1 + 6y_2 - 8y_3 + 5y_4 + 5y_6, y_5]$$

$$p' = s^5 - s^8 \quad p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1476 . Coloring, {5, 7, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, A, A, B, C, C, 4, 9]

B: [6, 8, 8, 7, A, 3, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	10 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 1, 3], [0, 0, 0, 1, 0, 2, 1, 0, 3, 4, 0, 5], [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7], [0, 0, \\ & 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, \\ & 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$ \end{aligned}$$

$$[0, 0, y_4, y_1 - y_4, 0, y_2 + y_3 - y_4 - y_5, y_1, 0, y_2, y_3, y_4, y_5]$$

$$p' = -s^5 + s^7 \quad p' = -s^5 + s^6 \quad p = s^5 - s^6$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 10

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 3, 1], [3, 1, 1, 0, 1, 2, 0, 3, 0, 2, 1, 2], [1, 2, 2, 0, 2, 3, 0, 2, 0, 1, 0, 3], [0, 1, \\ & 3, 0, 3, 1, 0, 4, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 0, 4, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, \\ & 0, 3, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, \\ & 0, 4]] \$ \end{aligned}$$

$$[y_5, y_6, y_7, 0, y_1, y_2, y_3, y_4, 0, y_8, y_9, y_{10}]$$

1477 . Coloring, {5, 7, 8, 10, 11, 12}

R: [7, 7, 7, 6, 3, A, A, B, B, 2, 4, 9]

B: [6, 8, 8, 8, 7, A, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 3, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 3, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 2, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[0, y_1, y_3, y_2, 0, y_4, y_7, 0, 2 y_3, y_6, y_5, 0]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 2, 4] , [2, 0, 1, 0, 4, 2, 0, 1, 0, 2, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 1, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 1, 0, 2, 0, 3, 0, 5] , [0, 0, 1, 0, 5, 0, 0, 2, 0, 3, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 1, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

1478 . Coloring, {5, 7, 9, 10, 11, 12}

R: [7, 7, 7, 6, 3, A, A, C, C, 2, 4, 9]

B: [6, 8, 8, 8, 7, A, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 2, 3, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2]] \$

$$[0, -3y_1 - y_2 - y_3 - y_5 + 6y_4, y_1, 2y_1, 0, y_2, y_3, 0, y_4, y_5, 0, y_4]$$

$$p = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 8, 11}}

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 4, 2] , [4, 0, 1, 0, 2, 2, 0, 1, 0, 2, 3, 1] , [3, 0, 2, 0, 1, 4, 0, 1, 0, 2, 1, 2] , [1, 0, 4, 0, 2, 3, 0, 2, 0, 1, 1, 2] , [1, 0, 3, 0, 2, 1, 0, 4, 0, 2, 2, 1] , [2, 0, 1, 0, 1, 1, 0, 3, 0, 2, 4, 2] , [4, 0, 1, 0, 2, 2, 0, 1, 0, 1, 3, 2] , [3, 0, 2, 0, 2, 4, 0, 1, 0, 2, 1, 1] , [1, 0, 4, 0, 1, 3, 0, 2, 0, 2, 1, 2]] \$

$$[5y_1, 0, -5y_1 + 11y_2 - 5y_3 - 5y_4 - 5y_5 + 11y_6 - 5y_7 + 11y_8, 0, 5y_2, 5y_3, 5y_4, 5y_5, 0, 5y_6, 5y_7, 5y_8]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1479 . Coloring, {5, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 16s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, B, B, C, 2, 4, 9]

B: [6, 8, 8, 7, A, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 7, 10, 11}, {9, 12}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 2, 3, 0, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 3, 1, 0, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 3, 1, 0, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 3, 2, 0, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 1, 3, 0, 1, 3, 2, 2] , [0, 3, 0, 2, 0, 1, 3, 0, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 2, 3, 0, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 3, 1, 0, 2, 2, 3, 1]] \$

[0, -3 y₁ - 3 y₄ + 8 y₂ - 3 y₆ + 5 y₇, 3 y₁, -3 y₅ + 5 y₂ - 3 y₃ + 8 y₇, 0, 3 y₄, 3 y₅, 0, 3 y₂, 3 y₃, 3 y₆, 3 y₇]

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 1, 3] , [1, 0, 1, 0, 3, 2, 0, 1, 0, 3, 0, 5] , [0, 0, 2, 0, 5, 1, 0, 1, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 0, 0, 2, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 1, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5]] \$

[y₃, 0, y₂, 0, y₁, y₈, y₇, y₆, 0, y₅, y₇, y₄]

$$p = s^6 - s^9$$

Â» SYNC'D !RANK'D

1480 . Coloring, {6, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -6s^2 - s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, 3, A, B, C, 2, 4, 5]

B: [6, 8, 8, 7, 3, A, B, C, B, C, 1, 9]

' See graph

' ' See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 3, 1, 1] , [0, 3, 1, 1, 1, 2, 3, 0, 0, 5, 0, 0] , [0, 5, 2, 0, 0, 1, 4, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 7, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0]] \$

$$[0, y_1, y_2, y_3, y_3, y_6, y_4, 0, 0, y_5, y_7, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 1, 3, 1, 3, 3] , [3, 0, 0, 0, 0, 3, 0, 0, 3, 2, 3, 2] , [3, 0, 0, 0, 0, 3, 0, 0, 2, 3, 3, 2] , [3, 0, 0, 0, 0, 3, 0, 0, 2, 3, 2, 3] , [2, 0, 0, 0, 0, 3, 0, 0, 3, 3, 2, 3] , [2, 0, 0, 0, 0, 2, 0, 0, 3, 3, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 3, 3] , [3, 0, 0, 0, 0, 3, 0, 0, 3, 2, 3, 2]] \$

$$[y_5 - y_4 - y_3 - y_1 + y_2 + y_7, 0, y_6, 0, 0, y_5, y_6, y_4, y_3, y_1, y_2, y_7]$$

$$p = s^3 - s^9 \quad p' = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1481 . Coloring, {6, 7, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, A, B, C, 2, 1, 9]

B: [6, 8, 8, 7, 3, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 9

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 3, 1, 1] , [1, 3, 1, 0, 0, 0, 5, 0, 1, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 5, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 3, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 5, 0, 2, 3, 0, 1] , [0, 3, 0, 0, 0, 0, 5, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 3, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 5, 0, 1, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 5, 0, 2, 5, 0, 1]] \$

$$[3y_1 + 3y_4, -6y_1 - 9y_4 - 3y_5 + 13y_6 - 3y_3 + 13y_2, 3y_1, 0, 0, 3y_4, 3y_5, 0, 3y_6, 3y_3, 3y_4, 3y_2]$$

$$p = s^3 - s^9 \quad p' = -s^3 + s^5 + s^6 - s^8 \quad p'' = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {4, 7, 11}} order: 12

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 1, 3, 3], [0, 0, 2, 3, 3, 0, 2, 1, 0, 1, 1, 3], [0, 0, 3, 1, 3, 0, 3, 2, 0, 0, 2, 2], [0, 0, 3, 2, 2, 0, 1, 3, 0, 0, 3, 2], [0, 0, 2, 3, 2, 0, 2, 3, 0, 0, 1, 3], [0, 0, 2, 1, 3, 0, 3, 2, 0, 0, 2, 3], [0, 0, 3, 2, 3, 0, 1, 2, 0, 0, 3, 2], [0, 0, 3, 3, 2, 0, 2, 3, 0, 0, 1, 2], [0, 0, 2, 1, 2, 0, 3, 3, 0, 0, 2, 3]] \$$$

$$[0, 0, 5y_7, 5y_6, 5y_5, 5y_4, 5y_3, 5y_2, 0, 5y_1, -5y_6 + 6y_5 - 5y_3 + 6y_2 + 6y_1, -5y_7 + 5y_5 - 5y_4 + 5y_2 + 5y_1]$$

$$p = -s^3 - s^4 - s^5 + s^7 + s^8 + s^9 \quad p' = -s^3 - s^5 + s^6 + s^8$$

1482 . Coloring, {6, 7, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, A, B, C, C, 4, 9]

B: [6, 8, 8, 7, 3, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 3, 1, 3], [0, 0, 1, 1, 0, 2, 1, 0, 3, 3, 0, 5], [0, 0, 2, 0, 0, 1, 1, 0, 5, 1, 0, 6], [0, 0, 1, 0, 0, 0, 2, 0, 6, 1, 0, 6], [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[0, 0, -y_1 + y_2 + y_3 - y_4 - y_5 + y_6 + y_7, y_1, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = s^7 - s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 0, 3, 0, 1, 1, 2] , [1, 1, 1, 0, 2, 3, 0, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 1, 0, 2, 0, 3, 0, 3] , [0, 3, 3, 0, 3, 0, 0, 4, 0, 1, 0, 2] , [0, 1, 3, 0, 2, 0, 0, 6, 0, 0, 0, 4] , [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4] , [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2] , [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4]] \$

$$[y_1 + y_2 - y_3 + y_4 - y_5 - y_6 - y_7 + y_8 + y_9, y_1, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

$$p = -s^7 + s^8 - s^9 + s^{10}$$

1483 . Coloring, {6, 7, 8, 10, 11, 12}

R: [7, 7, 7, 6, A, 3, A, B, B, 2, 4, 9]

B: [6, 8, 8, 7, 3, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 2, 0] , [0, 3, 1, 2, 0, 2, 3, 0, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 2, 4, 0, 0, 3, 0, 0] , [0, 3, 2, 0, 0, 2, 5, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_1, y_2, y_6, 0, y_7, y_3, 0, y_4, y_5, y_8, 0]$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 2, 4] , [2, 0, 2, 0, 4, 2, 0, 1, 0, 1, 1, 3] , [1, 0, 4, 0, 3, 2, 0, 2, 0, 2, 0, 2] , [0, 0, 3, 0, 2, 1, 0, 4, 0, 2, 0, 4] , [0, 0, 2, 0, 4, 0, 0, 3, 0, 1, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4] , [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2] , [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4] , [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6]] \$

$$[y_1 - y_2 + y_3 - y_4 - y_8 - y_5 + y_6 + y_7, 0, y_1, 0, y_2, y_3, y_4, y_8, 0, y_5, y_6, y_7]$$

$$p = s^6 - s^7 + s^8 - s^9$$

1484 . Coloring, {6, 7, 9, 10, 11, 12}

R: [7, 7, 7, 6, A, 3, A, C, C, 2, 4, 9]

B: [6, 8, 8, 7, 3, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 0, 2], [0, 3, 1, 0, 0, 2, 3, 0, 2, 3, 0, 2], [0, 3, 2, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2]] \$$$

$$[0, -y_1 - y_2 - y_6 - y_3 + 6y_5 - y_4, y_1, y_2, 0, y_6, y_3, 0, y_5, y_4, 0, y_5]$$

$$p' = s^4 - s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 4, 2], [4, 0, 2, 0, 2, 2, 0, 1, 0, 1, 3, 1], [3, 0, 2, 0, 1, 4, 0, 2, 0, 2, 1, 1], [1, 0, 1, 0, 1, 3, 0, 2, 0, 4, 2, 2], [2, 0, 1, 0, 2, 1, 0, 1, 0, 3, 2, 4], [2, 0, 2, 0, 4, 2, 0, 1, 0, 1, 1, 3], [1, 0, 4, 0, 3, 2, 0, 2, 0, 2, 1, 1], [1, 0, 3, 0, 1, 1, 0, 4, 0, 2, 2, 2], [2, 0, 1, 0, 2, 1, 0, 3, 0, 1, 4, 2]] \$$$

$$[y_1 - y_2 + y_3 - y_8 - y_4 - y_5 + y_6 + y_7, 0, y_1, 0, y_2, y_3, y_8, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

1485 . Coloring, {6, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, A, 3, B, B, C, 2, 4, 9]

B: [6, 8, 8, 7, 3, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 1, 3, 1] , [0, 1, 1, 3, 0, 2, 3, 0, 1, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 2, 0, 2, 0, 3, 1] , [0, 0, 3, 3, 0, 3, 2, 0, 1, 0, 2, 2] , [0, 0, 3, 2, 0, 3, 3, 0, 2, 0, 2, 1] , [0, 0, 3, 2, 0, 2, 3, 0, 1, 0, 3, 2] , [0, 0, 2, 3, 0, 2, 3, 0, 2, 0, 3, 1] , [0, 0, 2, 3, 0, 3, 2, 0, 1, 0, 3, 2] , [0, 0, 3, 3, 0, 3, 2, 0, 2, 0, 2, 1]] \$

$$[0, -3y_4 - 3y_3 - 3y_2 - 3y_1 + 13y_8 - 3y_7 - 3y_6 + 13y_5, 3y_4, 3y_3, 0, 3y_2, 3y_1, 0, 3y_8, 3y_7, 3y_6, 3y_5]$$

$$p = s^3 + s^4 - s^8 - s^9$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 1, 0, 2, 0, 5] , [0, 0, 3, 0, 5, 1, 0, 2, 0, 2, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 3, 0, 1, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4]] \$

$$[y_2, 0, y_1, 0, y_8, y_3, y_6, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^9$$

1486 . Coloring, {7, 8, 9, 10, 11, 12}

R: [7, 7, 7, 6, A, A, A, B, C, 2, 4, 9]

B: [6, 8, 8, 7, 3, 3, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 4, 1, 1], [0, 4, 0, 1, 0, 2, 2, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 1, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2]] \$$

$[0, -3y_1 - 3y_3 - 3y_2 + 13y_6 - 3y_4 - 3y_5 + 13y_7, 0, 3y_1, 0, 3y_3, 3y_2, 0, 3y_6, 3y_4, 3y_5, 3y_7]$

$$p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 0, 3, 3], [3, 0, 3, 0, 3, 2, 0, 2, 0, 0, 1, 2], [1, 0, 5, 0, 2, 3, 0, 3, 0, 0, 0, 2], [0, 0, 5, 0, 2, 1, 0, 5, 0, 0, 0, 3], [0, 0, 3, 0, 3, 0, 0, 5, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 3, 0, 0, 0, 5], [0, 0, 5, 0, 5, 0, 0, 3, 0, 0, 0, 3], [0, 0, 5, 0, 3, 0, 0, 5, 0, 0, 0, 3]] \$$

$[y_5, 0, y_4, 0, y_3, y_2, -y_5 - y_4 + y_3 + y_2 + y_1 + y_6 - y_7, y_1, 0, 0, y_6, y_7]$

$$p = -s^5 + s^6 - s^7 + s^8$$

1487 . Coloring, {2, 3, 4, 5, 6, 7, 8}

$$\Omega p(\Delta)=0: \quad p' = s^6 \quad p' = s^2 \quad p' = s^3 \quad p' = s^4 \quad p = s^2 \quad p' = s^5 \quad p' = s^7$$

R: [7, 8, 8, 7, 3, 3, A, B, B, C, 1, 5]

B: [6, 7, 7, 6, A, A, B, C, C, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

R: [7, 8, 8, 7, 3, 3, A, B, B, C, 1, 5]

B: [6, 7, 7, 6, A, A, B, C, C, 2, 4, 9]

Ranges

Action of R on ranges, [[1], [1]]

Action of B on ranges, [[2], [2]]

Cycles: R, {{1, 3, 5, 7, 8, 10, 11, 12}}, B, {{2, 4, 6, 7, 10, 11}, {9, 12}}

$\beta(\{1, 3, 5, 7, 8, 10, 11, 12\}) = 1/2$

$\beta(\{2, 4, 6, 7, 9, 10, 11, 12\}) = 1/2$

Partitions

$\alpha(\{\{12\}, \{10\}, \{11\}, \{2, 3\}, \{5, 6\}, \{1, 4\}, \{8, 9\}, \{7\}\}) = 1/1$

b1 = {12} ‘ , ‘ b2 = {10} ‘ , ‘ b3 = {11} ‘ , ‘ b4 = {2, 3} ‘ , ‘ b5 = {5, 6} ‘ , ‘ b6 = {1, 4} ‘ , ‘ b7 = {8, 9} ‘ , ‘ b8 = {7}

Action of R and B on the blocks of the partitions: = [2, 8, 7, 5, 1, 3, 4, 6] [7, 5, 8, 2, 6, 3, 1, 4]
with invariant measure [1, 1, 1, 1, 1, 1, 1, 1]

N by blocks, check: true . ‘ See partition graph.

‘ ‘ See level-8 partition graph.

‘

1488 . Coloring, {2, 3, 4, 5, 6, 7, 9}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^5 - 32s^7 \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 - 32s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, 3, A, C, C, C, 1, 5]

B: [6, 7, 7, 6, A, A, B, B, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	6 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\begin{aligned} \$ [[2, 0, 2, 0, 2, 0, 2, 2, 0, 2, 0, 4], [0, 0, 2, 0, 4, 0, 2, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 0, 2, 0, 2, 0, 4], [0, 0, \\ 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, \\ 0, 4, 0, 0, 0, 4]] \$ \end{aligned}$$

$$[y_1, 0, -y_2 + y_3, 0, -y_1 + y_3, 0, y_2, y_3 - y_4, 0, y_4, 0, y_3]$$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [[0, 2, 0, 2, 0, 2, 2, 0, 2, 2, 4, 0], [0, 2, 0, 4, 0, 2, 2, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 4, 2, 0, 0, 2, 2, 0], [0, 2, \\ 0, 2, 0, 4, 2, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 2, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 4, 0, 0, 2, 2, 0], [0, 2, 0, 2, 0, 2, \\ 4, 0, 0, 2, 4, 0]] \$ \end{aligned}$$

$$[0, y_4, 0, y_3, 0, y_2, y_1, 0, y_4 - y_3 + y_2 - y_1 - y_6 + y_5, y_6, y_5, 0]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1489 . Coloring, {2, 3, 4, 5, 6, 7, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, C, B, 2, 1, 5]
B: [6, 7, 7, 6, A, A, B, B, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	6 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 2, 2, 0, 2, 0, 2, 2, 0, 2, 1, 1] , [1, 2, 2, 0, 1, 0, 2, 4, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 1, 4, 0, 2, 0, 4] , [0, 2, 2, 0, 4, 0, 0, 3, 0, 1, 0, 4] , [0, 1, 4, 0, 4, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3]] \$

$$[y_1 + y_2 - y_3 + y_4 - y_5 - y_6 + y_7 + y_8, y_1, y_2, 0, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 2, 2, 0, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 2, 4] , [0, 0, 0, 2, 0, 3, 0, 0, 4, 2, 0, 5] , [0, 0, 0, 0, 2, 0, 0, 5, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, 0, y_1 - y_5 - y_3 - y_2 + y_4 + y_6, 0, y_1, y_5, 0, y_3, y_2, y_4, y_6]$$

$$p = -s^6 + s^7$$

1490 . Coloring, {2, 3, 4, 5, 6, 7, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, C, B, C, 4, 5]
B: [6, 7, 7, 6, A, A, B, B, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	6 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 2, 2, 2, 0, 2, 2, 0, 2, 1, 3], [0, 0, 2, 1, 3, 0, 2, 2, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 1, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 1, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$$

$$[0, 0, y_4 + y_5 - y_2, -y_1 + y_4 + y_5, y_1, 0, y_2, -y_3 + y_4 + y_5, 0, y_3, y_4, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7 \quad p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}, \{1, 2, 6, 7, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 2, 0, 1, 2, 2, 2], [2, 2, 0, 0, 0, 3, 2, 0, 2, 2, 2, 1], [2, 2, 0, 0, 0, 2, 2, 0, 1, 3, 2, 2], [2, 3, 0, 0, 0, 2, 2, 0, 2, 2, 2, 1], [2, 2, 0, 0, 0, 2, 3, 0, 1, 2, 2, 2], [2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 2, 0, 1, 2, 2, 2]] \$$

$$[-3y_2 + 5y_3 - 3y_4 + 8y_6, -3y_1 + 8y_3 - 3y_5 + 5y_6, 0, 0, 0, 3y_1, 3y_2, 0, 3y_3, 3y_4, 3y_5, 3y_6]$$

$$p = s - s^7 \quad p' = s - s^7$$

1491 . Coloring, $\{2, 3, 4, 5, 6, 7, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, C, B, C, 1, 9]

B: [6, 7, 7, 6, A, A, B, B, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 0, 2, 2, 2, 2, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 2, 3, 2, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 0, 4, 2, 3, 4] , [3, 0, 0, 0, 0, 2, 0, 4, 1, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 2, 4, 1] , [4, 0, 0, 0, 0, 0, 4, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 4, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 0, 3, 4, 2, 4]] \$

$$[y_7, 0, y_6, 0, 0, 0, y_7 - y_6 + y_1 + y_2 + y_3 - y_4 - y_5, y_1, y_2, y_3, y_4, y_5]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 0, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 2, 2, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 3, 2, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 4, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 3, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 4, 2, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 2, 0, 0, 4, 2, 0]] \$

$$[0, y_1, 0, y_3, y_4, y_5, y_2, 0, 0, y_6, y_7, y_8]$$

1492 . Coloring, {2, 3, 4, 5, 6, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, 3, B, B, C, C, 1, 5]

B: [6, 7, 7, 6, A, A, A, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 2, 0, 2, 2, 0, 0, 3, 3] , [3, 0, 2, 0, 3, 0, 2, 2, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 0, 3, 2, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 4, 3, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 0, 0, 0, 7, 0] , [7, 0, 0, 0, 0, 0, 5, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 7, 0, 0, 0, 5, 0]] \$

$$[y_7, 0, y_6, 0, y_5, 0, y_3, y_4, 0, 0, y_2, y_1]$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 2, 2, 0, 2, 4, 1, 1], [0, 4, 0, 1, 0, 2, 2, 0, 1, 4, 2, 0], [0, 4, 0, 2, 0, 1, 4, 0, 0, 4, 1, 0], [0, 4, 0, 1, 0, 2, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 1, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$$

$$[0, y_1, 0, y_4, 0, y_3, y_2, 0, y_7, y_6, y_8, y_5]$$

1493 . Coloring, {2, 3, 4, 5, 6, 8, 10}

$$\Omega p(\Delta)=0: \quad p = s^2 + 56s^5 + 16s^6 - 64s^7 - 256s^8 \quad p' = s^2 - 16s^4 - 8s^5 + 16s^6 + 64s^7 \quad p'' = s^3 + 4s^4 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, 3, 3, B, B, B, 2, 1, 5]

B: [6, 7, 7, 6, A, A, A, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	6 vs 7	4 vs 6

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 2, 0, 2, 2, 0, 0, 4, 0], [4, 0, 2, 0, 0, 0, 2, 4, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 4, 2, 0, 0, 6, 0], [6, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$$$

$$[y_5, y_4, y_3, 0, y_4, 0, y_2, y_1, 0, 0, y_6, 0]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[0, 0, 0, 2, 0, 2, 2, 0, 2, 4, 0, 4], [0, 0, 0, 0, 0, 2, 0, 0, 4, 4, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[0, 0, 0, y_3, 0, y_4, y_3, 0, y_2, y_1, 0, -y_4 + y_2 + y_1]$$

$$p' = s^4 - s^5 \quad p = s^4 - s^6$$

1494 . Coloring, {2, 3, 4, 5, 6, 8, 11}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7 \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8$$

R: [7, 8, 8, 7, 3, 3, B, B, B, C, 4, 5]

B: [6, 7, 7, 6, A, A, A, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	3 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 2, 0, 2, 2, 0, 0, 4, 2], [0, 0, 2, 4, 2, 0, 2, 2, 0, 0, 4, 0], [0, 0, 2, 4, 0, 0, 4, 2, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 4, 2, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$$$

$$[0, 0, y_1, y_2, y_3, 0, y_4, y_7, 0, 0, y_5, y_6]$$

Omega Rank for B : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 2, 2, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 2, 2, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 4, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 4, 0, 2]] \$$$

$$[-y_1 + 2y_3, y_1, 0, 0, 0, -y_2 + 2y_3, y_2, 0, y_3, 2y_3, 0, y_3]$$

$$p = -s^3 + s^4 \quad p = -s^3 + s^5 \quad p = -s^3 + s^6 \quad p = -s^3 + s^7$$

1495 . Coloring, {2, 3, 4, 5, 6, 8, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7 \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, 3, B, B, B, C, 1, 9]

B: [6, 7, 7, 6, A, A, A, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 7	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

$$\begin{aligned} \$ [[2, 0, 2, 0, 0, 0, 2, 2, 2, 0, 4, 2], [4, 0, 0, 0, 0, 0, 2, 2, 2, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, \\ 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, \\ 6, 0, 0, 0, 4, 0]] \$ \end{aligned}$$

$$[y_1, 0, y_2, 0, 0, 0, y_5, y_4, y_4, 0, y_3, y_2]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 3

See Matrix

$$\begin{aligned} \$ [[0, 2, 0, 2, 2, 2, 2, 0, 0, 4, 0, 2], [0, 4, 0, 0, 2, 2, 2, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, \\ 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, \\ 6, 0, 0, 4, 0, 0]] \$ \end{aligned}$$

$$[0, y_1, 0, y_5, y_2, y_2, y_3, 0, 0, y_4, 0, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

1496 . Coloring, {2, 3, 4, 5, 6, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^2 - 8s^5 - 80s^6 - 64s^7 - 128s^8 \quad p' = s^2 - 8s^4 - 8s^5 - 16s^6 \quad p'' = s^3 - 8s^5 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, 3, 3, B, C, C, 2, 1, 5]
B: [6, 7, 7, 6, A, A, A, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	5 vs 8	6 vs 7

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{3, 5, 8, 12\}\}$ order: 12
 See Matrix

$\$ [[2, 2, 2, 0, 2, 0, 2, 2, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 2, 4, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 2, 2, 0, 0, 2, 4], [2, 0, 2, 0, 4, 0, 2, 2, 0, 0, 2, 2], [2, 0, 4, 0, 2, 0, 2, 2, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 2, 4, 0, 0, 2, 2], [2, 0, 2, 0, 2, 0, 2, 0, 2, 0, 2, 0, 2, 2, 0, 0, 2, 4], [2, 0, 2, 0, 4, 0, 2, 2, 0, 0, 2, 2]] \$$

$$[y_4, -y_1 - y_2 + 5y_4 - y_3 - y_5, y_1, 0, y_2, 0, y_4, y_3, 0, 0, y_4, y_5]$$

$$p = -s^2 + s^6 \quad p' = -s^2 + s^6 \quad p'' = -s^3 + s^7$$

Omega Rank for B : cycles: $\{\{4, 6, 9, 10, 11, 12\}\}$ order: 6
 See Matrix

$\$ [[0, 0, 0, 2, 0, 2, 2, 0, 2, 4, 2, 2], [0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2, 4], [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 2, 4], [0, 0, 0, 2, 0, 0, 4, 2, 4, 2], [0, 0, 0, 4, 0, 2, 0, 0, 2, 2, 4, 2], [0, 0, 0, 4, 0, 4, 0, 0, 2, 2, 2, 2], [0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2, 2]] \$$

$$[0, 0, 0, y_6, 0, y_4, y_5, 0, y_1, y_2, y_3, y_6 - y_4 - y_5 + y_1 + y_2 - y_3]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1497 . Coloring, $\{2, 3, 4, 5, 6, 9, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 - 32s^7$$

R: [7, 8, 8, 7, 3, 3, B, C, C, C, 4, 5]
B: [6, 7, 7, 6, A, A, A, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	7 vs 7

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}, \{4, 7, 11\}\}$ order: 12

See Matrix

$\$ [[0, 0, 2, 2, 2, 0, 2, 2, 0, 0, 2, 4], [0, 0, 2, 2, 4, 0, 2, 2, 0, 0, 2, 2], [0, 0, 4, 2, 2, 0, 2, 2, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 2, 4, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 2, 2, 0, 0, 2, 4], [0, 0, 2, 2, 4, 0, 2, 2, 0, 0, 2, 2], [0, 0, 4, 2, 2, 0, 2, 2, 0, 0, 2, 2]] \$$

$$[0, 0, y_2, y_3, y_1, 0, y_3, -y_2 - y_1 + 5y_3 - y_4, 0, 0, y_3, y_4]$$

$$p' = s^2 - s^6 \quad p' = s - s^5 \quad p = s - s^5$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 2, 2, 0, 2, 4, 2, 0], [2, 4, 0, 0, 0, 2, 2, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 2, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$$

$$[y_1, y_2, 0, 0, 0, y_3, y_4, 0, y_5, y_6, y_7, 0]$$

1498 . Coloring, $\{2, 3, 4, 5, 6, 9, 12\}$

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^5 + 32s^7 \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 + 32s^7 - 64s^8$$

R: [7, 8, 8, 7, 3, 3, B, C, C, C, 1, 9]

B: [6, 7, 7, 6, A, A, A, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	6 vs 7

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 0, 2, 2, 2, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 2, 4, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6] , [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6] , [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6]] \$

$$[y_3, 0, 5y_3 - y_1 - y_2 - y_4, 0, 0, 0, y_3, y_1, y_2, 0, y_3, y_4]$$

$$p = -s^3 + s^5 \quad p' = -s^3 + s^5 \quad p = -s^3 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 2, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 2, 4, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[0, y_1, 0, y_2, y_5, y_3, y_4, 0, 0, y_6, y_5, 0]$$

$$p = -s^4 + s^7$$

1499 . Coloring, {2, 3, 4, 5, 6, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 9s^3 - 16s^5 - 24s^6 - 16s^7 + 64s^8 \quad p' = 3s^3 + 4s^4 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, 3, 3, B, C, B, 2, 4, 5]

B: [6, 7, 7, 6, A, A, A, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	5 vs 7

Omega Rank for R : cycles: {{4, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 2, 2, 0, 0, 3, 1] , [0, 0, 2, 3, 1, 0, 2, 4, 0, 0, 2, 2] , [0, 0, 1, 2, 2, 0, 3, 2, 0, 0, 2, 4] , [0, 0, 2, 2, 4, 0, 2, 1, 0, 0, 3, 2] , [0, 0, 4, 3, 2, 0, 2, 2, 0, 0, 2, 1] , [0, 0, 2, 2, 1, 0, 3, 4, 0, 0, 2, 2] , [0, 0, 1, 2, 2, 0, 2, 2, 0, 0, 3, 4] , [0, 0, 2, 3, 4, 0, 2, 1, 0, 0, 2, 2]] \$

$$[0, -7y_1 + 9y_2 - 7y_3 + 9y_4 - 7y_5 + 9y_6 - 7y_7, 7y_1, 7y_2, 7y_3, 0, 7y_4, 7y_5, 0, 0, 7y_6, 7y_7]$$

$$p = s^2 + s^3 + s^4 - s^6 - s^7 - s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 2, 2, 0, 2, 4, 1, 3], [1, 0, 0, 0, 0, 2, 0, 0, 3, 4, 0, 6], [0, 0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[y_5 - y_1 - y_4 + 3y_2 + y_3, 0, 0, 0, 0, y_5, 2y_2, 0, y_1, y_4, y_2, y_3]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7$$

1500 . Coloring, {2, 3, 4, 5, 6, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 + 32s^8 \quad p = 9s^3 + 8s^5 - 8s^6 + 16s^7 - 64s^8$$

R: [7, 8, 8, 7, 3, 3, B, C, B, 2, 1, 9]

B: [6, 7, 7, 6, A, A, A, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 0, 2, 2, 2, 0, 3, 1], [3, 0, 0, 0, 0, 0, 2, 4, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 3, 4], [3, 0, 0, 0, 0, 0, 4, 0, 4, 0, 5, 0], [5, 0, 0, 0, 0, 0, 3, 0, 0, 0, 8, 0], [8, 0, 0, 0, 0, 0, 5, 0, 0, 0, 3, 0], [3, 0, 0, 0, 0, 0, 8, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 3, 0, 0, 0, 8, 0]] \$$$

$$[y_2, y_1, y_1, 0, 0, 0, y_7, y_6, y_5, 0, y_4, y_3]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 2, 0, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[0, 0, 0, y_1, y_2, y_3, 2y_5, 0, 0, y_4, y_5, y_6]$$

$$p = s^4 - s^7$$

1501 . Coloring, {2, 3, 4, 5, 6, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, 3, B, C, B, C, 4, 9]

B: [6, 7, 7, 6, A, A, A, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	6 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 2, 2, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 2, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, 0, y_7, y_6, 0, 0, y_4, y_5, y_3, 0, y_2, y_1]$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 2, 0, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 2, 2, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[y_2, y_1, 0, 0, y_2, y_5, y_4, 0, 0, y_3, y_6, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1502 . Coloring, {2, 3, 4, 5, 7, 8, 9}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 + 8s^5 + 32s^7$$

R: [7, 8, 8, 7, 3, A, A, B, C, C, 1, 5]

B: [6, 7, 7, 6, A, 3, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 9

Omega Rank for R : cycles: {{1, 3, 5, 7, 8, 10, 11, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 3, 1, 3], [1, 0, 2, 0, 3, 0, 2, 1, 0, 2, 2, 3], [2, 0, 3, 0, 3, 0, 1, 2, 0, 2, 1, 2], [1, 0, 3, 0, 2, 0, 2, 3, 0, 1, 2, 2], [2, 0, 2, 0, 2, 0, 1, 3, 0, 2, 3, 1], [3, 0, 2, 0, 1, 0, 2, 2, 0, 1, 3, 2], [3, 0, 1, 0, 2, 0, 3, 2, 0, 2, 2, 1], [2, 0, 2, 0, 1, 0, 3, 1, 0, 3, 2, 2]] \$$$

$$[y_8, 0, y_7, 0, y_6, 0, y_5, y_4, 0, y_3, y_2, y_1]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 1, 3, 1], [0, 1, 2, 3, 0, 2, 3, 0, 1, 0, 4, 0], [0, 0, 2, 4, 0, 3, 3, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 4, 2, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 3, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 3, 4, 0, 0, 0, 3, 0], [0, 0, 3, 3, 0, 2, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 3, 3, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 4, 2, 0, 0, 0, 3, 0]] \$$$

$$[0, y_7, y_6, y_5, 0, y_4, y_3, 0, y_7, y_2, y_1, y_2]$$

$$p' = s^3 - s^8 \quad p = s^3 - s^8$$

1503 . Coloring, {2, 3, 4, 5, 7, 8, 10}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, A, B, B, 2, 1, 5]

B: [6, 7, 7, 6, A, 3, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 3, 2, 0], [2, 3, 2, 0, 0, 0, 2, 3, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 2, 5, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 2, 2, 0, 2, 5, 0], [5, 2, 0, 0, 0, 0, 3, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 5, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 2, 0, 5, 2, 0], [2, 5, 0, 0, 0, 0, 2, 3, 0, 2, 2, 0]] \$$

$$[y_7, y_6, y_8, 0, y_5, 0, y_4, y_3, 0, y_2, y_1, 0]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 1, 2, 4], [0, 0, 2, 2, 0, 2, 1, 0, 4, 0, 2, 3], [0, 0, 2, 2, 0, 2, 2, 0, 3, 0, 1, 4], [0, 0, 2, 1, 0, 2, 2, 0, 4, 0, 2, 3], [0, 0, 2, 2, 0, 1, 2, 0, 3, 0, 2, 4], [0, 0, 1, 2, 0, 2, 2, 0, 4, 0, 2, 3], [0, 0, 2, 2, 0, 2, 1, 0, 3, 0, 2, 4], [0, 0, 2, 2, 0, 2, 2, 0, 4, 0, 1, 3]] \$$

$$[0, 0, 7y_7, 7y_6, 0, 7y_5, 7y_4, 0, 7y_3, 7y_2, -7y_7 - 7y_6 - 7y_5 - 7y_4 + 9y_3 + 9y_2 + 9y_1, 7y_1]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

1504 . Coloring, $\{2, 3, 4, 5, 7, 8, 11\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, A, B, B, C, 4, 5]

B: [6, 7, 7, 6, A, 3, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 5, 7, 8, 10, 11, 12\}\}$ order: 8
See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 3, 2, 2], [0, 0, 2, 2, 2, 0, 2, 1, 0, 2, 2, 3], [0, 0, 2, 2, 3, 0, 2, 2, 0, 2, 1, 2], [0, 0, 3, 1, 2, 0, 2, 2, 0, 2, 2, 2], [0, 0, 2, 2, 2, 0, 1, 3, 0, 2, 2, 2], [0, 0, 2, 2, 2, 0, 2, 2, 0, 1, 3, 2], [0, 0, 2, 3, 2, 0, 2, 2, 0, 2, 2, 1], [0, 0, 2, 2, 1, 0, 3, 2, 0, 2, 2, 2]] \$$

$$[0, 0, y_1, y_2, y_5, 0, y_3, y_4, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}, \{9, 12\}\}$ order: 10
See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 1, 2, 2], [2, 1, 2, 0, 0, 2, 3, 0, 2, 0, 2, 2], [2, 0, 2, 0, 0, 2, 3, 0, 2, 0, 3, 2], [3, 0, 2, 0, 0, 2, 2, 0, 2, 0, 3, 2], [3, 0, 2, 0, 0, 3, 2, 0, 2, 0, 2, 2], [2, 0, 3, 0, 0, 3, 2, 0, 2, 0, 2, 2], [2, 0, 3, 0, 0, 2, 3, 0, 2, 0, 2, 2], [2, 0, 2, 0, 0, 2, 3, 0, 2, 0, 3, 2], [3, 0, 2, 0, 0, 2, 2, 0, 2, 0, 3, 2]] \$$

$$[y_3, y_1, y_2, 0, 0, -y_3 - y_1 - y_2 - y_5 - y_4 - y_6 + 6y_7, y_5, 0, y_7, y_4, y_6, y_7]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

1505 . Coloring, $\{2, 3, 4, 5, 7, 8, 12\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, A, A, B, B, C, 1, 9]

B: [6, 7, 7, 6, A, 3, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 1, 2, 2, 4, 3] , [4, 0, 0, 0, 0, 0, 2, 0, 3, 2, 3, 2] , [3, 0, 0, 0, 0, 4, 0, 2, 2, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 0, 3, 0, 2, 3, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 3, 2, 3] , [2, 0, 0, 0, 0, 0, 2, 0, 3, 2, 4, 3]] \$

[y₈, 0, y₇, 0, 0, 0, y₆, y₅, y₄, y₃, y₂, y₁]

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 0, 0, 1, 2, 2] , [0, 1, 2, 2, 2, 2, 3, 0, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 2, 3, 0, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 2, 4, 0, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 3, 4, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 3, 2, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 4, 3, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 4, 3, 0, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 2, 4, 0, 0, 0, 3, 0]] \$

[0, y₉, y₈, y₇, y₆, y₅, y₄, 0, 0, y₃, y₂, y₁]

1506 . Coloring, {2, 3, 4, 5, 7, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, A, C, C, 2, 1, 5]

B: [6, 7, 7, 6, A, 3, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	8 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 2, 3, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 0, 5, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5]] \$

$$[y_8, y_7, y_6, 0, y_5, 0, y_4, y_3, 0, y_2, 0, y_1]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 1, 4, 2], [0, 0, 2, 4, 0, 2, 1, 0, 2, 0, 4, 1], [0, 0, 2, 4, 0, 4, 2, 0, 1, 0, 3, 0], [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 3, 4, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 3, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0]] \$$$

$$[0, 0, y_8, y_7, 0, y_6, y_5, 0, y_4, y_3, y_2, y_1]$$

1507 . Coloring, {2, 3, 4, 5, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, A, A, C, C, C, 4, 5]

B: [6, 7, 7, 6, A, 3, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 2, 1, 0, 2, 0, 5], [0, 0, 4, 0, 5, 0, 0, 2, 0, 2, 0, 3], [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3]] \$$$

$$[0, 0, y_2, y_3, y_4, 0, y_1, y_6, 0, y_7, 0, y_5]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 1, 4, 0], [4, 1, 2, 0, 0, 2, 3, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0]] \$$$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, 0, 2y_6, y_6, y_7, 0]$$

$$p = -s^3 + s^8$$

1508 . Coloring, {2, 3, 4, 5, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, A, C, C, C, 1, 9]

B: [6, 7, 7, 6, A, 3, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 3, 0, 4], [0, 0, 0, 0, 0, 0, 2, 1, 4, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[2y_1, 0, y_1, 0, 0, 0, -2y_1 + 2y_5, y_5, y_4, y_3, 0, y_2]$$

$$p' = s^4 - s^6 \quad p = s^4 - s^6$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 0, 0, 1, 4, 0], [0, 1, 2, 4, 0, 2, 3, 0, 0, 2, 2, 0], [0, 2, 2, 2, 0, 4, 3, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 2, 4, 0, 0, 0, 3, 0], [0, 0, 2, 3, 0, 3, 4, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 3, 2, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 4, 3, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 3, 0, 0, 0, 3, 0]] \$$$

$$[0, y_6, y_4, y_5, y_3, y_1, y_2, 0, 0, y_7, y_8, 0]$$

1509 . Coloring, {2, 3, 4, 5, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7 \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, A, A, C, B, 2, 4, 5]

B: [6, 7, 7, 6, A, 3, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	9 vs 9	6 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 0, 2, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 1, 5, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 0, 3, 0, 1, 0, 5] , [0, 1, 3, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3]] \$

$$[0, y_8, y_6, y_7, y_5, 0, y_4, y_3, 0, y_2, y_1, y_9]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 1, 3, 3] , [3, 0, 2, 0, 0, 2, 1, 0, 3, 0, 2, 3] , [2, 0, 2, 0, 0, 3, 2, 0, 3, 0, 1, 3] , [1, 0, 3, 0, 0, 2, 2, 0, 3, 0, 2, 3] , [2, 0, 2, 0, 0, 1, 3, 0, 3, 0, 2, 3] , [2, 0, 1, 0, 0, 2, 2, 0, 3, 0, 3, 3] , [3, 0, 2, 0, 0, 2, 1, 0, 3, 0, 2, 3] , [2, 0, 2, 0, 0, 3, 2, 0, 3, 0, 1, 3]] \$

$$[3 y_3, 0, 3 y_2, 0, 0, 3 y_1, -3 y_3 - 3 y_2 - 3 y_1 + 10 y_6 + 10 y_5 - 3 y_4, 0, 3 y_6, 3 y_5, 3 y_4, 3 y_6 + 3 y_5]$$

$$p = -s^2 + s^7 \quad p' = s^2 - s^7$$

1510 . Coloring, {2, 3, 4, 5, 7, 10, 12}

$$\Omega p(\Delta)=0: \quad p' = s^3 + 8s^5 - 8s^6 + 16s^7 \quad p' = s^2 + 8s^4 - 8s^5 + 16s^6 \quad p = s^2 - 8s^5 - 48s^6 + 64s^7 - 128s^8$$

R: [7, 8, 8, 7, 3, A, A, C, B, 2, 1, 9]

B: [6, 7, 7, 6, A, 3, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	9 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 2, 3, 1, 2, 2, 2], [2, 2, 0, 0, 0, 0, 1, 3, 2, 2, 1, 3], [1, 2, 0, 0, 0, 0, 2, 2, 3, 1, 2, 3], [2, 1, 0, 0, 0, 0, 1, 2, 3, 2, 3, 2], [3, 2, 0, 0, 0, 0, 2, 1, 2, 1, 3, 2], [3, 1, 0, 0, 0, 0, 3, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 0, 3, 1, 1, 3, 2, 2], [2, 3, 0, 0, 0, 0, 2, 2, 2, 3, 1, 1]] \$$

$$[y_1, y_2, y_3, 0, 0, 0, y_4, y_9, y_5, y_6, y_7, y_8]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}, \{5, 10, 12\}\}$

See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 2, 0, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 1, 0, 0, 2, 2, 1], [0, 0, 2, 2, 1, 3, 2, 0, 0, 3, 1, 2], [0, 0, 3, 1, 2, 2, 2, 0, 0, 1, 2, 3], [0, 0, 2, 2, 3, 1, 3, 0, 0, 2, 2, 1], [0, 0, 1, 2, 1, 2, 2, 0, 0, 3, 3, 2], [0, 0, 2, 3, 2, 2, 1, 0, 0, 1, 2, 3], [0, 0, 2, 2, 3, 3, 2, 0, 0, 2, 1, 1]] \$$

$$[0, 0, -3y_1 + 5y_2 - 3y_3 - 3y_4 + 5y_5 - 3y_6 + 5y_7, 3y_1, 3y_2, 3y_3, 3y_4, 0, 0, 3y_5, 3y_6, 3y_7]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

1511 . Coloring, $\{2, 3, 4, 5, 7, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 - 32s^7$$

R: [7, 8, 8, 7, 3, A, A, C, B, C, 4, 9]

B: [6, 7, 7, 6, A, 3, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 1, 3, 2, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 5, 2] , [0, 0, 0, 5, 0, 0, 3, 0, 2, 2, 3, 1] , [0, 0, 0, 3, 0, 0, 5, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 5, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 3, 2, 5]] \$

[0, 0, y₈, y₇, 0, 0, y₆, y₅, y₄, y₃, y₂, y₁]

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 3, 0, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 3, 3, 0, 0, 1, 3, 0] , [3, 1, 3, 0, 0, 2, 4, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 3, 4, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 3, 2, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 4, 3, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 3, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 2, 4, 0, 0, 0, 3, 0]] \$

[y₃, y₂, y₁, 0, y₉, y₈, y₇, 0, 0, y₆, y₅, y₄]

1512 . Coloring, {2, 3, 4, 5, 8, 9, 10}

$\Omega p(\Delta)=0: p = s^2 + 8s^5 - 48s^6 - 64s^7 - 128s^8 \quad p' = s^2 + 8s^4 + 8s^5 + 16s^6 \quad p'' = s^3 + 8s^5 + 8s^6 + 16s^7$

R: [7, 8, 8, 7, 3, A, B, B, C, 2, 1, 5]

B: [6, 7, 7, 6, A, 3, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
5 vs 8	9 vs 9	9 vs 9	7 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 0, 2, 3, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 0, 3, 3, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_1, y_6, y_7, 0, y_6, 0, y_5, y_4, 0, y_3, y_2, y_3]$$

$$p' = s^5 - s^8 \quad p = s^5 - s^8$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 3, 1, 3], [0, 0, 2, 1, 0, 2, 1, 0, 3, 2, 2, 3], [0, 0, 2, 2, 0, 1, 2, 0, 3, 1, 3, 2], [0, 0, 1, 3, 0, 2, 2, 0, 2, 2, 3, 1], [0, 0, 2, 3, 0, 3, 1, 0, 1, 2, 2, 2], [0, 0, 3, 2, 0, 3, 2, 0, 2, 1, 1, 2], [0, 0, 3, 1, 0, 2, 3, 0, 2, 2, 2, 1], [0, 0, 2, 2, 0, 1, 3, 0, 1, 3, 2, 2]] \$$$

$$[0, 0, y_7, y_6, 0, y_5, y_4, 0, y_3, y_2, y_1, y_7 + y_6 - y_5 - y_4 + y_3 + y_2 - y_1]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1513 . Coloring, {2, 3, 4, 5, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7 \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 + 32s^7 - 64s^8$$

R: [7, 8, 8, 7, 3, A, B, B, C, C, 4, 5]

B: [6, 7, 7, 6, A, 3, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 1, 3, 3], [0, 0, 2, 3, 3, 0, 2, 1, 0, 0, 4, 1], [0, 0, 3, 4, 1, 0, 3, 2, 0, 0, 3, 0], [0, 0, 1, 3, 0, 0, 4, 3, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 3, 1, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0]] \$$$

$$[0, 0, y_1, y_4, y_5, 0, y_2, y_3, 0, y_7, y_8, y_6]$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 3, 1, 1] , [1, 3, 2, 0, 0, 2, 3, 0, 1, 2, 2, 0] , [2, 2, 2, 0, 0, 1, 5, 0, 0, 3, 1, 0] , [1, 3, 1, 0, 0, 2, 4, 0, 0, 5, 0, 0] , [0, 5, 2, 0, 0, 1, 4, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 7, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0]] \$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, 0, y_6, y_7, y_8, y_9]$$

1514 . Coloring, {2, 3, 4, 5, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7$$

R: [7, 8, 8, 7, 3, A, B, B, C, C, 1, 9]

B: [6, 7, 7, 6, A, 3, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 8	7 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 1, 3, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3] , [3, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3]] \$

$$[3y_5, 0, 3y_4, 0, 0, 0, 3y_3, 3y_2, 3y_1, 3y_4, -3y_5 + 7y_4 - 3y_3 - 3y_2 + 10y_1, 3y_4 + 3y_1]$$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 0, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 1, 5, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_2, y_1, y_7, y_7, y_6, y_5, 0, 0, y_4, y_3, y_3]$$

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

1515 . Coloring, {2, 3, 4, 5, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 16s^5 - 8s^6 + 16s^7 + 64s^8 \quad p' = s^3 + 4s^4 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, 3, A, B, B, B, 2, 4, 5]

B: [6, 7, 7, 6, A, 3, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 1, 4, 0], [0, 1, 2, 4, 0, 0, 2, 3, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 4, 3, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$$$

$$[0, y_1, 2y_1 - 3y_6, y_2, 2y_6, 0, y_4, y_5, 0, y_6, y_3, 0]$$

$$p = s^4 - s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 3, 0, 4], [0, 0, 2, 0, 0, 2, 1, 0, 4, 2, 0, 5], [0, 0, 2, 0, 0, 0, 2, 0, 5, 1, 0, 6], [0, 0, 0, 0, 0, 2, 0, 6, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[-y_2 + y_1 + y_4 - y_5 - y_3 + y_6, 0, y_2, 0, 0, y_1, y_4, 0, y_5, y_3, 0, y_6]$$

$$p = -s^6 + s^7$$

1516 . Coloring, {2, 3, 4, 5, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p' = s^3 + 4s^4 + 8s^5 + 8s^6 + 16s^7 \quad p = s^3 - 8s^5 - 24s^6 - 16s^7 - 64s^8$$

R: [7, 8, 8, 7, 3, A, B, B, B, 2, 1, 9]

B: [6, 7, 7, 6, A, 3, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 2, 3, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 1, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_1, y_2, y_5, 0, 0, 0, y_4, y_3, 2y_5, y_5, y_6, 0]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 2, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 2, 1, 0, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 0, 2, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[0, 0, y_3, y_4, y_5, y_1, y_2, 0, 0, y_6, 0, y_7]$$

1517 . Coloring, {2, 3, 4, 5, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, B, B, B, C, 4, 9]

B: [6, 7, 7, 6, A, 3, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 1, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

[0, 0, $y_6, y_5, 0, 0, y_4, y_3, y_2, y_6, y_1, y_3$]

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

[$y_6, y_1, y_2, 0, y_3, y_3, y_4, 0, 0, y_5, 0, y_6$]

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1518 . Coloring, {2, 3, 4, 5, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 8s^5 - 8s^6 - 16s^7 \quad p' = s^3 - 8s^5 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, 3, A, B, C, C, 2, 4, 5]

B: [6, 7, 7, 6, A, 3, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}, \{3, 5, 8, 12\}\}$ order: 12
See Matrix

$\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 1, 2, 2], [0, 1, 2, 2, 2, 0, 2, 3, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 2, 3, 0, 0, 2, 3], [0, 0, 2, 2, 3, 0, 2, 2, 0, 0, 2, 3], [0, 0, 3, 2, 3, 0, 2, 2, 0, 0, 2, 2], [0, 0, 3, 2, 2, 0, 2, 3, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 2, 3, 0, 0, 2, 3], [0, 0, 2, 2, 3, 0, 2, 2, 0, 0, 2, 3], [0, 0, 3, 2, 3, 0, 2, 2, 0, 0, 2, 2]] \$$

$$[0, -2y_1 + 5y_4 - 2y_5, 2y_1, 2y_4, 2y_2, 0, 2y_4, 2y_3, 0, 5y_4 - 2y_2 - 2y_3, 2y_4, 2y_5]$$

$$p = -s^3 + s^4 - s^5 + s^6 \quad p = -s^3 + s^7 \quad p' = -s^4 + s^8 \quad p' = -s^3 + s^7$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 9, 10, 11, 12\}\}$ order: 8
See Matrix

$\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 3, 2, 2], [2, 0, 2, 0, 0, 2, 1, 0, 2, 2, 2, 3], [2, 0, 2, 0, 0, 2, 2, 0, 3, 1, 2, 2], [2, 0, 2, 0, 0, 2, 2, 3, 1], [3, 0, 2, 0, 0, 2, 2, 0, 1, 2, 2, 2], [2, 0, 2, 0, 0, 3, 2, 0, 2, 2, 1, 2], [1, 0, 3, 0, 0, 2, 2, 0, 2, 2, 2, 2], [2, 0, 2, 0, 0, 1, 3, 0, 2, 2, 2, 2]] \$$

$$[y_1, 0, -y_1 + y_7 + y_6 - y_5 - y_4 + y_3 + y_2, 0, 0, y_7, y_6, 0, y_5, y_4, y_3, y_2]$$

$$p = s - s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1519 . Coloring, $\{2, 3, 4, 5, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p' = s^3 + 8s^6 + 16s^7 \quad p = s^3 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, 3, A, B, C, C, 2, 1, 9]

B: [6, 7, 7, 6, A, 3, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 9	8 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 1, 2, 2], [2, 1, 0, 0, 0, 0, 2, 3, 2, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 1, 4, 0, 2, 5], [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5]] \$$

$$[2 y_3, 5 y_3 - 2 y_2 - 2 y_4, 2 y_2, 0, 0, 0, 2 y_3, 5 y_3 - 2 y_2 - 2 y_1, 2 y_1, 2 y_2, 2 y_3, 2 y_4]$$

$$p' = -s^6 + s^7 \quad p = s^4 - s^7 \quad p' = s^4 - s^6 \quad p' = s^5 - s^6 \quad p' = -s^6 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 2, 2, 2, 0, 0, 3, 2, 2], [0, 0, 2, 2, 2, 2, 1, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 2, 2, 0, 0, 3, 0, 4], [0, 0, \\ & 2, 0, 4, 0, 2, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 0, 2, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, \\ & 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$ \end{aligned}$$

$$[0, 0, y_5, y_4, y_3, y_2, y_1, 0, 0, y_7, y_6, y_8]$$

1520 . Coloring, {2, 3, 4, 5, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, B, C, C, C, 4, 9]

B: [6, 7, 7, 6, A, 3, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	3 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 0, 0, 2, 2, 2, 1, 2, 4], [0, 0, 0, 2, 0, 0, 2, 1, 4, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, \\ & 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, \\ & 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5]] \$ \end{aligned}$$

$$[0, 0, 5 y_2 - 2 y_3, 2 y_2, 0, 0, 2 y_2, -2 y_1 + 2 y_3, 2 y_1, 5 y_2 - 2 y_3, 2 y_2, 2 y_3]$$

$$p = -s^3 + s^5 \quad p = -s^3 + s^6 \quad p = -s^3 + s^7 \quad p = -s^3 + s^8 \quad p = -s^3 + s^4$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 3, 2, 0] , [2, 3, 2, 0, 0, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 2, 5, 0, 0, 3, 0, 0] , [0, 3, 2, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[y_1, y_2, y_3, 0, y_7, y_4, y_5, 0, 0, y_6, y_7, 0]$$

$$p = -s^5 + s^8$$

1521 . Coloring, {2, 3, 4, 5, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^2 + 2s^3 + 8s^5 + 32s^7 \quad p = -27s^2 + 56s^5 + 16s^6 + 256s^7 + 128s^8 \quad p = 9s^2 + 2s^4 - 16s^5 - 80s^7 - 32s^8$$

R: [7, 8, 8, 7, 3, A, B, C, B, 2, 4, 9]

B: [6, 7, 7, 6, A, 3, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	8 vs 9	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 2, 3, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 1, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$

$$[0, y_2, y_5, y_1, 0, 0, y_8, y_7, y_6, y_5, y_4, y_3]$$

$$p = s^6 - s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 1, 0, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 1, 2, 0, 0, 4, 0, 4] , [0, 0, 1, 0, 4, 0, 2, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[y_1, 0, y_3, 0, y_2, y_4, y_5, 0, 0, y_6, y_7, y_8]$$

1522 . Coloring, {2, 3, 4, 6, 7, 8, 9}

$$\Omega p(\Delta)=0: \quad p' = 3s^2 + 2s^3 + 8s^4 - 8s^5 - 32s^7 \quad p = 3s^2 + 5s^3 + 10s^4 - 8s^6 - 32s^7 - 32s^8$$

R: [7, 8, 8, 7, A, 3, A, B, C, C, 1, 5]

B: [6, 7, 7, 6, 3, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 2, 0, 2, 2, 0, 3, 1, 3], [1, 0, 0, 0, 3, 0, 2, 1, 0, 4, 2, 3], [2, 0, 0, 0, 3, 0, 1, 0, 0, 5, 1, 4], [1, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$$$

$$[y_5, 0, y_4, 0, y_3, 0, y_2, y_1, 0, y_8, y_7, y_6]$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 2, 2, 0, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 3, 0, 1, 2, 4, 0], [0, 2, 0, 4, 0, 3, 1, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 4, 2, 0, 0, 3, 1, 0], [0, 3, 0, 1, 0, 4, 2, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 1, 3, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 4, 0, 0, 1, 3, 0], [0, 1, 0, 3, 0, 2, 4, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 3, 1, 0, 0, 2, 4, 0]] \$$$

$$[0, y_7, y_8, y_6, 0, y_5, y_4, 0, y_3, y_2, y_1, y_8]$$

$$p = -s^3 + s^9$$

1523 . Coloring, {2, 3, 4, 6, 7, 8, 10}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, A, B, B, 2, 1, 5]

B: [6, 7, 7, 6, 3, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 2, 3, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 2, 4, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 3, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 3, 2, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 4, 2, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 2, 3, 0, 4, 2, 0]] \$

$$[y_1, y_2, y_3, 0, 2y_3, 0, y_5, y_4, 0, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 1, 2, 4] , [0, 0, 0, 2, 0, 2, 1, 0, 4, 2, 2, 3] , [0, 0, 0, 2, 0, 2, 0, 0, 3, 2, 1, 6] , [0, 0, 0, 1, 0, 2, 0, 0, 6, 2, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, y_1, y_2, 0, y_3, y_4, 0, y_5, y_6, y_7, y_8]$$

1524 . Coloring, {2, 3, 4, 6, 7, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, A, B, B, C, 4, 5]

B: [6, 7, 7, 6, 3, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 3, 2, 2] , [0, 0, 0, 2, 2, 0, 2, 1, 0, 4, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 0, 0, 4, 1, 4] , [0, 0, 0, 1, 4, 0, 2, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

[0, 0, $y_1, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8$]

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}, {9, 12}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 1, 2, 2] , [2, 1, 0, 0, 0, 2, 3, 0, 2, 2, 2, 2] , [2, 2, 0, 0, 0, 2, 1, 0, 2, 2, 3, 2] , [3, 2, 0, 0, 0, 2, 2, 0, 2, 2, 1, 2] , [1, 2, 0, 0, 0, 3, 2, 0, 2, 2, 2, 2] , [2, 2, 0, 0, 0, 1, 2, 0, 2, 3, 2, 2] , [2, 3, 0, 0, 0, 2, 2, 0, 2, 1, 2, 2] , [2, 1, 0, 0, 0, 2, 3, 0, 2, 2, 2, 2] , [2, 2, 0, 0, 0, 2, 1, 0, 2, 2, 3, 2]] \$

$[-y_1 - y_2 - y_3 - y_4 + 6y_7 - y_5 - y_6, y_1, y_2, 0, 0, y_3, y_4, 0, y_7, y_5, y_6, y_7]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

1525 . Coloring, {2, 3, 4, 6, 7, 8, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, 3, A, B, B, C, 1, 9]

B: [6, 7, 7, 6, 3, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 3, 2, 2] , [2, 0, 0, 0, 0, 0, 2, 1, 2, 2, 4, 3] , [4, 0, 0, 0, 0, 0, 2, 0, 3, 2, 3, 2] , [3, 0, 0, 0, 0, 4, 0, 2, 2, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 0, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 0, 3, 0, 2, 3, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 3, 2, 3] , [2, 0, 0, 0, 0, 0, 2, 0, 3, 2, 4, 3]] \$$

$[y_1, 0, y_2, 0, 0, 0, y_6, y_5, y_4, y_3, y_7, y_8]$

Omega Rank for B : cycles: $\{\{2, 4, 6, 7, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 2, 0, 0, 1, 2, 2] , [0, 1, 2, 2, 2, 2, 3, 0, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 2, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 2, 4, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 2, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 3, 2, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 4, 2, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 3, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 3, 0, 0, 2, 3, 0]] \$$

$[0, y_7, y_4, y_5, y_6, y_3, y_2, 0, 0, y_1, y_9, y_8]$

1526 . Coloring, $\{2, 3, 4, 6, 7, 9, 10\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, 3, A, C, C, 2, 1, 5]

B: [6, 7, 7, 6, 3, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 2, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 2, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3]] \$$

$$[2 y_7, y_6, y_7, 0, y_5, 0, y_3, y_4, 0, y_2, 0, y_1]$$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 1, 4, 2], [0, 0, 0, 4, 0, 2, 1, 0, 2, 2, 4, 1], [0, 0, 0, 4, 0, 4, 0, 0, 1, 2, 3, 2], [0, 0, 0, 3, 0, 4, 0, 0, 2, 4, 1, 2], [0, 0, 0, 1, 0, 3, 0, 0, 2, 4, 2, 4], [0, 0, 0, 2, 0, 1, 0, 0, 4, 3, 2, 4], [0, 0, 0, 2, 0, 2, 0, 0, 4, 1, 4, 3], [0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 4, 1]] \$$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, 0, y_5, y_6, y_7, y_8]$$

1527 . Coloring, {2, 3, 4, 6, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, A, C, C, C, 4, 5]

B: [6, 7, 7, 6, 3, A, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 3, 0, 4], [0, 0, 0, 0, 4, 0, 2, 1, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$$

$$[0, 0, y_2, 2 y_2, y_1, 0, -2 y_2 + 2 y_5, y_5, 0, y_4, 0, y_3]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 1, 4, 0] , [4, 1, 0, 0, 0, 2, 3, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 4, 1, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 4, 2, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 3, 2, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 1, 4, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 4, 0, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 2, 3, 0, 0, 2, 4, 0]] \$

$$[y_1, y_2, y_3, 0, 0, y_5, y_4, 0, 2y_3, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

1528 . Coloring, {2, 3, 4, 6, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, 3, A, C, C, C, 1, 9]

B: [6, 7, 7, 6, 3, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 1, 4, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[2y_1, 0, y_1, 0, 0, 0, -2y_1 + 2y_4, y_4, y_5, y_3, 0, y_2]$$

$$p' = s^4 - s^6 \quad p = s^4 - s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 0, 0, 1, 4, 0] , [0, 1, 2, 4, 0, 2, 3, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 2, 2, 0, 0, 4, 3, 0] , [0, 4, 0, 3, 0, 3, 2, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 3, 4, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 2, 0, 0, 3, 4, 0] , [0, 3, 0, 4, 0, 2, 3, 0, 0, 2, 2, 0]] \$

$$[0, y_5, y_6, y_7, y_8, y_4, y_1, 0, 0, y_2, y_3, 0]$$

1529 . Coloring, {2, 3, 4, 6, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7$$

R: [7, 8, 8, 7, A, 3, A, C, B, 2, 4, 5]

B: [6, 7, 7, 6, 3, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 9	8 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 3, 1, 1], [0, 3, 0, 1, 1, 0, 2, 3, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 1, 3, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 3, 0, 0, 3, 0], [0, 3, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3]] \$$$

$$[0, y_8, y_6, y_7, y_5, 0, y_4, y_3, 0, y_2, y_6, y_1]$$

$$p = s^4 - s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 1, 3, 3], [3, 0, 0, 0, 0, 2, 1, 0, 3, 2, 2, 3], [2, 0, 0, 0, 0, 3, 0, 0, 3, 2, 1, 5], [1, 0, 0, 0, 0, 2, 0, 0, 5, 3, 0, 5], [0, 0, 0, 0, 0, 1, 0, 0, 5, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[y_2, 0, y_1, 0, 0, y_5, y_4, 0, y_3, y_8, y_7, y_6]$$

1530 . Coloring, {2, 3, 4, 6, 7, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 8s^5 + 48s^6 + 128s^8 \quad p' = s^2 - 8s^4 + 24s^5 - 16s^6 + 64s^7 \quad p'' = s^3 - 4s^4 + 8s^5 - 8s^6 + 16s^7$$

R: [7, 8, 8, 7, A, 3, A, C, B, 2, 1, 9]

B: [6, 7, 7, 6, 3, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	9 vs 9	8 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 0, 2, 3, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 1, 3, 2, 2, 1, 3] , [1, 2, 0, 0, 0, 0, 2, 2, 3, 1, 2, 3] , [2, 1, 0, 0, 0, 0, 1, 2, 3, 2, 3, 2] , [3, 2, 0, 0, 0, 0, 2, 1, 2, 1, 3, 2] , [3, 1, 0, 0, 0, 0, 3, 2, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 0, 3, 1, 1, 3, 2, 2] , [2, 3, 0, 0, 0, 0, 2, 2, 2, 3, 1, 1]] \$

$[y_1, y_2, y_3, 0, 0, 0, y_4, y_5, y_8, y_6, y_7, y_9]$

Omega Rank for B : cycles: {{3, 4, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 2, 0, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 2, 1, 0, 0, 2, 2, 1] , [0, 0, 3, 2, 1, 3, 2, 0, 0, 2, 1, 2] , [0, 0, 1, 1, 2, 2, 3, 0, 0, 3, 2, 2] , [0, 0, 2, 2, 2, 1, 1, 0, 0, 2, 3, 3] , [0, 0, 2, 3, 3, 2, 2, 0, 0, 1, 1, 2] , [0, 0, 3, 1, 2, 3, 2, 0, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 1, 3, 0, 0, 3, 2, 2]] \$

$[0, 0, y_7, y_6, y_5, y_4, y_3, 0, 0, y_2, y_1, y_8]$

1531 . Coloring, {2, 3, 4, 6, 7, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^5 - 32s^7 \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 - 32s^7 + 64s^8$$

R: [7, 8, 8, 7, A, 3, A, C, B, C, 4, 9]

B: [6, 7, 7, 6, 3, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 1, 3, 2, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 5, 2] , [0, 0, 0, 5, 0, 0, 3, 0, 2, 2, 3, 1] , [0, 0, 0, 3, 0, 0, 5, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 5, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 3, 2, 5]] \$

[0, 0, $y_7, y_8, 0, 0, y_3, y_4, y_5, y_6, y_2, y_1$]

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 3, 0, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 3, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 3, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 2, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 3, 0, 0, 2, 3, 0]] \$

[$y_4, y_1, y_2, 0, y_3, y_5, y_6, 0, 0, y_7, y_8, y_9$]

1532 . Coloring, {2, 3, 4, 6, 8, 9, 10}

$\Omega p(\Delta)=0$: $p = s^2 + s^3 + 24s^6 - 16s^7 + 64s^8$ $p' = -s^2 + 8s^4 + 24s^5 + 16s^6 + 64s^7$ $p'' = s^2 + 2s^3 - 8s^5 - 32s^7$

R: [7, 8, 8, 7, A, 3, B, B, C, 2, 1, 5]

B: [6, 7, 7, 6, 3, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 1, 3, 1] , [3, 1, 0, 0, 1, 0, 2, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 3, 1, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 4, 2, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 5, 1, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]] \$

6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0]] \$

[y₅, y₆, y₈, 0, y₁, 0, y₂, y₃, 0, y₄, y₇, y₈]

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 2, 1, 0, 3, 4, 2, 3] , [0, 0, 0, 2, 0, 1, 0, 0, 3, 3, 3, 4] , [0, 0, 0, 3, 0, 2, 0, 0, 4, 1, 3, 3] , [0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 4, 1] , [0, 0, 0, 4, 0, 3, 0, 0, 1, 3, 3, 2] , [0, 0, 0, 3, 0, 4, 0, 0, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 3, 0, 0, 3, 4, 2, 3]] \$

[0, 0, y₇, y₆, 0, y₅, y₄, 0, y₃, y₁, y₂, y₇ + y₆ - y₅ - y₄ + y₃ + y₁ - y₂]

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1533 . Coloring, {2, 3, 4, 6, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7 \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8$$

R: [7, 8, 8, 7, A, 3, B, B, C, C, 4, 5]

B: [6, 7, 7, 6, 3, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 8	8 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 1, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 1, 0, 2, 4, 1] , [0, 0, 0, 4, 1, 0, 3, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 3, 3] , [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 4, 1] , [0, 0, 0, 4, 1, 0, 3, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 1, 3, 3] , [0, 0, 0, 3, 3, 0, 3, 0, 0, 2, 4, 1]] \$

$$[0, 0, y_3, y_2, y_1, 0, 5y_1 - y_4 + 4y_3 + 4y_2 - 6y_5, y_4, 0, -2y_3 - 2y_2 - 4y_1 + 5y_5, y_5, 6y_1 + 5y_3 + 5y_2 - 8y_5]$$

$$p = s^3 - s^6 \quad p' = s^3 - s^6 \quad p'' = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6
See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 3, 1, 1], [1, 3, 0, 0, 0, 2, 3, 0, 1, 4, 2, 0], [2, 4, 0, 0, 0, 1, 3, 0, 0, 5, 1, 0], [1, 5, 0, 0, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 1, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$$$

$$[y_1, y_2, y_8, 0, 0, y_3, y_4, 0, y_5, y_6, y_7, y_8]$$

$$p = -s^6 + s^9$$

1534 . Coloring, {2, 3, 4, 6, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7$$

R: [7, 8, 8, 7, A, 3, B, B, C, C, 1, 9]

B: [6, 7, 7, 6, 3, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 9	8 vs 9	5 vs 8	6 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6
See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 1, 3, 3], [3, 0, 0, 0, 0, 0, 2, 1, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 3], [3, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 3]] \$$$

$$[3y_1, 0, 3y_3, 0, 0, 0, -3y_1 - 3y_5 + 7y_3 - 3y_2 + 10y_4, 3y_5, 3y_4, 3y_3, 3y_2, 3y_4 + 3y_3]$$

$$p' = s^4 - s^7 \quad p'' = -s^3 + s^6 \quad p''' = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 2, 2, 0, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[0, y_6, y_5, y_4, y_4, y_3, y_2, 0, 0, y_1, -y_5 + y_3, -y_5 + y_3]$$

$$p' = -s^5 + s^8 \quad p' = -s^4 + s^7 \quad p = s^4 - s^7$$

Â» SYNC'D !RANK'D

1535 . Coloring, {2, 3, 4, 6, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 8s^6 - 16s^7 \quad p' = s^3 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, A, 3, B, B, B, 2, 4, 5]

B: [6, 7, 7, 6, 3, A, A, C, C, C, 1, 9]

' See graph

' ' See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	4 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 2, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 4, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 2, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, y_3, y_2, y_1, 2y_2, 0, y_7, y_6, 0, y_5, y_4, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 2, 1, 0, 4, 4, 0, 5] , [0, 0, 0, 0, 0, 0, 0, 0, 5, 3, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[2y_4, 0, y_4, 0, 0, -2y_4 + 2y_3, y_3, 0, y_2, y_1, 0, 5y_4 - 3y_3 + y_2 + y_1]$$

$$p' = -s^4 + s^6 \quad p' = -s^4 + s^5 \quad p = s^4 - s^5$$

1536 . Coloring, {2, 3, 4, 6, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p' = s^3 + 8s^5 + 8s^6 + 16s^7 \quad p = s^3 + 8s^5 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, A, 3, B, B, B, 2, 1, 9]

B: [6, 7, 7, 6, 3, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 1, 4, 0], [4, 1, 0, 0, 0, 0, 2, 3, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 1, 0, 0, 5, 0], [5, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[y_1, y_2, y_5, 0, 0, 0, y_3, y_4, 2y_5, y_5, y_6, 0]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 1, 2, 2, 2, 0, 0, 3, 0, 4], [0, 0, 2, 0, 4, 2, 1, 0, 0, 4, 0, 3], [0, 0, 4, 0, 3, 0, 2, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 2, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 4, 0, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 3, 0, 0, 4, 0, 3]] \$$$

$$[0, 0, y_1, y_6, y_7, y_5, y_4, 0, 0, y_3, 0, y_2]$$

1537 . Coloring, {2, 3, 4, 6, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, 3, B, B, B, C, 4, 9]

B: [6, 7, 7, 6, 3, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 1, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, 0, y_2, y_6, 0, 0, y_5, y_4, y_3, y_2, y_1, y_4]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[y_4, y_5, y_6, 0, y_2, y_2, y_3, 0, 0, y_1, 0, y_4]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1538 . Coloring, {2, 3, 4, 6, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + s^4 + 4s^5 + 8s^7 - 16s^8 \quad p = -9s^3 - 8s^5 + 8s^6 - 16s^7 + 64s^8$$

R: [7, 8, 8, 7, A, 3, B, C, C, 2, 4, 5]

B: [6, 7, 7, 6, 3, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{2, 5, 8, 10, 12\}, \{4, 7, 11\}\}$

See Matrix

$\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 1, 2, 2], [0, 1, 0, 2, 2, 0, 2, 3, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 2, 1, 0, 2, 2, 3], [0, 2, 0, 2, 3, 0, 2, 2, 0, 2, 2, 1], [0, 2, 0, 2, 1, 0, 2, 2, 0, 3, 2, 2], [0, 3, 0, 2, 2, 0, 2, 2, 0, 1, 2, 2], [0, 1, 0, 2, 2, 0, 2, 3, 0, 2, 2, 2], [0, 2, 0, 2, 2, 0, 2, 1, 0, 2, 2, 3], [0, 2, 0, 2, 3, 0, 2, 2, 0, 2, 2, 1]] \$$

$$[0, y_1, -y_1 + 5y_6 - y_2 - y_3 - y_4 - y_5, y_6, y_2, 0, y_6, y_3, 0, y_4, y_6, y_5]$$

$$p' = s^2 - s^7 \quad p' = s^3 - s^8 \quad p = s^2 - s^7$$

Omega Rank for B : cycles: $\{\{1, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 3, 2, 2], [2, 0, 0, 0, 0, 2, 1, 0, 2, 4, 2, 3], [2, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 4, 2], [4, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 2], [3, 0, 0, 0, 0, 4, 0, 0, 2, 3, 2, 2], [2, 0, 0, 0, 0, 3, 0, 0, 2, 4, 2, 3]] \$$

$$[y_7, 0, y_4, 0, 0, y_5, y_6, 0, -y_7 - y_4 + y_5 + y_6 - y_1 + y_2 + y_3, y_1, y_2, y_3]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1539 . Coloring, $\{2, 3, 4, 6, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = 9s^3 - 16s^5 - 24s^6 - 16s^7 + 64s^8 \quad p' = 3s^3 + 4s^4 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, A, 3, B, C, C, 2, 1, 9]

B: [6, 7, 7, 6, 3, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 9	8 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}, \{1, 7, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 1, 2, 2], [2, 1, 0, 0, 0, 0, 2, 3, 2, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 1, 4, 0, 2, 5], [2, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 5]] \$$

$$[2y_2, 2y_3, 2y_4, 0, 0, 0, 2y_2, 5y_2 - 2y_4 - 2y_1, 2y_1, 2y_4, 2y_2, 5y_2 - 2y_3 - 2y_4]$$

$$p' = -s^5 + s^7 \quad p' = -s^5 + s^8 \quad p' = s^4 - s^5 \quad p' = -s^5 + s^6 \quad p = s^4 - s^6$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 2, 0, 0, 3, 2, 2], [0, 0, 2, 2, 2, 2, 1, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 2, 2, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 4, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2], [0, 0, 4, 0, 2, 0, 3, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4]] \$$

$$[0, 0, y_2, y_1, y_3, y_7, y_8, 0, 0, y_6, y_5, y_4]$$

1540 . Coloring, $\{2, 3, 4, 6, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, B, C, C, C, 4, 9]

B: [6, 7, 7, 6, 3, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	3 vs 8	6 vs 8

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 1, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 1, 4, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5]] \$

$$[0, 0, 2y_3, 2y_2, 0, 0, 2y_2, -2y_1 - 2y_3 + 5y_2, 2y_1, 2y_3, 2y_2, -2y_3 + 5y_2]$$

$$p' = -s^6 + s^7 \quad p' = s^3 - s^6 \quad p' = s^5 - s^6 \quad p' = s^4 - s^6 \quad p = s^3 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 3, 2, 0] , [2, 3, 2, 0, 0, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 2, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0]] \$

$$[y_2, y_3, y_1, 0, 2y_2 - 2y_1, y_5, y_6, 0, 0, y_4, 2y_2 - 2y_1, 0]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

1541 . Coloring, {2, 3, 4, 6, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 8s^4 - 8s^5 - 16s^6 \quad p' = s^3 - 8s^5 - 8s^6 - 16s^7 \quad p = s^2 - 8s^5 - 80s^6 - 64s^7 - 128s^8$$

R: [7, 8, 8, 7, A, 3, B, C, B, 2, 4, 9]

B: [6, 7, 7, 6, 3, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	8 vs 9	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 2, 3, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 1, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0]] \$

$$[0, y_1, y_6, y_5, 0, 0, y_4, y_3, y_2, y_6, y_8, y_7]$$

$$p = s^6 - s^9$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\begin{aligned} \$ [& [2, 0, 1, 0, 2, 2, 2, 0, 0, 3, 1, 3], [1, 0, 2, 0, 3, 2, 1, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 1, 2, 0, 0, 3, 0, 4], [0, 0, \\ & 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, \\ & 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4]] \$ \end{aligned}$$

$$[y_3, 0, y_2, 0, y_1, y_8, y_7, 0, 0, y_5, y_6, y_4]$$

1542 . Coloring, {2, 3, 4, 7, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, A, A, B, C, 2, 1, 5]

B: [6, 7, 7, 6, 3, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 7

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 0, 0, 2, 0, 2, 2, 0, 4, 1, 1], [1, 4, 0, 0, 1, 0, 2, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 1, 4, 0, 3, 2, 0], [2, 3, \\ & 0, 0, 0, 0, 2, 4, 0, 1, 4, 0], [4, 1, 0, 0, 0, 2, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 4, 1, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, \\ & 4, 2, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 3, 2, 0, 4, 2, 0]] \$ \end{aligned}$$

$$[y_5, y_4, 0, 0, y_3, 0, y_2, y_1, 0, y_8, y_7, y_6]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 0, 2, 2, 0, 2, 0, 3, 3] , [0, 0, 2, 3, 0, 2, 2, 0, 3, 0, 4, 0] , [0, 0, 2, 4, 0, 3, 2, 0, 0, 0, 5, 0] , [0, 0, 3, 5, 0, 4, 2, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 5, 3, 0, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 2, 4, 0, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 2, 5, 0, 0, 0, 4, 0]] \$

$$[0, 0, y_7, y_6, 0, y_5, y_4, 0, y_3, 0, y_2, y_1]$$

1543 . Coloring, {2, 3, 4, 7, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, A, A, B, C, C, 4, 5]

B: [6, 7, 7, 6, 3, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 0, 2, 2, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 4, 2, 4] , [0, 0, 0, 2, 4, 0, 1, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[0, 0, 0, y_1, y_2, 0, y_3, y_7, 0, y_4, y_5, y_6]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 0, 2, 2, 0, 2, 0, 3, 1] , [3, 0, 2, 0, 0, 2, 4, 0, 1, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 2, 0, 0, 0, 5, 0] , [5, 0, 3, 0, 0, 4, 2, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 5, 3, 0, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 2, 4, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 2, 5, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 2, 0, 0, 0, 5, 0]] \$

$$[y_1, 2 y_7, y_2, 0, 0, y_3, y_4, 0, y_5, 0, y_6, y_7]$$

$$p = s^3 - s^8$$

1544 . Coloring, {2, 3, 4, 7, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, A, A, B, C, C, 1, 9]

B: [6, 7, 7, 6, 3, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 0, 0, 0, 0, 0, 2, 2, 2, 4, 1, 3], [1, 0, 0, 0, 0, 0, 2, 0, 3, 2, 2, 6], [2, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 5], [0, 0, \\ & 0, 0, 0, 0, 2, 0, 5, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, \\ & 0, 0, 0, 10, 0, 0, 6]] \$ \end{aligned}$$

$$[y_1, 0, 0, 0, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\begin{aligned} \$ [& [0, 2, 2, 2, 2, 2, 0, 0, 0, 3, 1], [0, 0, 4, 3, 1, 2, 4, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0], [0, 0, \\ & 3, 4, 0, 2, 3, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 3, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 2, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 3, \\ & 4, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 4, 0, 0, 0, 4, 0]] \$ \end{aligned}$$

$$[0, 2y_7, y_5, y_4, y_1, y_2, y_3, 0, 0, 0, y_6, y_7]$$

$$p = -s^3 + s^8$$

1545 . Coloring, {2, 3, 4, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 + 32s^7$$

R: [7, 8, 8, 7, A, A, A, B, B, 2, 4, 5]

B: [6, 7, 7, 6, 3, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 7	2 vs 7

Omega Rank for R : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 0, 2, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 4, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 2, 4, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 4, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 4, 2, 0, 4, 2, 0]] \$$

$$[0, y_6, 0, y_5, y_4, 0, y_3, y_2, 0, y_1, -y_6 + y_5 - y_4 - y_3 + y_2 + y_1, 0]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$\$ [[2, 0, 2, 0, 0, 2, 2, 0, 2, 0, 2, 4], [2, 0, 2, 0, 0, 2, 2, 0, 4, 0, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 0, 2, 4], [2, 0, 2, 0, 0, 2, 2, 0, 4, 0, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 0, 2, 4], [2, 0, 2, 0, 0, 2, 2, 0, 4, 0, 2, 2], [2, 0, 2, 0, 0, 2, 2, 0, 2, 0, 2, 4]] \$$

$$[y_2, 0, y_2, 0, 0, y_2, y_2, 0, 3y_2 - y_1, 0, y_2, y_1]$$

$$p' = -s^2 + s^6 \quad p = s - s^3 \quad p' = s - s^3 \quad p' = -s^2 + s^4 \quad p' = -s^3 + s^5$$

1546 . Coloring, $\{2, 3, 4, 7, 8, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 - 8s^5 - 32s^7 \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 - 32s^7 - 64s^8$$

R: [7, 8, 8, 7, A, A, A, B, B, 2, 1, 9]

B: [6, 7, 7, 6, 3, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	7 vs 7

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 0, 0, 0, 0, 2, 2, 2, 4, 2, 0], [2, 4, 0, 0, 0, 0, 2, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 4, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 4, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 4, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 2, 4, 0, 4, 2, 0]] \$$

$$[y_6, y_5, 0, 0, 0, 0, y_4, y_3, y_2, y_1, y_7, 0]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5
See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 0, 0, 0, 2, 4], [0, 0, 4, 2, 4, 2, 2, 0, 0, 0, 2, 0], [0, 0, 6, 2, 0, 2, 4, 0, 0, 0, 2, 0], [0, 0, 2, 2, 0, 2, 6, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 2, 0, 0, 0, 6, 0], [0, 0, 2, 6, 0, 4, 2, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 6, 2, 0, 0, 0, 2, 0]] \$$

$$[0, 0, y_7, y_6, y_5, y_4, y_3, 0, 0, 0, y_2, y_1]$$

1547 . Coloring, $\{2, 3, 4, 7, 8, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^5 + 32s^7 \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 + 32s^7 - 64s^8$$

R: [7, 8, 8, 7, A, A, A, B, B, C, 4, 9]

B: [6, 7, 7, 6, 3, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 9, 10, 11, 12\}\}$ order: 6
See Matrix

\$ [[0, 0, 0, 2, 0, 0, 2, 2, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 0, 2, 2, 4, 4] , [0, 0, 0, 4, 0, 0, 2, 0, 4, 2, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 0, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 0, 2, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 4, 2, 2]] \$

[0, 0, 0, y₇, 0, 0, y₅, y₆, y₂, y₃, y₄, y₁]

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 2, 0, 0, 0, 2, 2] , [2, 0, 4, 0, 2, 2, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 2, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 4, 2, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 4, 0, 0, 0, 4, 0]] \$

[y₇, y₆, y₄, 0, y₁, y₂, y₃, 0, 0, 0, y₅, y₆]

$$p = -s^3 + s^8$$

1548 . Coloring, {2, 3, 4, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7 \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 + 32s^7 - 64s^8$$

R: [7, 8, 8, 7, A, A, A, C, C, 2, 4, 5]

B: [6, 7, 7, 6, 3, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	7 vs 7

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 0, 2, 2, 0, 2, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 2, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 2, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 2, 0, 4, 0, 2]] \$

[0, y₇, 0, y₆, y₅, 0, y₄, y₃, 0, y₂, 0, y₁]

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[2, 0, 2, 0, 0, 2, 2, 0, 2, 0, 4, 2], [4, 0, 2, 0, 0, 2, 2, 0, 2, 0, 4, 0], [4, 0, 2, 0, 0, 4, 2, 0, 0, 0, 4, 0], [4, 0, 4, 0, 0, 4, 2, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 4, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 2, 4, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 4, 0, 0, 0, 4, 0]] \$$

$$[y_3, 0, y_2, 0, 0, y_1, y_7, 0, y_6, 0, y_5, y_4]$$

1549 . Coloring, $\{2, 3, 4, 7, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7$$

R: [7, 8, 8, 7, A, A, A, C, C, 2, 1, 9]

B: [6, 7, 7, 6, 3, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	7 vs 7

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 0, 2, 2, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 2, 2, 2, 2, 0, 4], [0, 2, 0, 0, 0, 0, 0, 4, 4, 2, 0, 4], [0, 2, 0, 0, 0, 0, 0, 2, 4, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$$

$$[y_2, y_1, 0, 0, 0, 0, y_7, y_3, y_6, y_5, 0, y_4]$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 2, 0, 0, 0, 4, 2], [0, 0, 4, 4, 2, 2, 2, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 4, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 2, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 2, 0, 0, 0, 4, 0], [0, 0, 4, 4, 0, 4, 2, 0, 0, 0, 2, 0]] \$$

$$[0, 0, y_1, y_5, y_4, y_3, y_2, 0, 0, 0, y_7, y_6]$$

1550 . Coloring, {2, 3, 4, 7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 - 8s^5 + 32s^7$$

R: [7, 8, 8, 7, A, A, A, C, C, C, 4, 9]

B: [6, 7, 7, 6, 3, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 6	6 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[0, 0, 0, 2, 0, 0, 2, 2, 2, 4, 0, 4], [0, 0, 0, 0, 0, 0, 2, 0, 4, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10], [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$$$

$$[0, 0, 0, y_5, 0, 0, y_4, y_5, y_3, y_2, 0, y_1]$$

$$p = s^4 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 2, 2, 0, 2, 2, 2, 0, 0, 0, 4, 0], [4, 0, 4, 0, 0, 2, 4, 0, 0, 0, 2, 0], [2, 0, 2, 0, 0, 4, 4, 0, 0, 0, 4, 0], [4, 0, 4, 0, 0, 2, 2, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 4, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 2, 0, 0, 0, 4, 0], [4, 0, 4, 0, 0, 2, 4, 0, 0, 0, 2, 0]] \$$$

$$[y_1, y_3, y_4, 0, y_3, y_2, y_6, 0, 0, 0, y_5, 0]$$

$$p = -s^2 + s^7$$

1551 . Coloring, {2, 3, 4, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, A, A, C, B, 2, 4, 9]

B: [6, 7, 7, 6, 3, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 7

Omega Rank for R : cycles: {{2, 4, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 2, 0, 2, 0, 0, 2, 2, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 2, 2, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 1, 4, 2, 2, 1, 2] , [0, 2, 0, 1, 0, 0, 2, 2, 2, 1, 2, 4] , [0, 1, 0, 2, 0, 0, 1, 2, 4, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 2, 1, 2, 1, 4, 2] , [0, 1, 0, 4, 0, 0, 2, 2, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 0, 4, 1, 1, 2, 2, 2]] \$

$$[0, y_7, 0, y_8, 0, 0, y_1, y_2, y_3, y_4, y_5, y_6]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 2, 0, 0, 0, 3, 3] , [3, 0, 4, 0, 3, 2, 2, 0, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 3, 4, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 2, 5, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 3, 0, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 4, 2, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 5, 2, 0, 0, 0, 2, 0]] \$

$$[y_4, 0, y_5, 0, y_6, y_7, y_1, 0, 0, 0, y_2, y_3]$$

1552 . Coloring, {2, 3, 4, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 8s^5 - 24s^6 - 16s^7 - 64s^8 \quad p' = s^3 + 4s^4 + 8s^5 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, A, A, B, B, C, 2, 4, 5]

B: [6, 7, 7, 6, 3, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 2, 0, 2, 2, 0, 2, 2, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 2, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 3, 2, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 4, 2, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0]] \$

[0, y₁, 0, y₂, y₇, 0, y₅, y₆, 0, y₄, y₃, y₈]

Omega Rank for B : cycles: {{1, 3, 6, 7, 9, 10, 11, 12}} order: 8
See Matrix

\$ [[2, 0, 2, 0, 0, 2, 2, 0, 2, 2, 1, 3] , [1, 0, 2, 0, 0, 2, 2, 0, 3, 2, 2, 2] , [2, 0, 2, 0, 0, 1, 2, 0, 2, 2, 3, 2] , [3, 0, 1, 0, 0, 2, 2, 0, 2, 2, 2, 2] , [2, 0, 2, 0, 0, 3, 1, 0, 2, 2, 2, 2] , [2, 0, 3, 0, 0, 2, 2, 0, 2, 1, 2, 2] , [2, 0, 2, 0, 0, 2, 3, 0, 2, 2, 2, 1] , [2, 0, 2, 0, 0, 2, 2, 0, 1, 3, 2, 2]] \$

[-y₁ + y₂ + y₃ - y₇ - y₄ + y₅ + y₆, 0, y₁, 0, 0, y₂, y₃, 0, y₇, y₄, y₅, y₆]

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1553 . Coloring, {2, 3, 4, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 16s^5 - 8s^6 + 16s^7 + 64s^8 \quad p' = s^3 + 4s^4 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, A, A, B, B, C, 2, 1, 9]

B: [6, 7, 7, 6, 3, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 0, 2, 2, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 2, 2, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 2, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2]] \$$

$$[-3 y_1 - 3 y_2 - 3 y_3 + 13 y_4 - 3 y_5 - 3 y_6 + 13 y_7, 3 y_1, 0, 0, 0, 0, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7]$$

$$p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 2, 0, 0, 2, 1, 3], [0, 0, 4, 1, 3, 2, 2, 0, 0, 2, 0, 2], [0, 0, 5, 0, 2, 1, 4, 0, 0, 2, 0, 2], [0, 0, 3, 0, 2, 0, 5, 0, 0, 4, 0, 2], [0, 0, 2, 0, 2, 0, 3, 0, 0, 5, 0, 4], [0, 0, 2, 0, 4, 0, 2, 0, 0, 3, 0, 5], [0, 0, 4, 0, 5, 0, 2, 0, 0, 2, 0, 3], [0, 0, 5, 0, 3, 0, 4, 0, 0, 2, 0, 2]] \$$

$$[0, 0, y_8, y_7, y_6, y_5, y_4, 0, 0, y_3, y_2, y_1]$$

1554 . Coloring, $\{2, 3, 4, 8, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, A, B, B, C, C, 4, 9]

B: [6, 7, 7, 6, 3, 3, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}, \{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 0, 0, 2, 2, 2, 2, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 0, 4, 4], [0, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2, 3], [0, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 2, 4], [0, 0, 0, 2, 0, 0, 4, 0, 4, 0, 3, 3]] \$$

[0, 0, 0, 2 y₄, 0, 0, 2 y₅, 7 y₄ + 7 y₅ - 9 y₁ + 7 y₂ - 9 y₃, 2 y₁, 7 y₄ + 7 y₅ - 9 y₁ + 7 y₂ - 9 y₃, 2 y₂, 2 y₃]

$$p = -s^2 - s^3 + s^5 + s^6 \quad p' = -s^2 - s^3 + s^5 + s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 2, 0, 0, 2, 1, 1] , [1, 2, 4, 0, 1, 2, 4, 0, 0, 2, 0, 0] , [0, 2, 3, 0, 0, 1, 6, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

[y₃, y₄, y₅, 0, y₃, y₁, y₂, 0, 0, y₆, y₇, y₇]

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

1555 . Coloring, {2, 3, 4, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 8s^5 - 48s^6 - 64s^7 - 128s^8 \quad p' = s^2 + 8s^4 + 8s^5 + 16s^6 \quad p'' = s^3 + 8s^5 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, A, A, B, B, B, 2, 4, 9]

B: [6, 7, 7, 6, 3, 3, A, C, C, C, 1, 5]

' See graph

' ' See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
5 vs 8	8 vs 8	8 vs 8	6 vs 7	7 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 0, 2, 2, 2, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 2, 2, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 2, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

[0, y₃, 0, y₂, 0, 0, y₁, y₆, y₅, y₅, y₄, 0]

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 2, 2, 0, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 2, 2, 0, 0, 2, 0, 2] , [0, 0, 6, 0, 2, 0, 4, 0, 0, 2, 0, 2] , [0, 0, 2, 0, 2, 0, 6, 0, 0, 4, 0, 2] , [0, 0, 2, 0, 2, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 0, 0, 2, 0, 6] , [0, 0, 4, 0, 6, 0, 2, 0, 0, 2, 0, 2]] \$$$

$$[y_1, 0, y_7, 0, y_5, y_6, y_4, 0, 0, y_3, 0, y_2]$$

1556 . Coloring, {2, 3, 4, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 9s^2 + 2s^4 - 16s^6 + 16s^7 - 96s^8 \quad p = -6s^2 + s^3 + 8s^6 - 16s^7 + 64s^8 \quad p = -27s^2 + 8s^5 + 48s^6 - 64s^7 + 256s^8$$

R: [7, 8, 8, 7, A, A, B, C, C, 2, 4, 9]

B: [6, 7, 7, 6, 3, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	5 vs 8	8 vs 8

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 0, 2, 2, 2, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 2, 2, 2, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 2, 4, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6]] \$$$

$$[0, y_1, 0, y_2, 0, 0, y_2, -y_1 - y_3 - y_4 + 5y_2 - y_5, y_3, y_4, y_2, y_5]$$

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6 \quad p = -s^4 + s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 2, 2, 0, 0, 2, 2, 2] , [2, 0, 4, 0, 2, 2, 2, 0, 0, 2, 0, 2] , [0, 0, 4, 0, 2, 2, 4, 0, 0, 2, 0, 2] , [0, 0, 4, 0, 2, 0, 4, 0, 0, 4, 0, 2] , [0, 0, 2, 0, 2, 0, 4, 0, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 0, 0, 4, 0, 4] , [0, 0, 4, 0, 4, 0, 2, 0, 0, 2, 0, 4] , [0, 0, 4, 0, 4, 0, 4, 0, 0, 2, 0, 2]] \$$$

$$[y_5, 0, y_4, 0, y_6, y_7, y_8, 0, 0, y_2, y_1, y_3]$$

1557 . Coloring, {2, 3, 5, 6, 7, 8, 9}

R: [7, 8, 8, 6, 3, 3, A, B, C, C, 1, 5]

B: [6, 7, 7, 7, A, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 8

Omega Rank for R : cycles: {{1, 3, 5, 7, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 1, 2, 0, 2, 1, 3] , [1, 0, 3, 0, 3, 0, 2, 2, 0, 1, 2, 2] , [2, 0, 3, 0, 2, 0, 1, 3, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 0, 2, 3, 0, 1, 3, 2] , [3, 0, 1, 0, 2, 0, 2, 2, 0, 2, 3, 1] , [3, 0, 2, 0, 1, 0, 3, 1, 0, 2, 2, 2] , [2, 0, 1, 0, 2, 0, 3, 2, 0, 3, 1, 2] , [1, 0, 2, 0, 2, 0, 2, 1, 0, 3, 2, 3] , [2, 0, 2, 0, 3, 0, 1, 2, 0, 2, 1, 3]] \$

$$[y_1, 0, y_7, 0, y_2, y_3, y_4, y_5, 0, y_6, y_9, y_8]$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 3, 0, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 0, 4, 0, 1, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, y_2, 0, y_3, 0, y_6, y_1, 0, y_4, y_4, y_5, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1558 . Coloring, {2, 3, 5, 6, 7, 8, 10}

$$\Omega p(\Delta)=0: \quad p = 6s^2 + s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, B, B, 2, 1, 5]

B: [6, 7, 7, 7, A, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	6 vs 7

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 2, 2, 0], [2, 2, 3, 0, 0, 0, 2, 4, 0, 1, 2, 0], [2, 1, 0, 0, 0, 0, 2, 5, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 1, 0, 2, 5, 0], [5, 2, 0, 0, 0, 0, 4, 2, 0, 2, 1, 0], [1, 2, 0, 0, 0, 0, 5, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 1, 2, 0, 5, 2, 0], [2, 5, 0, 0, 0, 0, 2, 4, 0, 1, 2, 0], [2, 1, 0, 0, 0, 0, 2, 5, 0, 2, 4, 0]] \$$

$$[y_8, y_6, y_7, 0, 2y_5, y_5, y_4, y_3, 0, y_2, y_1, 0]$$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 2, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 1, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 2, 5], [0, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 3, 5], [0, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 2, 5]] \$$

$$[0, 0, 0, 7y_2, 0, 9y_2 + 9y_1 - 7y_3 - 7y_4 + 9y_5 - 7y_6, 7y_1, 0, 7y_3, 7y_4, 7y_5, 7y_6]$$

$$p = s^3 + s^4 - s^6 - s^7$$

1559 . Coloring, $\{2, 3, 5, 6, 7, 8, 11\}$

$$\Omega p(\Delta)=0: \quad p = -6s^2 + s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, B, B, C, 4, 5]

B: [6, 7, 7, 7, A, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	9 vs 9	4 vs 8

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5
See Matrix

$\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 2, 2, 2], [0, 0, 3, 2, 2, 2, 0, 2, 0, 1, 2, 2], [0, 0, 4, 2, 2, 2, 0, 3, 0, 0, 2, 1], [0, 0, 4, 2, 1, 2, 0, 4, 0, 0, 3, 0], [0, 0, 3, 3, 0, 2, 0, 4, 0, 0, 4, 0], [0, 0, 2, 4, 0, 3, 0, 3, 0, 0, 4, 0], [0, 0, 3, 4, 0, 4, 0, 2, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 0, 3, 0, 0, 2, 0], [0, 0, 4, 2, 0, 3, 0, 4, 0, 0, 3, 0]] \$$

$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$

Omega Rank for B : cycles: $\{\{1, 2, 6, 7, 10, 11\}, \{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 2, 2, 2], [2, 2, 0, 0, 0, 2, 2, 0, 2, 1, 3, 2], [3, 1, 0, 0, 0, 2, 2, 0, 2, 2, 2, 2], [2, 2, 0, 0, 0, 3, 1, 0, 2, 2, 2, 2], [2, 2, 0, 0, 0, 2, 2, 0, 2, 3, 1, 2], [1, 3, 0, 0, 0, 2, 2, 0, 2, 2, 2, 2], [2, 2, 0, 0, 0, 1, 3, 0, 2, 2, 2, 2], [2, 2, 0, 0, 0, 2, 2, 0, 2, 1, 3, 2]] \$$

$[y_1, -y_1 + 2y_3, 0, 0, 0, -y_4 + 2y_3, y_4, 0, y_3, y_2, 2y_3 - y_2, y_3]$

$$p' = -s + s^7 \quad p' = -s^2 + s^3 - s^5 + s^6 \quad p' = s - s^2 + s^4 - s^5 \quad p = s - s^3 + s^4 - s^6$$

1560 . Coloring, $\{2, 3, 5, 6, 7, 8, 12\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, B, B, C, 1, 9]

B: [6, 7, 7, 7, A, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 2, 2, 2] , [2, 0, 1, 0, 0, 0, 2, 2, 2, 1, 4, 2] , [4, 0, 0, 0, 0, 0, 2, 1, 2, 2, 4, 1] , [4, 0, 0, 0, 0, 4, 0, 1, 2, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 4, 1, 2] , [1, 0, 0, 0, 0, 0, 3, 0, 2, 4, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 0, 4, 3, 2, 4] , [2, 0, 0, 0, 0, 0, 2, 0, 4, 1, 4, 3] , [4, 0, 0, 0, 0, 0, 2, 0, 3, 2, 4, 1]] \$

$$[y_3, 0, y_2, 0, 0, y_1, y_9, y_8, y_7, y_6, y_5, y_4]$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 2, 2, 2] , [0, 2, 0, 2, 2, 0, 4, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 4, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[0, y_7, 0, y_5, y_6, y_4, y_3, 0, 0, y_1, y_2, 2 y_4]$$

$$p = s^5 - s^8$$

1561 . Coloring, {2, 3, 5, 6, 7, 9, 10}

$$\Omega p(\Delta)=0: p = 2s^2 + 3s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, C, C, 2, 1, 5]

B: [6, 7, 7, 7, A, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	8 vs 9	7 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 0, 2, 4, 0, 1, 0, 2] , [0, 1, 2, 0, 2, 0, 0, 5, 0, 2, 0, 4] , [0, 2, 2, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3]] \$

$$[2 y_4, y_2, y_1, 0, y_3, y_4, y_6, y_5, 0, y_7, 0, y_8]$$

$$p = -s^5 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 2, 4, 2], [0, 0, 0, 4, 0, 0, 2, 0, 2, 1, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$$$

$$[0, 0, 0, y_7, 0, y_6, y_5, 0, y_4, y_3, y_2, y_1]$$

1562 . Coloring, {2, 3, 5, 6, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 3s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, C, C, C, 4, 5]

B: [6, 7, 7, 7, A, A, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 2, 0, 4], [0, 0, 3, 0, 4, 2, 0, 2, 0, 1, 0, 4], [0, 0, 6, 0, 4, 0, 0, 3, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 6, 0, 0, 0, 3], [0, 0, 3, 0, 3, 0, 0, 4, 0, 0, 0, 6], [0, 0, 3, 0, 6, 0, 0, 3, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 3, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 6, 0, 0, 0, 3]] \$$$

$$[0, 0, y_2, 2 y_3, y_1, -3 y_3 + 2 y_5, y_3, y_4, 0, y_5, 0, y_6]$$

$$p = s^3 - s^7 \quad p' = -s^3 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 2, 0, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 4, 2, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 5, 1, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 2, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 2, 4, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 1, 5, 0, 0, 2, 4, 0]] \$

$$[y_4, y_3, 0, 0, 0, y_2, y_1, 0, y_7, y_6, y_5, 0]$$

1563 . Coloring, {2, 3, 5, 6, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, C, C, C, 1, 9]

B: [6, 7, 7, 7, A, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	6 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 2, 0, 4] , [0, 0, 1, 0, 0, 0, 2, 2, 4, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 1, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[-6y_3 + 8y_4 - 4y_1, 0, -4y_3 + 6y_4 - 3y_1, 0, 0, -3y_3 + 4y_4 - 2y_1, y_3, y_4, y_5, y_1, 0, y_2]$$

$$p = s^4 - s^6 \quad p' = -s^5 + s^7 \quad p'' = s^4 - s^6$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 4, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[0, y_6, 0, y_5, 2y_4, y_4, y_3, 0, 0, y_2, y_1, 0]$$

$$p = s^4 - s^7$$

1564 . Coloring, {2, 3, 5, 6, 7, 10, 11}

R: [7, 8, 8, 6, 3, 3, A, C, B, 2, 4, 5]

B: [6, 7, 7, 7, A, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 10	7 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 2, 1, 1] , [0, 2, 3, 1, 1, 2, 0, 4, 0, 1, 0, 2] , [0, 1, 3, 0, 2, 1, 0, 5, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3]] \$

$$[0, y_2 + y_6, y_1 - y_6 + y_3 - y_5, y_4, y_1, y_2, y_6, y_3, 0, y_4, y_6, y_5]$$

$$p = s^4 - s^5 + s^6 - s^7 \quad p = -s^4 + s^8 \quad p' = -s^4 + s^8 \quad p = s^4 - s^5 - s^7 + s^{10}$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 3, 4] , [3, 0, 0, 0, 0, 3, 0, 0, 4, 2, 0, 4] , [0, 0, 0, 0, 3, 0, 0, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[y_7, 0, 0, 0, 0, y_6, y_5, 0, y_4, y_3, y_2, y_1]$$

1565 . Coloring, {2, 3, 5, 6, 7, 10, 12}

R: [7, 8, 8, 6, 3, 3, A, C, B, 2, 1, 9]

B: [6, 7, 7, 7, A, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	4 vs 7

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 2, 1, 1], [1, 2, 1, 0, 0, 0, 2, 4, 1, 1, 2, 2], [2, 1, 0, 0, 0, 0, 1, 3, 2, 2, 1, 4], [1, 2, 0, 0, 0, 0, 2, 1, 4, 1, 2, 3], [2, 1, 0, 0, 0, 0, 1, 2, 3, 2, 4, 1], [4, 2, 0, 0, 0, 0, 2, 1, 1, 1, 3, 2], [3, 1, 0, 0, 0, 0, 4, 2, 2, 2, 1, 1], [1, 2, 0, 0, 0, 0, 3, 1, 1, 4, 2, 2], [2, 4, 0, 0, 0, 0, 1, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 2, 4, 1, 1, 2, 2]] \$$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, y_7, y_8, y_9, y_{10}]$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}, \{4, 7, 11\}\}$ order: 3

See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 3, 3]] \$$

$$[0, 0, 0, y_2, -y_1 + y_3, y_1, y_4, 0, 0, y_2, y_3, y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = s^3 - s^6$$

1566 . Coloring, $\{2, 3, 5, 6, 7, 11, 12\}$

R: [7, 8, 8, 6, 3, 3, A, C, B, C, 4, 9]

B: [6, 7, 7, 7, A, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 2, 1, 3], [0, 0, 1, 1, 0, 2, 0, 2, 3, 1, 2, 4], [0, 0, 2, 2, 0, 1, 0, 1, 4, 0, 3, 3], [0, 0, 1, 3, 0, 2, 0, 2, 3, 0, 4, 1], [0, 0, 2, 4, 0, 3, 0, 1, 1, 0, 3, 2], [0, 0, 3, 3, 0, 4, 0, 2, 2, 0, 1, 1], [0, 0, 4, 1, 0, 3, 0, 3, 1, 0, 2, 2], [0, 0, 3, 2, 0, 1, 0, 4, 2, 0, 1, 3], [0, 0, 1, 1, 0, 2, 0, 3, 3, 0, 2, 4]] \$$

$[0, 0, y_9, y_8, 0, y_7, y_6, y_5, y_4, y_3, y_2, y_1]$

Omega Rank for B : cycles: $\{\{1, 2, 6, 7, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 2, 3, 1], [3, 2, 0, 0, 1, 2, 2, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 3, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 3, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 3, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 3, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 2, 0, 0, 3, 3, 0]] \$$

$[y_1, y_1 - y_7 - y_6 + y_5 + y_4 - y_3 + y_2, 0, 0, y_7, y_6, y_5, 0, 0, y_4, y_3, y_2]$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1567 . Coloring, $\{2, 3, 5, 6, 8, 9, 10\}$

R: [7, 8, 8, 6, 3, 3, B, B, C, 2, 1, 5]

B: [6, 7, 7, 7, A, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 7

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 0, 3, 1], [3, 0, 3, 0, 1, 0, 2, 4, 0, 0, 3, 0], [3, 0, 1, 0, 0, 0, 3, 3, 0, 0, 6, 0], [6, 0, 0, 0, 0, 3, 1, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0]] \$$

$$[y_7, 2y_4, y_6, 0, y_5, y_4, y_3, y_2, 0, 0, y_1, y_4]$$

$$p' = -s^5 + s^8 \quad p = s^5 - s^8$$

Omega Rank for B : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 4, 1, 3], [0, 0, 0, 1, 0, 0, 2, 0, 3, 4, 2, 4], [0, 0, 0, 2, 0, 0, 1, 0, 4, 2, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 1, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 2, 4, 1], [0, 0, 0, 4, 0, 0, 4, 0, 1, 3, 2, 2], [0, 0, 0, 2, 0, 0, 4, 0, 2, 4, 1, 3]] \$$$

$$[0, 0, 0, y_1 + y_2 - y_6 - y_3 + y_4 + y_5, 0, y_1, y_2, 0, y_6, y_3, y_4, y_5]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

1568 . Coloring, {2, 3, 5, 6, 8, 9, 11}

R: [7, 8, 8, 6, 3, 3, B, B, C, C, 4, 5]

B: [6, 7, 7, 7, A, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 0, 3, 3], [0, 0, 3, 3, 3, 2, 0, 2, 0, 0, 3, 0], [0, 0, 5, 3, 0, 3, 0, 3, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 0, 5, 0, 0, 3, 0], [0, 0, 3, 3, 0, 2, 0, 3, 0, 0, 5, 0], [0, 0, 2, 5, 0, 3, 0, 3, 0, 0, 3, 0], [0, 0, 3, 3, 0, 5, 0, 2, 0, 0, 3, 0], [0, 0, 5, 3, 0, 3, 0, 3, 0, 0, 2, 0]] \$$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_6, 0, 0, y_7, 3y_5]$$

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 2, 2, 0, 1, 4, 2, 0] , [2, 4, 0, 0, 0, 1, 4, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 2, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 1, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[y_1, y_2, 0, 0, 0, y_8, y_7, 0, y_3, y_4, y_5, y_6]$$

1569 . Coloring, {2, 3, 5, 6, 8, 9, 12}

R: [7, 8, 8, 6, 3, 3, B, B, C, C, 1, 9]

B: [6, 7, 7, 7, A, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	5 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 0, 3, 3] , [3, 0, 1, 0, 0, 0, 2, 2, 3, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 1, 2, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 2]] \$

$$[-5 y_1 - 5 y_2 - 5 y_7 - 5 y_3 + 11 y_4 - 5 y_5 + 11 y_6, 0, 5 y_1, 0, 0, 5 y_2, 5 y_7, 5 y_3, 5 y_4, 0, 5 y_5, 5 y_6]$$

$$p = s^4 + s^5 - s^7 - s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[0, y_1, 0, y_5, y_5, y_4, y_3, 0, 0, y_2, y_4, y_4]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6 \quad p' = s^4 - s^7$$

1570 . Coloring, {2, 3, 5, 6, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, B, B, 2, 4, 5]

B: [6, 7, 7, 7, A, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 8	4 vs 6

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\begin{aligned} \$ [& [0, 2, 2, 2, 2, 1, 1, 2, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 0, 4, 0, 0, 3, 0], [0, 0, 2, 3, 0, 4, 0, 3, 0, 0, 4, 0], [0, 0, \\ & 4, 4, 0, 3, 0, 2, 0, 0, 3, 0], [0, 0, 3, 3, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 3, 0, 3, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, \\ & 0, 4, 0, 0, 3, 0], [0, 0, 2, 3, 0, 4, 0, 3, 0, 0, 4, 0]] \$ \end{aligned}$$

$$[0, 2y_3, y_1, y_2, 2y_3, y_4, y_3, y_5, 0, 0, y_6, 0]$$

$$p = s^2 - s^7 \quad p' = s^2 - s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

$$\begin{aligned} \$ [& [2, 0, 0, 0, 0, 1, 3, 0, 2, 4, 0, 4], [0, 0, 0, 0, 0, 2, 0, 0, 4, 4, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, \\ & 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$ \end{aligned}$$

$$[-2y_1 + 2y_2 + 2y_3 - 2y_4, 0, 0, 0, 0, y_1, -3y_1 + 3y_2 + 3y_3 - 3y_4, 0, y_2, y_3, 0, y_4]$$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6$$

Â» SYNC'D !RANK'D

1571 . Coloring, {2, 3, 5, 6, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, B, B, 2, 1, 9]

B: [6, 7, 7, 7, A, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 8	5 vs 6

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 0, 4, 0] , [4, 0, 1, 0, 0, 0, 2, 4, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 4, 1, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_1, 2y_3, y_2, 0, 0, y_3, y_4, y_5, 2y_3, 0, y_6, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

$$[0, 0, 0, 2y_2, y_3, y_2, y_1, 0, 0, y_5, 0, y_4]$$

$$p = s^3 - s^6$$

Â» SYNC'D !RANK'D

1572 . Coloring, {2, 3, 5, 6, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, B, B, C, 4, 9]

B: [6, 7, 7, 7, A, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	5 vs 7

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 0, 4, 2], [0, 0, 1, 4, 0, 2, 0, 2, 2, 0, 5, 0], [0, 0, 2, 5, 0, 4, 0, 1, 0, 0, 4, 0], [0, 0, 4, 4, 0, 5, 0, 2, 0, 0, 1, 0], [0, 0, 5, 1, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 1, 0, 5, 0, 0, 4, 0], [0, 0, 1, 4, 0, 2, 0, 4, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 0, 1, 0, 0, 4, 0]] \$$

$[0, 0, y_3, y_2, 0, y_1, y_4, y_6, y_5, 0, y_7, 2 y_4]$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 3

See Matrix

$\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 4, 0, 2], [0, 4, 0, 0, 2, 2, 2, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$$

$[2 y_2 - 2 y_5, y_1, 0, 0, y_2, y_5, y_4, 0, 0, y_3, 0, 2 y_2 - 2 y_5]$

$$p' = -s^3 + s^6 \quad p = s^3 - s^6$$

1573 . Coloring, $\{2, 3, 5, 6, 9, 10, 11\}$

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 7s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, C, C, 2, 4, 5]

B: [6, 7, 7, 7, A, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	6 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8
See Matrix

\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 0, 2, 2] , [0, 0, 3, 2, 2, 2, 0, 4, 0, 0, 1, 2] , [0, 0, 4, 1, 2, 2, 0, 3, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 1, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$

[0, 2 y₃, y₆, y₅, y₁, y₂, y₃, y₄, 0, 0, y₇, y₈]

$$p = -s^5 + s^9$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 2, 0, 0, 2, 4, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 4, 2] , [4, 0, 0, 0, 0, 2, 0, 0, 2, 2, 4, 2] , [4, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 2] , [2, 0, 0, 0, 0, 4, 0, 0, 2, 4, 2, 2]] \$

[y₂, 0, 0, 0, 0, y₁, y₂ - y₁ + y₆ + y₅ - y₄ - y₃, 0, y₆, y₅, y₄, y₃]

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

1574 . Coloring, {2, 3, 5, 6, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, C, C, 2, 1, 9]

B: [6, 7, 7, 7, A, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 9	6 vs 7

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 0, 2, 2], [2, 0, 1, 0, 0, 0, 2, 4, 2, 0, 1, 4], [1, 0, 0, 0, 0, 0, 2, 1, 4, 0, 2, 6], [2, 0, 0, 0, 0, 1, 0, 6, 0, 2, 5], [2, 0, 0, 0, 0, 0, 2, 0, 5, 0, 1, 6], [1, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 5], [2, 0, 0, 0, 0, 0, 1, 0, 5, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 1, 5], [1, 0, 0, 0, 0, 0, 2, 0, 5, 0, 2, 6]] \$$

$[5 y_1, 10 y_2, 11 y_1 - 15 y_2 + 11 y_3 - 5 y_4 - 5 y_5 + 11 y_6 - 5 y_7, 0, 0, 5 y_2, 5 y_3, 5 y_4, 5 y_5, 0, 5 y_6, 5 y_7]$

$$p' = -s^4 - s^5 + s^7 + s^8 \quad p = s^4 + s^5 - s^7 - s^8$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 2, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$$

$[0, 0, 0, y_5, y_6, y_4, y_3, 0, 0, y_2, 2 y_4, y_1]$

$$p = s^4 - s^7$$

1575 . Coloring, $\{2, 3, 5, 6, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, C, C, C, 4, 9]

B: [6, 7, 7, 7, A, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	8 vs 8	6 vs 7

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 0, 2, 4], [0, 0, 1, 2, 0, 2, 0, 2, 4, 0, 1, 4], [0, 0, 2, 1, 0, 2, 0, 1, 4, 0, 0, 6], [0, 0, 2, 0, 0, 1, 0, 2, 6, 0, 0, 5], [0, 0, 1, 0, 0, 0, 0, 2, 5, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 1, 8, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]] \$$

0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[0, 0, y_1 , y_8 , 0, y_7 , y_6 , y_5 , y_4 , 0, y_2 , y_3]

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 2, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 2, 4, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

[y_1 , y_2 , 0, 0, y_6 , y_4 , y_3 , 0, 0, y_5 , y_6 , 0]

$$p = -s^4 + s^7$$

1576 . Coloring, {2, 3, 5, 6, 10, 11, 12}

R: [7, 8, 8, 6, 3, 3, B, C, B, 2, 4, 9]

B: [6, 7, 7, 7, A, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 7

Omega Rank for R : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 0, 3, 1] , [0, 0, 1, 3, 0, 2, 0, 4, 1, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 0, 1, 2, 0, 1, 4] , [0, 0, 3, 1, 0, 3, 0, 2, 4, 0, 2, 1] , [0, 0, 3, 2, 0, 1, 0, 3, 1, 0, 4, 2] , [0, 0, 1, 4, 0, 2, 0, 3, 2, 0, 1, 3] , [0, 0, 2, 1, 0, 4, 0, 1, 3, 0, 2, 3] , [0, 0, 4, 2, 0, 1, 0, 2, 3, 0, 3, 1] , [0, 0, 1, 3, 0, 2, 0, 4, 1, 0, 3, 2]] \$

[0, 2 y_5 , y_8 , y_6 , 0, y_7 , y_5 , y_4 , y_3 , 0, y_1 , y_2]

$$p = -s^2 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_1, 0, 0, 0, y_2, y_3, 3y_5, 0, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7$$

1577 . Coloring, {2, 3, 5, 7, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, A, B, C, 2, 1, 5]

B: [6, 7, 7, 7, A, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	9 vs 10	6 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 0, 2, 3, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 0, 1, 5, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 2, 3, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 0, 3, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 5, 1, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 3, 2, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 2, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 1, 5, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 2, 3, 0, 1, 5, 0]] \$

$$[y_3, y_2, y_1, 0, y_9, y_8, y_7, y_6, 0, y_5, y_4, y_8]$$

$$p = s^4 - s^{10}$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 3, 3] , [0, 0, 1, 3, 0, 0, 3, 0, 3, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, 0, -2y_4 + y_2, y_1, 0, y_4, y_6, 0, y_5, y_4, y_3, y_2]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

Â» SYNC'D !RANK'D

1578 . Coloring, {2, 3, 5, 7, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, A, B, C, C, 4, 5]

B: [6, 7, 7, 7, A, 3, B, C, B, 2, 1, 9]

' See graph

' ' See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	9 vs 9	7 vs 9

Omega Rank for R : cycles: {{3, 4, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 2, 0, 1, 0, 2, 2, 3] , [0, 0, 3, 2, 3, 1, 0, 2, 0, 2, 1, 2] , [0, 0, 3, 1, 2, 2, 0, 3, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 1, 0, 3, 0, 2, 3, 1] , [0, 0, 2, 3, 1, 2, 0, 2, 0, 1, 3, 2] , [0, 0, 1, 3, 2, 3, 0, 2, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 3, 0, 1, 0, 3, 2, 2] , [0, 0, 1, 2, 2, 2, 0, 2, 0, 3, 1, 3]] \$

$$[0, 0, y_5, y_4, y_1, y_2, y_3, y_6, 0, y_7, y_8, y_9]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 3, 1] , [3, 1, 1, 0, 0, 2, 3, 0, 1, 0, 5, 0] , [5, 0, 2, 0, 0, 3, 2, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 5, 2, 0, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 4, 3, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 5, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 2, 4, 0, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 3, 2, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 5, 2, 0, 0, 0, 2, 0]] \$

$$[y_1, y_6, y_7, 0, 0, y_4, y_5, 0, y_6, y_3, y_2, y_3]$$

$$p' = -s^3 + s^8 \quad p = -s^3 + s^8$$

1579 . Coloring, {2, 3, 5, 7, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 7s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, A, B, C, C, 1, 9]

B: [6, 7, 7, 7, A, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 1, 3], [1, 0, 0, 0, 0, 0, 2, 1, 3, 2, 2, 5], [2, 0, 0, 0, 0, 0, 1, 0, 5, 2, 1, 5], [1, 0, 0, 0, 0, 2, 0, 5, 1, 0, 7], [0, 0, 0, 0, 0, 0, 1, 0, 7, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[y₁, 0, y₅, 0, 0, y₅, y₄, y₂, y₃, y₈, y₆, y₇]

$$p = s^7 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 3, 1], [0, 1, 1, 3, 1, 0, 5, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 5, 0, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 5, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

[0, y₁, y₃ - y₇, y₂, y₃, y₇, y₄, 0, 0, y₅, y₆, y₇]

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

1580 . Coloring, {2, 3, 5, 7, 8, 10, 11}

R: [7, 8, 8, 6, 3, A, A, B, B, 2, 4, 5]

B: [6, 7, 7, 7, A, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 2, 0], [0, 3, 2, 2, 0, 2, 0, 3, 0, 2, 2, 0], [0, 2, 0, 2, 0, 2, 0, 5, 0, 2, 3, 0], [0, 2, 0, 3, 0, 2, 0, 2, 0, 2, 5, 0], [0, 2, 0, 5, 0, 3, 0, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 5, 0, 2, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 2, 0, 5, 2, 0], [0, 5, 0, 2, 0, 2, 0, 3, 0, 2, 2, 0], [0, 2, 0, 2, 0, 2, 0, 5, 0, 2, 3, 0]] \$$

$$[0, y_1, y_2, y_4, 2y_5, y_3, y_5, y_7, 0, y_6, y_8, 0]$$

$$p = s^3 - s^9$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 2, 4], [2, 0, 1, 0, 0, 2, 1, 0, 4, 0, 3, 3], [3, 0, 2, 0, 0, 2, 1, 0, 3, 0, 1, 4], [1, 0, 2, 0, 0, 3, 2, 0, 4, 0, 1, 3], [1, 0, 3, 0, 0, 1, 2, 0, 3, 0, 2, 4], [2, 0, 1, 0, 0, 1, 3, 0, 4, 0, 2, 3], [2, 0, 1, 0, 0, 2, 1, 0, 3, 0, 3, 4], [3, 0, 2, 0, 0, 2, 1, 0, 4, 0, 1, 3]] \$$

$$[-7y_1 - 7y_2 - 7y_3 + 9y_4 + 9y_5 - 7y_6 + 9y_7, 0, 7y_1, 0, 0, 7y_2, 7y_3, 0, 7y_4, 7y_5, 7y_6, 7y_7]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

1581 . Coloring, $\{2, 3, 5, 7, 8, 10, 12\}$

R: [7, 8, 8, 6, 3, A, A, B, B, 2, 1, 9]

B: [6, 7, 7, 7, A, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 4, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 3, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 3, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 3, 0, 2, 3, 0]] \$$

$$[y_1, y_2, y_3, 0, 0, y_3, y_5, y_4, 2y_3, y_7, y_6, 0]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 2, 4], [0, 0, 1, 2, 4, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 3, 0, 0, 4, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 3, 4], [0, 0, 0, 3, 4, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 3, 0, 0, 4, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 3, 4], [0, 0, 0, 3, 4, 0, 3, 0, 0, 2, 3, 1]] \$$

$$[0, 0, 3y_5, 3y_4, 3y_3, 3y_2, 3y_5 + 3y_4, 0, 0, 3y_1, 3y_5 + 3y_4 - 3y_2, 7y_5 + 7y_4 - 3y_3 - 3y_1]$$

$$p = s^3 - s^6 \quad p' = -s^3 + s^6 \quad p' = -s^4 + s^7$$

1582 . Coloring, $\{2, 3, 5, 7, 8, 11, 12\}$

R: [7, 8, 8, 6, 3, A, A, B, B, C, 4, 9]

B: [6, 7, 7, 7, A, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{4, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 2, 2], [0, 0, 0, 2, 0, 2, 0, 1, 2, 2, 4, 3], [0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 3, 2], [0, 0, 0, 3, 0, 4, 0, 0, 2, 2, 3, 2], [0, 0, 0, 3, 0, 3, 0, 0, 2, 4, 2, 2], [0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 2, 4], [0, 0, 0, 2, 0, 2, 0, 0, 4, 3, 2, 3], [0, 0, 0, 2, 0, 2, 0, 0, 3, 2, 4, 3], [0, 0, 0, 4, 0, 2, 0, 0, 3, 2, 3, 2]] \$$

$$[0, 0, y_3, y_1, 0, y_2, y_3, y_4, y_5, y_8, y_6, y_7]$$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 2, 2], [2, 1, 1, 0, 2, 2, 3, 0, 0, 2, 3, 0], [3, 2, 2, 0, 0, 2, 2, 0, 0, 2, 3, 0], [3, 2, \\ & 2, 0, 0, 3, 4, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, \\ & 3, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0]] \$ \end{aligned}$$

$$[y_3, y_2, y_1, 0, y_9, y_8, y_7, 0, 0, y_6, y_5, y_4]$$

1583 . Coloring, {2, 3, 5, 7, 9, 10, 11}

R: [7, 8, 8, 6, 3, A, A, C, C, 2, 4, 5]

B: [6, 7, 7, 7, A, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 0, 2], [0, 3, 2, 0, 2, 2, 0, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 0, 5, 0, 2, 0, 3], [0, 2, \\ & 2, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, \\ & 0, 5, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4]] \$ \end{aligned}$$

$$[0, y_1, y_2, 2y_4, y_6, y_3, y_4, y_5, 0, y_8, 0, y_7]$$

$$p = -s^5 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\begin{aligned} \$ [& [2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 4, 2], [4, 0, 1, 0, 0, 2, 1, 0, 2, 0, 5, 1], [5, 0, 2, 0, 0, 4, 1, 0, 1, 0, 3, 0], [3, 0, \\ & 4, 0, 0, 5, 2, 0, 0, 0, 2, 0], [2, 0, 5, 0, 0, 3, 4, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 2, 5, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, \\ & 3, 0, 0, 0, 5, 0], [5, 0, 2, 0, 0, 4, 2, 0, 0, 0, 3, 0]] \$ \end{aligned}$$

$$[y_2, 0, y_1, 0, 0, y_4, y_3, 0, y_8, y_7, y_6, y_5]$$

1584 . Coloring, {2, 3, 5, 7, 9, 10, 12}

R: [7, 8, 8, 6, 3, A, A, C, C, 2, 1, 9]

B: [6, 7, 7, 7, A, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 2, 3, 2, 2, 0, 4], [0, 2, 0, 0, 0, 0, 0, 3, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7], [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[2 y_6, y_7, y_6, 0, 0, y_6, y_5, y_4, y_3, y_2, 0, y_1]$$

$$p' = s^6 - s^8 \quad p = s^6 - s^8$$

Omega Rank for B : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 4, 2], [0, 0, 1, 4, 2, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 5, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 5, 2], [0, 0, 0, 5, 2, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 5, 0, 0, 2, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 5, 2], [0, 0, 0, 5, 2, 0, 3, 0, 0, 2, 3, 1]] \$$$

$$[0, 0, -3 y_5 - 7 y_3 + 14 y_2 + 8 y_1, 3 y_5, -5 y_3 + 7 y_2 + 7 y_1, 3 y_4, 3 y_3, 0, 0, 3 y_2, -3 y_4 - 7 y_3 + 8 y_2 + 14 y_1, 3 y_1]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p' = -s^4 + s^7$$

1585 . Coloring, {2, 3, 5, 7, 9, 11, 12}

R: [7, 8, 8, 6, 3, A, A, C, C, C, 4, 9]

B: [6, 7, 7, 7, A, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 1, 4, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, 0, y_5, 2 y_5, 0, -3 y_5 + 2 y_4, y_5, y_4, y_3, y_2, 0, y_1]$$

$$p' = s^5 - s^7 \quad p' = s^4 - s^6 \quad p = s^4 - s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 4, 0] , [4, 1, 1, 0, 0, 2, 3, 0, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 4, 2, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0]] \$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, 0, 0, y_7, y_8, 0]$$

1586 . Coloring, {2, 3, 5, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -2s^2 - s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, A, C, B, 2, 4, 9]

B: [6, 7, 7, 7, A, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 9, 10, 11, 12\}\}$ order: 8
See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 0, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 1, 0, 3, 2, 2, 1, 3], [0, 2, 0, 1, 0, 2, 0, 2, 3, 1, 2, 3], [0, 1, 0, 2, 0, 1, 0, 2, 3, 2, 3, 2], [0, 2, 0, 3, 0, 2, 0, 1, 2, 1, 3, 2], [0, 1, 0, 3, 0, 3, 0, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 3, 0, 1, 1, 3, 2, 2], [0, 3, 0, 2, 0, 2, 0, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 0, 3, 1, 2, 2, 2]] \$$

$$[0, y_9, y_7, y_8, 0, y_6, y_7, y_5, y_3, y_4, y_2, y_1]$$

$$p = -s^2 + s^{10}$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}, \{1, 3, 6, 7, 11\}\}$
See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 3, 3], [3, 0, 1, 0, 3, 2, 1, 0, 0, 2, 3, 1], [3, 0, 2, 0, 1, 3, 1, 0, 0, 3, 1, 2], [1, 0, 3, 0, 2, 3, 2, 0, 0, 1, 1, 3], [1, 0, 3, 0, 3, 1, 3, 0, 0, 2, 2, 1], [2, 0, 1, 0, 1, 1, 3, 0, 0, 3, 3, 2], [3, 0, 1, 0, 2, 2, 1, 0, 0, 1, 3, 3], [3, 0, 2, 0, 3, 3, 1, 0, 0, 2, 1, 1]] \$$

$$[3y_2, 0, -3y_2 + 5y_1 - 3y_7 - 3y_6 + 5y_5 - 3y_3 + 5y_4, 0, 3y_1, 3y_7, 3y_6, 0, 0, 3y_5, 3y_3, 3y_4]$$

$$p = s + s^2 + s^3 - s^6 - s^7 - s^8$$

1587 . Coloring, $\{2, 3, 5, 8, 9, 10, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, B, B, C, 2, 4, 5]

B: [6, 7, 7, 7, A, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 10	7 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 3, 1], [0, 1, 2, 3, 1, 2, 0, 3, 0, 1, 3, 0], [0, 1, 1, 3, 0, 3, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 0, 2, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 0, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 3, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 2, 0, 3, 3, 0]] \$$

$$[0, y_7, y_8, y_6, y_5, y_3, y_4, y_2, 0, y_1, -y_7 - y_8 + y_6 + y_5 - y_3 + y_2 + y_1, y_4]$$

$$p = s^4 - s^{10} \quad p' = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 1, 3], [1, 0, 1, 0, 0, 2, 1, 0, 3, 3, 2, 3], [2, 0, 2, 0, 0, 1, 1, 0, 3, 1, 3, 3], [3, 0, 1, 0, 0, 2, 2, 0, 3, 1, 3, 1], [3, 0, 2, 0, 0, 3, 1, 0, 1, 2, 3, 1], [3, 0, 3, 0, 0, 3, 2, 0, 1, 1, 1, 2], [1, 0, 3, 0, 0, 3, 3, 0, 2, 2, 1, 1], [1, 0, 3, 0, 0, 1, 3, 0, 1, 3, 2, 2]] \$$

$$[-y_3 + y_1 + y_2 - y_4 - y_5 + y_6 + y_7, 0, y_3, 0, 0, y_1, y_2, 0, y_4, y_5, y_6, y_7]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1588 . Coloring, $\{2, 3, 5, 8, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 - 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, B, B, C, 2, 1, 9]

B: [6, 7, 7, 7, A, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	8 vs 10	6 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 2, 3, 1, 1, 3, 2], [3, 1, 0, 0, 0, 0, 3, 1, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 3, 1, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 4, 0]] \$$

4, 2]] \$

[3 y₁, -3 y₁ - 6 y₈ - 3 y₇ - 3 y₆ + 13 y₅ - 3 y₄ - 3 y₃ + 13 y₂, 3 y₈, 0, 0, 3 y₈, 3 y₇, 3 y₆, 3 y₅, 3 y₄, 3 y₃, 3 y₂]

$$p' = s^5 + s^6 - s^8 - s^9 \quad p = s^5 - s^7 - s^8 + s^{10}$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 0, 3, 0, 0, 5, 0, 3] , [0, 0, 0, 0, 3, 0, 2, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

[0, 0, y₂, y₂ + y₆, y₁, y₆, y₅, 0, 0, y₄, y₆, y₃]

$$p' = -s^4 + s^7 \quad p = s^4 - s^7$$

Â» SYNC'D !RANK'D

1589 . Coloring, {2, 3, 5, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -2s^2 + 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, B, B, C, C, 4, 9]

B: [6, 7, 7, 7, A, 3, A, C, B, 2, 1, 5]

' See graph

' ' See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 10	9 vs 10	7 vs 9	7 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8
See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 1, 3, 1, 3, 3] , [0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 1, 4] , [0, 0, 0, 1, 0, 3, 0, 0, 4, 3, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_3, y_2, 0, y_1, y_3, -y_2 + y_1 - y_7 - y_6 + y_5 + y_4, y_7, y_6, y_5, y_4]$$

$$p' = s^7 - s^8 \quad p = s^7 - s^9$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 1, 1], [1, 3, 1, 0, 1, 2, 3, 0, 0, 5, 0, 0], [0, 5, 2, 0, 0, 1, 4, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 7, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0]] \$$$

$$[y_3, y_1, y_2, 0, y_3, y_4, y_5, 0, 0, y_6, y_7, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Â» SYNC'D !RANK'D

1590 . Coloring, {2, 3, 5, 8, 10, 11, 12}

R: [7, 8, 8, 6, 3, A, B, B, B, 2, 4, 9]

B: [6, 7, 7, 7, A, 3, A, C, C, C, 1, 5]

' See graph

' ' See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 7

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 4, 0], [0, 1, 0, 4, 0, 2, 0, 3, 0, 1, 5, 0], [0, 1, 0, 5, 0, 4, 0, 1, 0, 2, 3, 0], [0, 2, 0, 3, 0, 5, 0, 1, 0, 4, 1, 0], [0, 4, 0, 1, 0, 3, 0, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 1, 0, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 1, 0, 5, 0, 1, 4, 0], [0, 1, 0, 4, 0, 2, 0, 3, 0, 1, 5, 0], [0, 1, 0, 5, 0, 4, 0, 1, 0, 2, 3, 0]] \$$$

$$[0, y_6, y_5, y_4, 0, y_3, y_5, y_2, 2y_5, y_1, -y_6 + 2y_5 + y_4 - y_3 + y_2 + y_1, 0]$$

$$p' = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p' = s^2 - s^8 \quad p = s^2 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 2, 1, 0, 0, 5, 0, 3] , [0, 0, 2, 0, 3, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 2, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5]] \$

$$[y_1, 0, y_7, 0, y_6, y_5, y_4, 0, 0, y_3, 0, y_2]$$

1591 . Coloring, {2, 3, 5, 9, 10, 11, 12}

R: [7, 8, 8, 6, 3, A, B, C, C, 2, 4, 9]

B: [6, 7, 7, 7, A, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 8
See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 2, 2] , [0, 1, 0, 2, 0, 2, 0, 3, 2, 1, 1, 4] , [0, 1, 0, 1, 0, 2, 0, 1, 4, 2, 0, 5] , [0, 2, 0, 0, 0, 1, 0, 1, 5, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 0, 2, 5, 1, 0, 6] , [0, 1, 0, 0, 0, 0, 0, 2, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, y_1 - y_2 + y_4 + y_5 + y_6 - y_7 - y_8, y_3, y_1, 0, y_2, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p = -s^8 + s^9 \quad p = -s^8 + s^{10}$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 2, 1, 0, 0, 5, 0, 3] , [0, 0, 2, 0, 3, 2, 1, 0, 0, 3, 0, 5] , [0, 0, 2, 0, 5, 0, 2, 0, 0, 4, 0, 3] , [0, 0, 0, 0, 3, 0, 2, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, 0, 0, y_6, y_7, y_8]$$

1592 . Coloring, {2, 3, 6, 7, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = 9s^3 - 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, A, B, C, 2, 1, 5]

B: [6, 7, 7, 7, 3, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 10	7 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 1, 2, 0, 3, 1, 1], [1, 3, 1, 0, 1, 0, 2, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 1, 4, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 2, 3, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 3, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 4, 1, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 3, 2, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 3, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 1, 4, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 2, 3, 0, 1, 4, 0]] \$

$$[y_1, y_2, y_4 - y_8, 0, y_4, y_8, y_3, y_7, 0, y_5, y_6, y_8]$$

$$p' = s^3 - s^9 \quad p = s^3 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 3, 0, 2, 1, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 1, 5, 1], [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 6, 1], [0, 0, 0, 6, 0, 0, 5, 0, 1, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

$$[0, 0, y_7, y_6, 0, y_7, y_5, 0, y_4, y_3, y_2, y_1]$$

$$p = -s^5 + s^8$$

1593 . Coloring, {2, 3, 6, 7, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 9s^3 + 2s^4 + 16s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, A, B, C, C, 4, 5]

B: [6, 7, 7, 7, 3, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	7 vs 9

Omega Rank for R : cycles: {{5, 10, 12}, {3, 4, 6, 8, 11}}

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 1, 2, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 2, 0, 1, 0, 3, 2, 3] , [0, 0, 2, 2, 3, 1, 0, 1, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 2, 0, 2, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 1, 0, 1, 0, 3, 2, 3] , [0, 0, 1, 2, 3, 1, 0, 2, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 2, 0, 1, 0, 3, 2, 3] , [0, 0, 2, 2, 3, 1, 0, 1, 0, 3, 1, 3] , [0, 0, 1, 1, 3, 2, 0, 2, 0, 3, 1, 3]] \$

[0, 0, -3 y₆ - 3 y₅ - 3 y₂ - 3 y₁ + 7 y₄ + 7 y₃, 3 y₆, 3 y₄, 3 y₅, 3 y₃, 3 y₂, 0, 3 y₄ + 3 y₃, 3 y₁, 3 y₄ + 3 y₃]

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7 \quad p'' = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 3, 0, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 3, 0, 1, 1, 5, 0] , [5, 1, 0, 0, 0, 3, 1, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 5, 1, 0, 0, 3, 1, 0] , [1, 3, 0, 0, 0, 4, 2, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 1, 3, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 1, 5, 0, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 2, 4, 0, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 3, 1, 0, 0, 2, 4, 0]] \$

[y₁, y₁ - 2 y₂ - y₇ + y₆ + y₅ + y₄ - y₃, y₂, 0, 0, y₇, y₆, 0, y₅, y₄, y₃, y₂]

$$p = -s^3 + s^9 \quad p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1594 . Coloring, {2, 3, 6, 7, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = 6s^2 + 5s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, A, B, C, C, 1, 9]

B: [6, 7, 7, 7, 3, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 1, 2, 2, 3, 1, 3] , [1, 0, 1, 0, 0, 0, 2, 1, 3, 1, 2, 5] , [2, 0, 0, 0, 0, 0, 1, 1, 5, 2, 1, 4] , [1, 0, 0, 0, 0, 0, 2, 0, 4, 1, 1, 7] , [1, 0, 0, 0, 0, 0, 1, 0, 7, 2, 0, 5] , [0, 0, 0, 0, 0, 0, 1, 0, 5, 1, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$

$$[y_9, 0, y_8, 0, 0, y_7, y_6, y_4, y_5, y_3, y_1, y_2]$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 3, 0, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 0, 5, 0, 0, 1, 3, 0] , [0, 1, 1, 3, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, y_5, y_6, y_4, -y_5 + y_6 + 3y_3, y_3, y_2, 0, 0, -y_5 + y_6 + 2y_3, y_1, y_3]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7 \quad p' = -s^5 + s^8$$

1595 . Coloring, {2, 3, 6, 7, 8, 10, 11}

R: [7, 8, 8, 6, A, 3, A, B, B, 2, 4, 5]

B: [6, 7, 7, 7, 3, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 2, 0], [0, 3, 1, 2, 0, 2, 0, 3, 0, 3, 2, 0], [0, 3, 2, 2, 0, 2, 0, 4, 0, 0, 3, 0], [0, 0, 2, 3, 0, 2, 0, 5, 0, 0, 4, 0], [0, 0, 2, 4, 0, 3, 0, 2, 0, 0, 5, 0], [0, 0, 3, 5, 0, 4, 0, 2, 0, 0, 2, 0], [0, 0, 4, 2, 0, 5, 0, 3, 0, 0, 2, 0], [0, 0, 5, 2, 0, 2, 0, 4, 0, 0, 3, 0], [0, 0, 2, 3, 0, 2, 0, 5, 0, 0, 4, 0]] \$$

$$[0, y_1, y_2, y_7, 2y_6, y_8, y_6, y_5, 0, y_4, y_3, 0]$$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 2, 4], [2, 0, 0, 0, 0, 2, 1, 0, 4, 1, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 1, 5], [1, 0, 0, 0, 3, 0, 0, 5, 2, 0, 5], [0, 0, 0, 0, 0, 1, 0, 0, 5, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[y_1, 0, y_1 - y_5 + y_4 + y_3 + y_2 - y_7 - y_6, 0, 0, y_5, y_4, 0, y_3, y_2, y_7, y_6]$$

$$p = s^7 - s^8$$

1596 . Coloring, $\{2, 3, 6, 7, 8, 10, 12\}$

R: [7, 8, 8, 6, A, 3, A, B, B, 2, 1, 9]

B: [6, 7, 7, 7, 3, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 2, 0], [2, 3, 1, 0, 0, 0, 2, 3, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 2, 4, 0, 2, 3, 0], [3, 2, 0, 0, 0, 4, 1, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 3, 2, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 4, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 1, 4, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 2, 3, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 2, 4, 0, 2, 3, 0]] \$$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, 2y_4, y_7, y_8, 0]$$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 2, 4], [0, 0, 2, 2, 4, 0, 3, 0, 0, 1, 3, 1], [0, 0, 4, 3, 1, 0, 4, 0, 0, 0, 3, 1], [0, 0, 1, 3, 1, 0, 7, 0, 0, 0, 4, 0], [0, 0, 1, 4, 0, 0, 4, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0]] \$$$

$$[0, 0, y_4, y_3, y_2, y_1, y_8, 0, 0, y_7, y_6, y_5]$$

1597 . Coloring, {2, 3, 6, 7, 8, 11, 12}

R: [7, 8, 8, 6, A, 3, A, B, B, C, 4, 9]

B: [6, 7, 7, 7, 3, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 2, 2], [0, 0, 1, 2, 0, 2, 0, 1, 2, 1, 4, 3], [0, 0, 2, 4, 0, 2, 0, 1, 3, 0, 3, 1], [0, 0, 2, 3, 0, 4, 0, 2, 1, 0, 4, 0], [0, 0, 4, 4, 0, 3, 0, 2, 0, 0, 3, 0], [0, 0, 3, 3, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 3, 0, 3, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 0, 4, 0, 0, 3, 0], [0, 0, 2, 3, 0, 4, 0, 3, 0, 0, 4, 0]] \$$$

$$[0, 0, y_1, y_4, 0, y_2, y_3, y_7, y_5, y_6, y_8, y_9]$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 2, 2], [2, 1, 2, 0, 2, 2, 3, 0, 0, 1, 3, 0], [3, 1, 2, 0, 0, 2, 3, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 3, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 2, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 3, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 3, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 3, 0, 0, 2, 3, 0]] \$$$

$$[y_2, y_2 - y_1 + y_8 - y_6 + y_7 + y_3 - y_4 - y_5, y_1, 0, y_8, y_6, y_7, 0, 0, y_3, y_4, y_5]$$

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

1598 . Coloring, {2, 3, 6, 7, 9, 10, 11}

R: [7, 8, 8, 6, A, 3, A, C, C, 2, 4, 5]

B: [6, 7, 7, 7, 3, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 2, 0, 3, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 0, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 2, 0, 3, 0, 5] , [0, 3, 0, 0, 5, 0, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 5, 0, 2, 0, 4]] \$

$$[0, y_4, y_5, 2y_2, y_6, y_1, y_2, y_3, 0, y_7, 0, y_8]$$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 4, 2] , [4, 0, 0, 0, 0, 2, 1, 0, 2, 1, 5, 1] , [5, 0, 0, 0, 0, 4, 0, 0, 1, 2, 3, 1] , [3, 0, 0, 0, 0, 5, 0, 0, 1, 4, 1, 2] , [1, 0, 0, 0, 0, 3, 0, 0, 2, 5, 1, 4] , [1, 0, 0, 0, 0, 1, 0, 0, 4, 3, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 0, 5, 1, 4, 3] , [4, 0, 0, 0, 0, 2, 0, 0, 3, 1, 5, 1]] \$

$$[y_1, 0, y_1 - y_7 + y_6 + y_5 + y_4 - y_3 - y_2, 0, 0, y_7, y_6, 0, y_5, y_4, y_3, y_2]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1599 . Coloring, {2, 3, 6, 7, 9, 10, 12}

R: [7, 8, 8, 6, A, 3, A, C, C, 2, 1, 9]

B: [6, 7, 7, 7, 3, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 0, 2] , [0, 3, 1, 0, 0, 0, 2, 3, 2, 1, 0, 4] , [0, 1, 0, 0, 0, 0, 0, 4, 4, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 0, 1, 5, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 6] , [0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$

$$[4y_2 - 2y_3, y_1, y_2, 0, 0, 2y_2 - y_3, y_3, y_7, y_4, y_5, 0, y_6]$$

$$p = -s^6 + s^8 \quad p' = -s^6 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 0, 3, 0, 0, 1, 3, 1] , [0, 0, 2, 3, 1, 0, 6, 0, 0, 0, 3, 1] , [0, 0, 1, 3, 1, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 1, 6, 0, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0]] \$

$$[0, 0, y_4, y_5, y_3, y_1, y_2, 0, 0, y_8, y_7, y_6]$$

1600 . Coloring, {2, 3, 6, 7, 9, 11, 12}

R: [7, 8, 8, 6, A, 3, A, C, C, C, 4, 9]

B: [6, 7, 7, 7, 3, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 0, 4] , [0, 0, 1, 0, 0, 2, 0, 1, 4, 1, 0, 7] , [0, 0, 2, 0, 0, 0, 0, 1, 7, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, -8y_1 + 3y_4 + y_2 + y_3 - y_5, 2y_1, 0, -5y_1 + 2y_4, y_1, y_2, y_3, y_4, 0, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7 \quad p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 4, 0] , [4, 1, 2, 0, 0, 2, 3, 0, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 4, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 1, 0, 0, 4, 3, 0] , [3, 4, 0, 0, 0, 3, 2, 0, 0, 3, 1, 0] , [1, 3, 0, 0, 0, 3, 4, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 1, 3, 0, 0, 3, 4, 0] , [4, 3, 0, 0, 0, 2, 3, 0, 0, 1, 3, 0]] \$

$$[y_4, y_2, y_3, 0, -y_4 + y_2 + y_3 + y_5 - y_1 - y_6 + y_7, y_5, y_1, 0, 0, y_6, y_7, 0]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1601 . Coloring, {2, 3, 6, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, A, C, B, 2, 4, 9]

B: [6, 7, 7, 7, 3, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	10 vs 10	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 1, 1] , [0, 3, 1, 1, 0, 2, 0, 3, 1, 1, 2, 2] , [0, 1, 2, 2, 0, 1, 0, 4, 2, 0, 1, 3] , [0, 0, 1, 1, 0, 2, 0, 3, 3, 0, 2, 4] , [0, 0, 2, 2, 0, 1, 0, 1, 4, 0, 3, 3] , [0, 0, 1, 3, 0, 2, 0, 2, 3, 0, 4, 1] , [0, 0, 2, 4, 0, 3, 0, 1, 1, 0, 3, 2] , [0, 0, 3, 3, 0, 4, 0, 2, 2, 0, 1, 1] , [0, 0, 4, 1, 0, 3, 0, 3, 1, 0, 2, 2] , [0, 0, 3, 2, 0, 1, 0, 4, 2, 0, 1, 3]] \$

[0, y₃, y₁, y₂, 0, y₄, y₅, y₆, y₇, y₈, y₉, y₁₀]

Omega Rank for B : cycles: {{1, 3, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 2, 1, 0, 0, 1, 3, 1] , [3, 0, 3, 0, 1, 3, 2, 0, 0, 2, 1, 1] , [1, 0, 1, 0, 1, 3, 3, 0, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 1, 1, 0, 0, 3, 3, 3] , [3, 0, 2, 0, 3, 2, 1, 0, 0, 1, 1, 3] , [1, 0, 3, 0, 3, 3, 2, 0, 0, 2, 1, 1] , [1, 0, 3, 0, 1, 1, 3, 0, 0, 3, 2, 2]] \$

[y₇, 0, y₆, 0, y₄, y₅, y₃, 0, 0, y₂, y₇ - y₆ + y₄ - y₅ + y₃ + y₂ - y₁, y₁]

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1602 . Coloring, {2, 3, 6, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: p = s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, B, B, C, 2, 4, 5]

B: [6, 7, 7, 7, 3, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 1, 3, 1] , [0, 1, 1, 3, 1, 2, 0, 3, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 3, 0, 2, 0, 1, 3, 0] , [0, 1, 3, 3, 0, 3, 0, 4, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 0, 3, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 0, 4, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0]] \$

$$[0, y_1, y_2, y_3, y_4, y_5, y_9, y_6, 0, y_7, y_8, y_9]$$

$$p = s^5 - s^{10}$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 3, 1, 3], [1, 0, 0, 0, 0, 2, 1, 0, 3, 4, 2, 3], [2, 0, 0, 0, 0, 1, 0, 0, 3, 3, 3, 4], [3, 0, 0, 0, 0, 2, 0, 0, 4, 1, 3, 3], [3, 0, 0, 0, 0, 3, 0, 0, 3, 2, 4, 1], [4, 0, 0, 0, 0, 3, 0, 0, 1, 3, 3, 2], [3, 0, 0, 0, 0, 4, 0, 0, 2, 3, 1, 3], [1, 0, 0, 0, 0, 3, 0, 0, 3, 4, 2, 3]] \$$$

$$[y_7, 0, y_6, 0, 0, y_5, y_4, 0, y_3, y_2, y_1, y_7 + y_6 - y_5 - y_4 + y_3 + y_2 - y_1]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1603 . Coloring, {2, 3, 6, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 + 2s^4 - 16s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, B, B, C, 2, 1, 9]

B: [6, 7, 7, 7, 3, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 10	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 1, 3, 1], [3, 1, 1, 0, 0, 0, 2, 3, 1, 0, 3, 2], [3, 0, 0, 0, 0, 0, 3, 2, 2, 0, 5, 1], [5, 0, 0, 0, 0, 3, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 5, 0, 2, 0, 3, 1], [3, 0, 0, 0, 0, 0, 5, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 3, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 5, 0, 1, 0, 3, 2], [3, 0, 0, 0, 0, 0, 5, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 3, 0, 1, 0, 5, 2]] \$$$

$$[-6 y_1 - 9 y_5 - 3 y_2 - 3 y_3 + 13 y_4 - 3 y_6 + 13 y_7, 3 y_1 + 3 y_5, 3 y_1, 0, 0, 3 y_5, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7]$$

$$p = -s^4 + s^6 + s^7 - s^9 \quad p' = -s^4 - s^5 + s^7 + s^8 \quad p = -s^4 + s^{10}$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 3, 1, 3], [0, 0, 2, 1, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4]] \$$$

$$[0, 0, y_4, y_3, y_2, y_6, y_1, 0, 0, y_7, y_6, y_5]$$

$$p = -s^3 + s^8$$

1604 . Coloring, {2, 3, 6, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 3s^3 + 2s^4 + 16s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, B, B, C, C, 4, 9]

B: [6, 7, 7, 7, 3, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 9

Omega Rank for R : cycles: {{9, 12}, {3, 4, 6, 8, 11}} order: 10

See Matrix

$$\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 1, 3, 3], [0, 0, 1, 3, 0, 2, 0, 1, 3, 0, 3, 3], [0, 0, 2, 3, 0, 3, 0, 1, 3, 0, 1, 3], [0, 0, 3, 1, 0, 3, 0, 2, 3, 0, 1, 3], [0, 0, 3, 1, 0, 1, 0, 3, 3, 0, 2, 3], [0, 0, 1, 2, 0, 1, 0, 3, 3, 0, 3, 3], [0, 0, 1, 3, 0, 2, 0, 1, 3, 0, 3, 3], [0, 0, 2, 3, 0, 3, 0, 1, 3, 0, 1, 3], [0, 0, 3, 1, 0, 3, 0, 2, 3, 0, 1, 3]] \$$$

$$[0, 0, -3y_1 - 3y_6 + 7y_4 - 3y_2 + 10y_3 - 3y_5, 3y_1, 0, 3y_6, 3y_4, 3y_2, 3y_3, 3y_4, 3y_5, 3y_4 + 3y_3]$$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7 \quad p' = -s^3 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 0, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_2, y_1, y_3, 0, y_2, y_3, y_4, 0, 0, y_5, y_6, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

1605 . Coloring, {2, 3, 6, 8, 10, 11, 12}

R: [7, 8, 8, 6, A, 3, B, B, B, 2, 4, 9]

B: [6, 7, 7, 7, 3, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 7

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 4, 0] , [0, 1, 1, 4, 0, 2, 0, 3, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 5, 0, 2, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 3, 0, 4, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 2, 0, 5, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 0, 3, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 5, 0, 2, 0, 0, 2, 0]] \$

$$[0, y_1, y_2, y_3, 0, y_4, y_6, y_5, 2y_6, y_6, y_7, 0]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 2, 1, 0, 0, 4, 0, 3] , [0, 0, 4, 0, 3, 0, 2, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 2] , [0, 0, 3, 0, 2, 0, 4, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 4, 0, 3]] \$

$$[y_4, 0, y_3, 0, y_2, y_1, y_6, 0, 0, y_5, 0, y_7]$$

1606 . Coloring, {2, 3, 6, 9, 10, 11, 12}

R: [7, 8, 8, 6, A, 3, B, C, C, 2, 4, 9]

B: [6, 7, 7, 7, 3, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 2, 2] , [0, 1, 1, 2, 0, 2, 0, 3, 2, 0, 1, 4] , [0, 0, 2, 1, 0, 2, 0, 2, 4, 0, 0, 5] , [0, 0, 2, 0, 0, 1, 0, 2, 5, 0, 0, 6] , [0, 0, 1, 0, 0, 0, 0, 2, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, y_4, y_2, y_1, 0, y_2 + y_1 - y_6 - y_5 + y_3, y_7, y_6, y_5, y_7, y_4, y_3]$$

$$p' = s^8 - s^9 \quad p' = s^7 - s^9 \quad p = s^7 - s^{10}$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 2, 1, 0, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 2, 2, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 2, 0, 0, 4, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2] , [0, 0, 4, 0, 2, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, 0, 0, y_6, y_7, y_8]$$

1607 . Coloring, {2, 3, 7, 8, 9, 10, 11}

R: [7, 8, 8, 6, A, A, A, B, C, 2, 4, 5]

B: [6, 7, 7, 7, 3, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 7

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[0, 2, 0, 2, 2, 1, 1, 2, 0, 4, 1, 1], [0, 4, 0, 1, 1, 2, 0, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 1, 0, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 4, 0, 1, 4, 0], [0, 1, 0, 4, 0, 2, 0, 3, 0, 2, 4, 0], [0, 2, 0, 4, 0, 4, 0, 1, 0, 2, 3, 0], [0, 2, 0, 3, 0, 4, 0, 2, 0, 4, 1, 0], [0, 4, 0, 1, 0, 3, 0, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 1, 0, 4, 0, 3, 2, 0]] \$$

$[0, y_4, 0, y_2, y_3, y_1, y_7, y_8, 0, y_5, y_6, y_7]$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5
See Matrix

$\$ [[2, 0, 2, 0, 0, 1, 3, 0, 2, 0, 3, 3], [3, 0, 1, 0, 0, 2, 2, 0, 3, 0, 5, 0], [5, 0, 2, 0, 0, 3, 1, 0, 0, 0, 5, 0], [5, 0, 3, 0, 0, 5, 2, 0, 0, 0, 1, 0], [1, 0, 5, 0, 0, 5, 3, 0, 0, 0, 2, 0], [2, 0, 5, 0, 0, 1, 5, 0, 0, 0, 3, 0], [3, 0, 1, 0, 0, 2, 5, 0, 0, 0, 5, 0]] \$$

$[y_7, 0, y_6, 0, 0, y_5, y_4, 0, y_3, 0, y_1, y_2]$

1608 . Coloring, $\{2, 3, 7, 8, 9, 10, 12\}$

R: [7, 8, 8, 6, A, A, A, B, C, 2, 1, 9]

B: [6, 7, 7, 7, 3, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 7

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 1, 2, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 0, 2, 2, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 1, 4, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 0, 2, 2, 1, 1, 4, 2] , [4, 1, 0, 0, 0, 0, 2, 2, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 0, 4, 1, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 2, 2, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 0, 2, 2, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 1, 4, 2, 2, 2, 1]] \$

[11 y₁ + 11 y₂ + 11 y₃ - 2 y₇ - 2 y₄ + 11 y₅ - 39 y₆, 2 y₁, 0, 0, 0, 2 y₂, 2 y₃, 2 y₇, 3 y₁ + 3 y₂ + 3 y₃ + 3 y₅ - 11 y₆, 2 y₄, 2 y₅, 2 y₆]

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 3, 0, 0, 0, 3, 3] , [0, 0, 3, 3, 3, 0, 4, 0, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0]] \$

[0, 0, y₄, y₅, y₆, y₃, y₂, 0, 0, 0, y₁, 3 y₃]

$$p = -s^4 + s^7$$

1609 . Coloring, {2, 3, 7, 8, 9, 11, 12}

R: [7, 8, 8, 6, A, A, A, B, C, C, 4, 9]

B: [6, 7, 7, 7, 3, 3, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 1, 2, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 2, 2, 6] , [0, 0, 0, 2, 0, 1, 0, 0, 6, 2, 0, 5] , [0, 0, 0, 0, 2, 0, 0, 5, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$

$$[0, 0, 0, y_3, 0, y_2, y_1, 2y_1, y_7, y_6, y_5, y_4]$$

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 3, 0, 0, 0, 3, 1], [3, 0, 3, 0, 1, 2, 4, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 3, 3, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 3, 3, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 4, 3, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 3, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 3, 4, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 3, 3, 0, 0, 0, 4, 0]] \$$$

$$[y_5, 2y_7, y_4, 0, y_2, y_3, y_1, 0, 0, 0, y_6, y_7]$$

$$p = -s^3 + s^8$$

1610 . Coloring, {2, 3, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, A, B, B, 2, 4, 9]

B: [6, 7, 7, 7, 3, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 8	7 vs 7

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 4, 2, 0], [0, 4, 0, 2, 0, 2, 0, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 0, 4, 0, 2, 2, 0], [0, 2, 0, 2, 0, 4, 0, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 0, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 4, 0, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 2, 0, 4, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 0, 2, 0, 2, 0, 2, 4, 0]] \$$$

$$[0, y_2, 0, y_1, 0, y_3, y_4, y_5, 2y_4, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 0, 2, 4] , [2, 0, 3, 0, 4, 2, 2, 0, 0, 0, 3, 0] , [3, 0, 6, 0, 0, 2, 3, 0, 0, 0, 2, 0] , [2, 0, 2, 0, 0, 3, 6, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 2, 2, 0, 0, 0, 6, 0] , [6, 0, 2, 0, 0, 3, 3, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 6, 2, 0, 0, 0, 3, 0]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, 0, 0, 0, y_7, y_6]$$

1611 . Coloring, {2, 3, 7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, A, A, C, C, 2, 4, 9]

B: [6, 7, 7, 7, 3, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 2, 0, 2, 2, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 4, 4, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 2, 4, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0] , [0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10]] \$

$$[0, y_2, 0, 2 y_6, 0, y_1, y_6, y_7, y_5, y_4, 0, y_3]$$

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 0, 4, 2] , [4, 0, 3, 0, 2, 2, 2, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 3, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 4, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 2, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 3, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 4, 2, 0, 0, 0, 3, 0]] \$

$$[y_1, 0, y_2, 0, y_5, y_3, y_4, 0, 0, 0, y_6, y_7]$$

1612 . Coloring, {2, 3, 8, 9, 10, 11, 12}

R: [7, 8, 8, 6, A, A, B, B, C, 2, 4, 9]

B: [6, 7, 7, 7, 3, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 0, 2, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 3, 0, 2, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 3, 0, 1, 1, 3, 2, 2] , [0, 3, 0, 2, 0, 2, 0, 2, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 2, 0, 3, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 1, 0, 3, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 0, 2, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 3, 0, 2, 2, 2, 2, 1]] \$

[0, 3 y₇, 0, 3 y₆, 0, 3 y₅, 3 y₄, 3 y₃, 3 y₂, -3 y₆ - 3 y₄ - 3 y₃ + 8 y₂ + 5 y₁, -3 y₇ - 3 y₅ + 5 y₂ + 8 y₁, 3 y₁]

$$p' = s^2 - s^8 \quad p = s^2 - s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 2, 1, 3] , [1, 0, 3, 0, 3, 2, 2, 0, 0, 3, 0, 2] , [0, 0, 5, 0, 2, 1, 3, 0, 0, 2, 0, 3] , [0, 0, 3, 0, 3, 0, 5, 0, 0, 3, 0, 2] , [0, 0, 3, 0, 2, 0, 3, 0, 0, 5, 0, 3] , [0, 0, 2, 0, 3, 0, 3, 0, 0, 3, 0, 5] , [0, 0, 3, 0, 5, 0, 2, 0, 0, 3, 0, 3] , [0, 0, 5, 0, 3, 0, 3, 0, 0, 2, 0, 3]] \$

[y₂, 0, y₁, 0, y₅, y₃, y₄, 0, 0, y₈, y₇, y₆]

1613 . Coloring, {2, 4, 5, 6, 7, 8, 9}

R: [7, 8, 7, 7, 3, 3, A, B, C, C, 1, 5]

B: [6, 7, 8, 6, A, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
See Matrix

$\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 2, 1, 3], [1, 0, 2, 0, 3, 0, 4, 0, 0, 3, 1, 2], [1, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 4, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2], [0, 0, 4, 0, 2, 0, 3, 0, 0, 4, 0, 3]] \$$

$$[y_1, 0, y_2, 0, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 7, 10, 11\}\}$ order: 6
See Matrix

$\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 2, 0, 1, 2, 3, 1], [0, 2, 0, 3, 0, 3, 2, 0, 1, 2, 3, 0], [0, 2, 0, 3, 0, 3, 2, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 2, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 3, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 3, 0, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 3, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 3, 0, 0, 2, 3, 0]] \$$

$$[0, y_8, 0, y_7, 0, y_6, y_5, y_4, y_3, y_2, y_1, -y_8 + y_7 - y_6 + y_5 + y_4 + y_3 + y_2 - y_1]$$

$$p = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

1614 . Coloring, $\{2, 4, 5, 6, 7, 8, 10\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, B, B, 2, 1, 5]

B: [6, 7, 8, 6, A, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 0, 4, 2, 0, 3, 1, 0] , [1, 3, 0, 0, 0, 0, 4, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 1, 3, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 4, 0, 1, 3, 0] , [3, 1, 0, 0, 0, 0, 2, 4, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 3, 1, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 2, 0, 3, 1, 0]] \$

$$[y_7, y_6, y_5, 0, y_4, 0, y_2, y_3, 0, y_8, y_1, 0]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 2, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 1, 5] , [0, 0, 0, 1, 0, 2, 0, 0, 5, 2, 0, 6] , [0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, 0, y_1, 0, y_2, y_3, y_3, y_4, y_5, y_6, y_1 - y_2 + 2y_3 + y_4 + y_5 - y_6]$$

$$p = -s^6 + s^8 \quad p = -s^6 + s^7$$

1615 . Coloring, {2, 4, 5, 6, 7, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, B, B, C, 4, 5]

B: [6, 7, 8, 6, A, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 4, 0, 0, 3, 1, 2] , [0, 0, 2, 1, 2, 0, 4, 0, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 0, 3, 0, 0, 4, 0, 4] , [0, 0, 3, 0, 4, 0, 2, 0, 0, 3, 0, 4] , [0, 0, 4, 0, 4, 0, 3, 0, 0, 2, 0, 3] , [0, 0, 4, 0, 3, 0, 4, 0, 0, 3, 0, 2] , [0, 0, 3, 0, 2, 0, 4, 0, 0, 4, 0, 3]] \$

$$[0, 0, y_2, y_3, y_1, 0, y_6, y_4, 0, y_5, y_7, y_8]$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 2, 2, 2], [2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 1, 3], [1, 2, 0, 0, 0, 2, 2, 0, 3, 2, 2, 2], [2, 2, 0, 0, 0, 1, 2, 0, 2, 2, 2, 3], [2, 2, 0, 0, 0, 2, 2, 0, 3, 1, 2, 2], [2, 1, 0, 0, 0, 2, 2, 0, 2, 2, 2, 3], [2, 2, 0, 0, 0, 2, 1, 0, 3, 2, 2, 2], [2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 1, 3], [1, 2, 0, 0, 0, 2, 2, 0, 3, 2, 2, 2]] \$$$

$$[8 y_1 + 8 y_2 - 3 y_3 - 11 y_4 - 11 y_5 - 3 y_6 + 8 y_7, 3 y_1, 0, 0, 0, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7, 5 y_1 + 5 y_2 - 8 y_4 - 8 y_5 + 5 y_7]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

1616 . Coloring, {2, 4, 5, 6, 7, 8, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, B, B, C, 1, 9]

B: [6, 7, 8, 6, A, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 2, 2, 2], [2, 0, 0, 0, 0, 0, 4, 0, 2, 3, 3, 2], [3, 0, 0, 0, 0, 0, 2, 0, 2, 4, 2, 3], [2, 0, 0, 0, 0, 0, 3, 0, 3, 2, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 3, 3, 2], [3, 0, 0, 0, 0, 0, 2, 0, 2, 2, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 2, 2, 2], [2, 0, 0, 0, 0, 0, 4, 0, 2, 3, 3, 2]] \$$$

$$[y_1, 0, 2 y_7, 0, 0, 0, y_6, y_7, y_4, y_3, y_5, y_2]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 2, 2, 2] , [0, 2, 0, 2, 2, 2, 2, 0, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 2, 2, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 1, 4, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 4, 0, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 2, 3, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 4, 1, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 4, 2, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 3, 2, 0, 0, 4, 2, 0]] \$

$$[0, y_1, 0, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

1617 . Coloring, {2, 4, 5, 6, 7, 9, 10}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, C, C, 2, 1, 5]

B: [6, 7, 8, 6, A, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	6 vs 8

Omega Rank for R : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 4, 2, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 2, 2, 0, 4, 0, 2] , [0, 4, 1, 0, 2, 0, 2, 3, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 1, 4, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 2, 2, 0, 1, 0, 4] , [0, 1, 3, 0, 4, 0, 2, 2, 0, 2, 0, 2] , [0, 2, 4, 0, 2, 0, 3, 1, 0, 2, 0, 2]] \$

$$[y_1, y_2, y_7, 0, y_3, 0, y_4, y_5, 0, y_6, 0, y_8]$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 4, 0, 0, 2, 2, 2, 2] , [0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 2, 4, 2]] \$

$$[0, 0, 0, y_1 - 2y_6 - y_2 - y_3 + y_4 + y_5, 0, y_1, y_6, y_6, y_2, y_3, y_4, y_5]$$

$$p' = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 \quad p = s^2 - s^8$$

1618 . Coloring, {2, 4, 5, 6, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, C, C, C, 4, 5]

B: [6, 7, 8, 6, A, A, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	6 vs 7	6 vs 8

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 2, 0, 4], [0, 0, 2, 0, 4, 0, 4, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 2, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 4, 0, 2], [0, 0, 4, 0, 2, 0, 3, 0, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 4, 0, 0, 3, 0, 3]] \$$$

$$[0, 0, y_4, 2y_1, y_3, 0, y_2, y_1, 0, y_5, 0, y_6]$$

$$p = -s^2 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 2, 4, 0], [4, 2, 0, 0, 0, 2, 2, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 4, 2, 0, 0, 2, 2, 0], [2, 2, 0, 0, 0, 4, 2, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 2, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 4, 0, 0, 2, 2, 0], [2, 2, 0, 0, 0, 2, 4, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 2, 2, 0, 0, 2, 4, 0]] \$$$

$$[y_1 + y_4 - y_5 - 3y_6 - y_2 + y_3, y_1, 0, 0, 0, y_4, y_5, y_6, 2y_6, y_2, y_3, 0]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 \quad p = -s^2 + s^8$$

1619 . Coloring, {2, 4, 5, 6, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, C, C, C, 1, 9]
B: [6, 7, 8, 6, A, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4
 See Matrix

\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 2, 0, 4] , [0, 0, 0, 0, 0, 0, 4, 0, 4, 3, 0, 5] , [0, 0, 0, 0, 0, 0, 0, 0, 5, 4, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[2 y_4, 0, 2 y_4, 0, 0, 0, y_5, y_4, y_3, y_2, 0, y_1]$$

$$p' = s^4 - s^6 \quad p = s^4 - s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6
 See Matrix

\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 2, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 4, 2, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 4, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 2, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 4, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 2, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 2, 0, 0, 4, 2, 0]] \$

$$[0, y_4, 0, y_3, 2 y_7, y_1, y_2, y_7, 0, y_6, y_5, 0]$$

$$p = -s^2 + s^8$$

1620 . Coloring, {2, 4, 5, 6, 7, 10, 11}

R: [7, 8, 7, 7, 3, 3, A, C, B, 2, 4, 5]
B: [6, 7, 8, 6, A, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 8

Omega Rank for R : cycles: $\{\{2, 3, 5, 7, 8, 10, 12\}\}$ order: 7
See Matrix

$\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 2, 1, 1], [0, 2, 2, 1, 1, 0, 4, 2, 0, 3, 0, 1], [0, 3, 1, 0, 1, 0, 3, 2, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 1, 3, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 1, 4, 0, 1, 0, 3], [0, 1, 2, 0, 3, 0, 2, 3, 0, 1, 0, 4], [0, 1, 3, 0, 4, 0, 2, 1, 0, 2, 0, 3], [0, 2, 4, 0, 3, 0, 3, 1, 0, 2, 0, 1], [0, 2, 3, 0, 1, 0, 4, 2, 0, 3, 0, 1]] \$$

$$[0, y_9, y_8, y_7, y_6, 0, y_5, y_3, 0, y_4, y_2, y_1]$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 2, 4], [2, 0, 0, 0, 0, 3, 0, 0, 4, 2, 0, 5], [0, 0, 0, 0, 2, 0, 0, 5, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[y_6, 0, 0, 0, 0, y_5, y_4, y_4, y_3, y_2, y_6 - y_5 + 2y_4 + y_3 + y_2 - y_1, y_1]$$

$$p' = -s^6 + s^7 \quad p = s^6 - s^7$$

1621 . Coloring, $\{2, 4, 5, 6, 7, 10, 12\}$

R: [7, 8, 7, 7, 3, 3, A, C, B, 2, 1, 9]

B: [6, 7, 8, 6, A, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 9, 10, 11, 12\}\}$ order: 8
See Matrix

\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 2, 1, 1] , [1, 2, 0, 0, 0, 0, 4, 2, 1, 3, 2, 1] , [2, 3, 0, 0, 0, 0, 1, 2, 1, 4, 1, 2] , [1, 4, 0, 0, 0, 0, 2, 3, 2, 1, 1, 2] , [1, 1, 0, 0, 0, 0, 1, 4, 2, 2, 2, 3] , [2, 2, 0, 0, 0, 0, 1, 1, 3, 1, 2, 4] , [2, 1, 0, 0, 0, 0, 2, 2, 4, 1, 3, 1] , [3, 1, 0, 0, 0, 0, 2, 1, 1, 2, 4, 2] , [4, 2, 0, 0, 0, 0, 3, 1, 2, 2, 1, 1]] \$

$[y_1, y_2, y_3, 0, 0, 0, y_4, y_5, y_6, y_7, y_9, y_8]$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 2, 0, 0, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 3, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$[0, 0, 0, y_4, y_5, y_6, y_7, y_7, 0, y_1, y_2, y_3]$

$$p = -s^5 + s^8$$

1622 . Coloring, {2, 4, 5, 6, 7, 11, 12}

R: [7, 8, 7, 7, 3, 3, A, C, B, C, 4, 9]

B: [6, 7, 8, 6, A, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 0, 0, 3, 1, 2, 2, 1, 3] , [0, 0, 0, 1, 0, 0, 4, 0, 3, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 1, 0, 3, 4, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 3, 4] , [0, 0, 0, 3, 0, 0, 3, 0, 4, 2, 3, 1] , [0, 0, 0, 3, 0, 0, 3, 0, 1, 3, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 4, 0, 3, 3, 2, 3]] \$

$[0, 0, 2y_3, y_1, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$

$$p = s^2 - s^8$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 7, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 2, 2, 1, 1, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 2, 2, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 4, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 3, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 4, 2, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 2, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0]] \$$

$[y_8, y_7, 0, 0, y_6, y_5, y_4, y_3, 0, y_2, y_1, y_3]$

$$p = s^3 - s^9$$

1623 . Coloring, $\{2, 4, 5, 6, 8, 9, 10\}$

R: $[7, 8, 7, 7, 3, 3, B, B, C, 2, 1, 5]$

B: $[6, 7, 8, 6, A, A, A, C, B, C, 4, 9]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 0, 3, 1] , [3, 0, 2, 0, 1, 0, 4, 2, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$[y_1, 2y_6, y_2, 0, y_3, 0, y_4, 2y_3 - 3y_6, 0, 0, y_5, y_6]$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{4, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 2, 5] , [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 5, 2] , [0, 0, 0, 5, 0, 3, 0, 0, 2, 2, 3, 1] , [0, 0, 0, 3, 0, 5, 0, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 3, 0, 0, 2, 5, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 2, 5]] \$$

$$[0, 0, 0, y_7, 0, y_1, y_6, y_6, y_5, y_3, y_4, y_2]$$

$$p = -s^2 + s^8$$

1624 . Coloring, {2, 4, 5, 6, 8, 9, 11}

R: [7, 8, 7, 7, 3, 3, B, B, C, C, 4, 5]

B: [6, 7, 8, 6, A, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 0, 3, 3] , [0, 0, 2, 3, 3, 0, 4, 0, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0]] \$

$$[0, 0, y_1, y_2, y_3, 0, y_4, y_5, 0, 0, y_6, 3 y_5]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 2, 2, 0, 1, 3, 2, 1] , [2, 3, 0, 0, 0, 1, 4, 0, 1, 4, 1, 0] , [1, 4, 0, 0, 0, 2, 3, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_1, y_2, 0, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

1625 . Coloring, {2, 4, 5, 6, 8, 9, 12}

R: [7, 8, 7, 7, 3, 3, B, B, C, C, 1, 9]

B: [6, 7, 8, 6, A, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	6 vs 9

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 4, 0, 3, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 3]] \$

$$[-5y_1 - 15y_2 + 11y_3 - 5y_5 + 11y_4, 0, 10y_2, 0, 0, 0, 5y_1, 5y_2, 5y_3, 0, 5y_5, 5y_4]$$

$$p = s^2 + s^3 - s^5 - s^6 \quad p = -s^2 + s^4 + s^5 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 2, 2, 0, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[0, y_1, 0, y_6 + y_4, y_6 - y_4 + y_2, y_2, y_3, y_6, 0, y_5, y_6, y_4]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

1626 . Coloring, {2, 4, 5, 6, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, B, B, 2, 4, 5]

B: [6, 7, 8, 6, A, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	5 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 3
See Matrix

\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 0, 4, 2, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[0, 2y_5 - 2y_2, y_5, y_4, 2y_5 - 2y_2, 0, y_1, y_2, 0, 0, y_3, 0]$$

$$p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 4
See Matrix

\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 0, 4, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[2y_2, 0, 0, 0, 0, y_1, y_2, y_2, y_3, y_4, 0, y_5]$$

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6$$

1627 . Coloring, {2, 4, 5, 6, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, B, B, 2, 1, 9]

B: [6, 7, 8, 6, A, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 4, 2, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$[y_5, y_4, y_4, 0, 0, 0, y_2, y_3, y_4, 0, y_1, 0]$

$$p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$[0, 0, 0, 2 y_1, y_2, y_3, y_1, y_1, 0, y_5, 0, y_4]$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

1628 . Coloring, {2, 4, 5, 6, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, B, B, C, 4, 9]

B: [6, 7, 8, 6, A, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	5 vs 7	6 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$$[0, 0, 2 y_3, y_5, 0, 0, y_4, y_3, y_2, 0, y_1, 2 y_3]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 2, 1, 1, 0, 4, 0, 2], [0, 4, 0, 0, 2, 2, 2, 0, 0, 5, 0, 1], [0, 5, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[2 y_3, y_1, 0, 0, y_2, -2 y_3 + 2 y_5, y_6, y_3, 0, y_4, 0, y_5]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1629 . Coloring, {2, 4, 5, 6, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, C, C, 2, 4, 5]

B: [6, 7, 8, 6, A, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 4, 2, 0, 0, 3, 1], [0, 0, 2, 3, 1, 0, 4, 0, 0, 0, 4, 2], [0, 0, 1, 4, 2, 0, 5, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$$$

$$[0, y_1, y_2, y_8, y_7, 0, y_6, y_5, 0, 0, y_4, y_3]$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 2, 0, 0, 2, 3, 3, 4] , [3, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 3] , [2, 0, 0, 0, 0, 3, 0, 0, 3, 2, 4, 2] , [4, 0, 0, 0, 0, 2, 0, 0, 2, 3, 3, 2] , [3, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 3] , [2, 0, 0, 0, 0, 3, 0, 0, 3, 4, 2, 2] , [2, 0, 0, 0, 0, 2, 0, 0, 2, 3, 3, 4]] \$

$$[y_1, 0, 0, 0, 0, y_2, y_7, y_7, y_5, y_6, y_4, y_3]$$

$$p = s^2 - s^8$$

1630 . Coloring, {2, 4, 5, 6, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, C, C, 2, 1, 9]

B: [6, 7, 8, 6, A, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 0, 2, 2] , [2, 0, 0, 0, 0, 0, 4, 2, 2, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 0, 3, 0, 4, 4] , [4, 0, 0, 0, 0, 0, 3, 0, 4, 0, 2, 3] , [2, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 4] , [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 2, 4] , [2, 0, 0, 0, 0, 0, 4, 0, 4, 0, 3, 3]] \$

$$[2y_1, 7y_1 + 7y_6 - 9y_5 - 9y_4 + 7y_3 - 9y_2, 7y_1 + 7y_6 - 9y_5 - 9y_4 + 7y_3 - 9y_2, 0, 0, 0, 2y_6, 2y_5, 2y_4, 0, 2y_3, 2y_2]$$

$$p = -s^3 + s^5 + s^6 - s^8 \quad p = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 2, 0, 0, 0, 5, 1, 4] , [0, 0, 0, 1, 4, 2, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 5, 1, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6]] \$

$$[0, 0, 0, y_1, y_2, y_4, y_3, y_3, 0, y_5, y_6, y_7]$$

$$p = s^5 - s^8$$

1631 . Coloring, {2, 4, 5, 6, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, C, C, C, 4, 9]

B: [6, 7, 8, 6, A, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 0, 2, 4], [0, 0, 0, 2, 0, 0, 4, 0, 4, 0, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 0, 4, 4], [0, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2, 3], [0, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 2, 4]] \$$$

$$[0, 0, -14 y_5 - 14 y_2 + 18 y_3 - 14 y_4 + 18 y_1, 5 y_5, 0, 0, 5 y_2, -7 y_5 - 7 y_2 + 9 y_3 - 7 y_4 + 9 y_1, 5 y_3, 0, 5 y_4, 5 y_1]$$

$$p = -s^2 + s^4 + s^5 - s^7 \quad p' = -s^2 - s^3 + s^5 + s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 2, 1, 1, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 2, 0, 0, 5, 1, 0], [1, 5, 0, 0, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 1, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$$$

$$[y_1, y_2, 0, 0, 2 y_4, y_5, y_6, y_4, 0, y_3, y_7, 0]$$

$$p = s^5 - s^8$$

1632 . Coloring, {2, 4, 5, 6, 10, 11, 12}

R: [7, 8, 7, 7, 3, 3, B, C, B, 2, 4, 9]

B: [6, 7, 8, 6, A, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 4, 2, 1, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 5, 0, 2, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0]] \$

[0, y_7 , y_7 , y_6 , 0, 0, y_5 , y_4 , y_3 , 0, y_2 , y_1]

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 5, 1, 4] , [1, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

[y_1 , 0, 0, 0, y_2 , y_5 , y_4 , y_4 , 0, y_3 , y_6 , y_7]

$$p = -s^5 + s^8$$

1633 . Coloring, {2, 4, 5, 7, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, A, B, C, 2, 1, 5]

B: [6, 7, 8, 6, A, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 1, 1], [1, 3, 2, 0, 1, 0, 3, 2, 0, 3, 1, 0], [1, 3, 1, 0, 0, 0, 3, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 3, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 2, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 3, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 3, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 3, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 3, 3, 0, 3, 2, 0]] \$$

$[y_1, y_1 + y_2 - y_3 - y_4 + y_5 + y_6 - y_7 + y_8, y_2, 0, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 3, 3], [0, 0, 2, 3, 0, 2, 0, 1, 3, 0, 3, 2], [0, 0, 2, 3, 0, 3, 0, 2, 2, 0, 3, 1], [0, 0, 3, 3, 0, 3, 0, 2, 1, 0, 2, 2], [0, 0, 3, 2, 0, 3, 0, 3, 2, 0, 1, 2], [0, 0, 3, 1, 0, 2, 0, 3, 2, 0, 2, 3], [0, 0, 2, 2, 0, 1, 0, 3, 3, 0, 2, 3], [0, 0, 1, 2, 0, 2, 0, 2, 3, 0, 3, 3], [0, 0, 2, 3, 0, 2, 0, 1, 3, 0, 3, 2]] \$$

$[0, 0, y_1, y_2, 0, y_3, y_6, y_4, y_5, y_6, y_7, y_8]$

$$p = -s^2 + s^9$$

1634 . Coloring, $\{2, 4, 5, 7, 8, 9, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, A, B, C, C, 4, 5]

B: [6, 7, 8, 6, A, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 0, 3, 0, 0, 3, 1, 3], [0, 0, 3, 1, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3]] \$$

$[0, 0, y_1, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7
See Matrix

$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 3, 1], [3, 1, 2, 0, 0, 2, 2, 1, 1, 0, 3, 1], [3, 0, 2, 0, 0, 3, 1, 2, 1, 0, 3, 1], [3, 0, 3, 0, 0, 3, 0, 2, 1, 0, 2, 2], [2, 0, 3, 0, 0, 3, 0, 3, 2, 0, 1, 2], [1, 0, 3, 0, 0, 2, 0, 3, 2, 0, 2, 3], [2, 0, 2, 0, 0, 1, 0, 3, 3, 0, 2, 3], [2, 0, 1, 0, 0, 2, 0, 2, 3, 0, 3, 3], [3, 0, 2, 0, 0, 2, 0, 1, 3, 0, 3, 2], [3, 0, 2, 0, 0, 3, 0, 2, 2, 0, 3, 1]] \$$

$[y_6, y_5, y_4, 0, 0, y_3, y_2, y_1, y_{10}, y_9, y_8, y_7]$

1635 . Coloring, $\{2, 4, 5, 7, 8, 9, 12\}$

$\Omega p(\Delta)=0: p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$

R: [7, 8, 7, 7, 3, A, A, B, C, C, 1, 9]

B: [6, 7, 8, 6, A, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 6
See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 3, 1, 5] , [1, 0, 0, 0, 0, 0, 1, 0, 5, 3, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$[y_1, 0, y_5, 0, 0, 0, y_7, y_5, y_6, y_4, y_2, y_3]$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{2, 3, 4, 5, 6, 7, 8, 10, 11, 12}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 2, 1, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 3, 1, 2, 0, 1, 2, 1] , [0, 1, 3, 2, 1, 1, 2, 2, 0, 1, 1, 2] , [0, 1, 1, 1, 2, 2, 1, 3, 0, 1, 2, 2] , [0, 1, 2, 2, 2, 1, 1, 1, 0, 2, 1, 3] , [0, 2, 1, 1, 3, 2, 1, 2, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 1, 2, 1, 0, 3, 1, 2] , [0, 3, 1, 1, 2, 1, 2, 2, 0, 1, 2, 1] , [0, 1, 1, 2, 1, 1, 3, 1, 0, 2, 2, 2]] \$

$[0, y_9, y_{10}, y_8, y_6, y_7, y_5, y_4, 0, y_3, y_1, y_2]$

1636 . Coloring, {2, 4, 5, 7, 8, 10, 11}

R: [7, 8, 7, 7, 3, A, A, B, B, 2, 4, 5]

B: [6, 7, 8, 6, A, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	7 vs 9

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 0, 3, 2, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 0, 4, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 1, 3, 0, 4, 3, 0] , [0, 4, 0, 3, 0, 0, 2, 3, 0, 1, 3, 0] , [0, 1, 0, 3, 0, 0, 3, 4, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 1, 0, 3, 4, 0] , [0, 3, 0, 4, 0, 0, 3, 2, 0, 3, 1, 0]] \$

$[0, y_1, y_2, y_3, y_4, 0, y_5, y_6, 0, y_7, y_8, 0]$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 2, 4] , [2, 0, 2, 0, 0, 2, 0, 1, 4, 0, 1, 4] , [1, 0, 2, 0, 0, 2, 0, 2, 4, 0, 0, 5] , [0, 0, 2, 0, 0, 1, 0, 2, 5, 0, 0, 6] , [0, 0, 1, 0, 0, 0, 0, 2, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_4, 0, y_3, 0, 0, y_2, y_7, y_1, y_4 + y_3 - y_2 - y_1 - y_6 + y_5, y_7, y_6, y_5]$$

$$p' = s^7 - s^8 \quad p = s^7 - s^9$$

1637 . Coloring, {2, 4, 5, 7, 8, 10, 12}

R: [7, 8, 7, 7, 3, A, A, B, B, 2, 1, 9]

B: [6, 7, 8, 6, A, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 3, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 2, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 3, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 2, 3, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 3, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 3, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 3, 2, 0, 3, 3, 0]] \$

$$[y_7, y_6, y_5, 0, 0, 0, y_4, y_3, 2y_5, y_2, y_1, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 2, 4] , [0, 0, 2, 2, 4, 2, 0, 1, 0, 2, 1, 2] , [0, 0, 2, 1, 2, 2, 0, 2, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 1, 0, 2, 0, 2, 0, 6] , [0, 0, 1, 0, 6, 0, 0, 2, 0, 3, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 1, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5]] \$

[0, 0, y₁, y₂, y₃, y₄, y₅, y₆, 0, y₇, y₉, y₈]

1638 . Coloring, {2, 4, 5, 7, 8, 11, 12}

R: [7, 8, 7, 7, 3, A, A, B, B, C, 4, 9]

B: [6, 7, 8, 6, A, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 3, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 3, 3, 3]] \$

[0, 0, y₇, y₁, 0, 0, y₂, y₇, y₅, y₆, y₄, y₃]

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 2, 3, 5, 6, 7, 8, 10, 11, 12}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 2, 2, 1, 0, 2, 1, 1] , [1, 2, 2, 0, 1, 2, 1, 2, 0, 2, 2, 1] , [2, 2, 2, 0, 1, 1, 2, 2, 0, 1, 1, 2] , [1, 1, 1, 0, 2, 2, 2, 2, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 1, 1, 1, 0, 2, 2, 2] , [2, 2, 1, 0, 2, 2, 1, 2, 0, 2, 1, 1] , [1, 2, 2, 0, 1, 2, 2, 1, 0, 2, 1, 2] , [1, 2, 2, 0, 2, 1, 2, 2, 0, 1, 2, 1] , [2, 1, 1, 0, 1, 1, 2, 2, 0, 2, 2, 2]] \$

[y₁, y₂, y₃, 0, y₇, y₆, y₄, y₅, 0, y₉, y₈, y₁₀]

1639 . Coloring, {2, 4, 5, 7, 9, 10, 11}

R: [7, 8, 7, 7, 3, A, A, C, C, 2, 4, 5]

B: [6, 7, 8, 6, A, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{2, 3, 5, 7, 8, 10, 12\}\}$ order: 7

See Matrix

$\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 0, 2] , [0, 3, 2, 0, 2, 0, 3, 2, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 0, 2, 3, 0, 3, 0, 2] , [0, 3, 1, 0, 2, 0, 2, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 1, 3, 0, 2, 0, 3] , [0, 2, 3, 0, 3, 0, 2, 2, 0, 1, 0, 3] , [0, 1, 3, 0, 3, 0, 3, 2, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 0, 3, 1, 0, 3, 0, 2]] \$$

$[0, y_6, y_5, y_4, y_3, 0, y_2, y_1, 0, y_8, 0, y_7]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 11\}\}$ order: 5

See Matrix

$\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 4, 2] , [4, 0, 2, 0, 0, 2, 0, 1, 2, 0, 4, 1] , [4, 0, 2, 0, 0, 4, 0, 2, 1, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 0, 4, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 0, 4, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 0, 3, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 0, 3, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 0, 2, 0, 0, 3, 0]] \$$

$[y_2, 0, y_1, 0, 0, y_8, y_7, y_6, y_5, y_7, y_4, y_3]$

$$p = s^4 - s^9$$

1640 . Coloring, $\{2, 4, 5, 7, 9, 10, 12\}$

R: [7, 8, 7, 7, 3, A, A, C, C, 2, 1, 9]

B: [6, 7, 8, 6, A, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 3, 2, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 0, 3, 3, 3, 0, 4] , [0, 3, 0, 0, 0, 0, 3, 4, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 3, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[2 y₅, y₄, y₅, 0, 0, 0, y₁, y₂, y₃, y₇, 0, y₆]

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{3, 4, 6, 8, 11}, {5, 10, 12}}

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 2, 0, 1, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 4, 0, 2, 0, 2, 1, 2] , [0, 0, 4, 1, 2, 2, 0, 2, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 1, 0, 4, 0, 2, 2, 1] , [0, 0, 1, 2, 1, 2, 0, 2, 0, 2, 4, 2] , [0, 0, 2, 4, 2, 2, 0, 1, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 4, 0, 2, 0, 2, 1, 1] , [0, 0, 4, 1, 1, 2, 0, 2, 0, 2, 2, 2]] \$

[0, 0, -5 y₁ + 11 y₂ - 5 y₃ - 5 y₄ - 5 y₅ + 11 y₆ - 5 y₇ + 11 y₈, 5 y₁, 5 y₂, 5 y₃, 5 y₄, 5 y₅, 0, 5 y₆, 5 y₇, 5 y₈]

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

1641 . Coloring, {2, 4, 5, 7, 9, 11, 12}

R: [7, 8, 7, 7, 3, A, A, C, C, C, 4, 9]

B: [6, 7, 8, 6, A, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 3, 0, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, y_5, 2y_5, 0, 0, y_3, y_5, y_4, y_1, 0, y_2]$$

$$p' = -s^4 + s^6 \quad p = -s^4 + s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 4, 0], [4, 1, 2, 0, 0, 2, 2, 1, 0, 2, 2, 0], [2, 2, 2, 0, 0, 4, 1, 2, 0, 0, 3, 0], [3, 0, \\ & 4, 0, 0, 2, 2, 2, 0, 0, 3, 0], [3, 0, 2, 0, 0, 3, 0, 4, 0, 0, 4, 0], [4, 0, 3, 0, 0, 3, 0, 2, 0, 0, 4, 0], [4, 0, 3, 0, 0, 4, \\ & 0, 3, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 0, 3, 0, 0, 3, 0], [3, 0, 4, 0, 0, 2, 0, 4, 0, 0, 3, 0]] \$ \end{aligned}$$

$$[y_9, y_8, y_7, 0, y_6, y_5, y_4, y_3, 0, y_2, y_1, 0]$$

1642 . Coloring, {2, 4, 5, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, A, C, B, 2, 4, 9]

B: [6, 7, 8, 6, A, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 4, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 3, 2, 1, 3, 2, 1], [0, 3, 0, 2, 0, 0, 1, 3, 1, 3, 1, 2], [0, 3, \\ & 0, 1, 0, 0, 2, 3, 2, 1, 1, 3], [0, 1, 0, 1, 0, 0, 1, 3, 3, 2, 2, 3], [0, 2, 0, 2, 0, 0, 1, 1, 3, 1, 3, 3], [0, 1, 0, 3, 0, 0, \\ & 2, 2, 3, 1, 3, 1], [0, 1, 0, 3, 0, 0, 3, 1, 1, 2, 3, 2], [0, 2, 0, 3, 0, 0, 3, 1, 2, 3, 1, 1]] \$ \end{aligned}$$

$$[0, y_1, y_2, y_9, 0, 0, y_8, y_7, y_5, y_6, y_3, y_4]$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 8, 11}}

See Matrix

$$\begin{aligned} \$ [& [2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 0, 1, 0, 2, 2, 1], [2, 0, 2, 0, 1, 3, 0, 2, 0, 3, 1, 2], [1, 0, \\ & 3, 0, 2, 2, 0, 2, 0, 1, 2, 3], [2, 0, 2, 0, 3, 1, 0, 3, 0, 2, 2, 1], [2, 0, 1, 0, 1, 2, 0, 2, 0, 3, 3, 2], [3, 0, 2, 0, 2, 2, \\ & 0, 1, 0, 1, 2, 3], [2, 0, 2, 0, 3, 3, 0, 2, 0, 2, 1, 1], [1, 0, 3, 0, 1, 2, 0, 2, 0, 3, 2, 2]] \$ \end{aligned}$$

$$[3y_1, 0, -3y_1 + 5y_4 - 3y_2 - 3y_3 - 3y_8 + 5y_7 - 3y_6 + 5y_5, 0, 3y_4, 3y_2, 3y_3, 3y_8, 0, 3y_7, 3y_6, 3y_5]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1643 . Coloring, {2, 4, 5, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, B, B, C, 2, 4, 5]

B: [6, 7, 8, 6, A, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 3, 1], [0, 1, 2, 3, 1, 0, 3, 2, 0, 0, 4, 0], [0, 0, 1, 4, 0, 0, 5, 1, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[0, y_4, y_3, y_2, y_4, 0, y_1, y_3, 0, y_5, y_6, y_5]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

$$\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 1, 3], [1, 0, 2, 0, 0, 2, 0, 1, 3, 1, 2, 4], [2, 0, 2, 0, 0, 1, 0, 2, 4, 0, 3, 2], [3, 0, 1, 0, 0, 2, 0, 2, 2, 0, 4, 2], [4, 0, 2, 0, 0, 3, 0, 1, 2, 0, 2, 2], [2, 0, 3, 0, 0, 4, 0, 2, 2, 0, 2, 1], [2, 0, 4, 0, 0, 2, 0, 3, 1, 0, 2, 2], [2, 0, 2, 0, 0, 2, 0, 4, 2, 0, 1, 3], [1, 0, 2, 0, 0, 2, 0, 2, 3, 0, 2, 4]] \$$$

$$[y_9, 0, y_8, 0, 0, y_7, y_6, y_5, y_4, y_3, y_2, y_1]$$

1644 . Coloring, {2, 4, 5, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, B, B, C, 2, 1, 9]

B: [6, 7, 8, 6, A, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 3, 2, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 1, 2, 0, 5, 1], [5, 0, \\ & 0, 0, 0, 0, 4, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, \\ & 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1]] \$ \end{aligned}$$

$$[-3y_5 - 6y_6 - 3y_1 - 3y_7 + 13y_2 - 3y_3 + 13y_4, 3y_5, 3y_6, 0, 0, 0, 3y_1, 3y_7, 3y_2, 3y_6, 3y_3, 3y_4]$$

$$p = -s^4 + s^6 + s^7 - s^9 \quad p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 0, 1, 0, 3, 0, 4], [0, 0, 2, 0, 4, 1, 0, 2, 0, 3, 0, 4], [0, 0, \\ & 1, 0, 4, 0, 0, 2, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 0, 1, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, \\ & 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$ \end{aligned}$$

$$[0, 0, y_1, y_2, y_3, y_4, y_8, y_7, 0, y_5, y_8, y_6]$$

$$p = -s^6 + s^9$$

1645 . Coloring, {2, 4, 5, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, B, B, C, C, 4, 9]

B: [6, 7, 8, 6, A, 3, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	4 vs 8	10 vs 10

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3]] \$

$[0, 0, 3 y_4, -3 y_1 - 6 y_4 + 10 y_3 - 3 y_2, 0, 0, 3 y_1, 3 y_4, -3 y_4 + 3 y_3, 3 y_4, 3 y_2, 3 y_3]$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6 \quad p''' = -s^2 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 2, 1, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 1, 3, 2, 0, 3, 0, 1] , [0, 3, 1, 0, 1, 0, 3, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 3, 1, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 4, 0, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 0]] \$

$[y_1, y_2, y_3, 0, y_6, y_7, y_5, y_4, 0, y_{10}, y_8, y_9]$

1646 . Coloring, {2, 4, 5, 8, 10, 11, 12}

R: [7, 8, 7, 7, 3, A, B, B, B, 2, 4, 9]

B: [6, 7, 8, 6, A, 3, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

$\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 4, 0], [0, 1, 0, 4, 0, 0, 3, 2, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 1, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$

$$[0, y_4, y_5, y_3, 0, 0, y_2, y_1, 2y_5, y_5, y_6, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
See Matrix

$\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 0, 4], [0, 0, 2, 0, 4, 2, 0, 1, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 0, 2, 0, 4, 0, 4], [0, 0, 0, 0, 4, 0, 0, 2, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$$

$$[2y_1, 0, y_4, 0, y_3, y_2, y_1, y_7, 0, y_6, 0, y_5]$$

$$p = s^5 - s^8$$

1647 . Coloring, {2, 4, 5, 9, 10, 11, 12}

R: [7, 8, 7, 7, 3, A, B, C, C, 2, 4, 9]

B: [6, 7, 8, 6, A, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}, \{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 2, 2], [0, 1, 0, 2, 0, 0, 3, 2, 2, 0, 3, 3], [0, 0, 0, 3, 0, 0, 2, 1, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 3, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4]] \$$

$$[0, y_4 + y_1 + y_2 - y_6, y_4, y_4 + 2y_1 + 2y_2 - y_3 - y_5, 0, 0, y_3, y_1, y_2, y_4, y_5, y_6]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7 \quad p'' = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}, \{1, 3, 6, 8, 11\}\}$

See Matrix

$\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 2, 2], [2, 0, 2, 0, 2, 2, 0, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 2, 0, 2, 0, 2, 1, 3], [1, 0, 2, 0, 3, 1, 0, 2, 0, 3, 2, 2], [2, 0, 1, 0, 2, 1, 0, 2, 0, 3, 2, 3], [2, 0, 1, 0, 3, 2, 0, 1, 0, 2, 2, 3], [2, 0, 2, 0, 3, 2, 0, 1, 0, 3, 1, 2], [1, 0, 2, 0, 2, 2, 0, 2, 0, 3, 1, 3], [1, 0, 2, 0, 3, 1, 0, 2, 0, 2, 2, 3]] \$$

$$[y_2, 0, y_1, 0, y_2 + y_1 + y_8 - y_7 + y_6 - y_5 + y_3 - y_4, y_8, y_7, y_6, 0, y_5, y_3, y_4]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1648 . Coloring, $\{2, 4, 6, 7, 8, 9, 10\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, A, B, C, 2, 1, 5]

B: [6, 7, 8, 6, 3, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 1, 1], [1, 3, 0, 0, 1, 0, 3, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 1, 3, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 1, 5, 0, 1, 3, 0], [3, 1, 0, 0, 0, 0, 2, 4, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 3, 1, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 5, 1, 0, 3, 1, 0], [1, 3, 0, 0, 0, 0, 4, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 1, 3, 0, 4, 2, 0]] \$$

$$[y_4, y_3, y_5, 0, y_2, 0, y_1, -y_4 + y_3 + y_2 + y_1 - y_7 + y_6 - 2y_5, 0, y_7, y_6, y_5]$$

$$p = -s^3 + s^9 \quad p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 3, 3], [0, 0, 0, 3, 0, 2, 0, 1, 3, 2, 3, 2], [0, 0, 0, 3, 0, 3, 0, 0, 2, 2, 3, 3], [0, 0, 0, 3, 0, 3, 0, 0, 3, 3, 2, 2], [0, 0, 0, 2, 0, 3, 0, 0, 2, 3, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 2, 3], [0, 0, 0, 2, 0, 3, 0, 0, 3, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 3, 3, 2], [0, 0, 0, 3, 0, 3, 0, 0, 2, 2, 3, 3]] \$$$

$$[0, 0, y_8, y_7, 0, y_6, y_8, y_5, y_4, y_3, y_2, y_1]$$

$$p = s^3 - s^9$$

1649 . Coloring, {2, 4, 6, 7, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, 3, A, B, C, C, 4, 5]

B: [6, 7, 8, 6, 3, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 1, 3], [0, 0, 0, 1, 3, 0, 3, 0, 0, 5, 1, 3], [0, 0, 0, 1, 3, 0, 1, 0, 0, 6, 0, 5], [0, 0, 0, 5, 0, 1, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 0], [0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$$$

$$[0, 0, y_4, y_2, y_1, 0, y_3, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 2, 1, 1, 2, 3, 1] , [3, 2, 0, 0, 0, 3, 1, 0, 1, 2, 3, 1] , [3, 2, 0, 0, 0, 3, 2, 0, 1, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 3, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 2, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 3, 0, 0, 3, 2, 0]] \$

[y₁, y₂, y₃, 0, 0, y₆, y₄, y₅, y₁₀, y₇, y₈, y₉]

1650 . Coloring, {2, 4, 6, 7, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, A, B, C, C, 1, 9]

B: [6, 7, 8, 6, 3, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 3, 0, 3, 3, 1, 5] , [1, 0, 0, 0, 0, 0, 1, 0, 5, 3, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[y₁, 0, y₆, 0, 0, 0, y₇, y₆, y₅, y₂, y₃, y₄]

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 2, 1, 0, 2, 1, 1] , [0, 2, 1, 1, 1, 3, 1, 2, 0, 2, 2, 1] , [0, 2, 1, 2, 1, 1, 2, 1, 0, 3, 1, 2] , [0, 3, 1, 1, 2, 2, 2, 1, 0, 1, 2, 1] , [0, 1, 2, 2, 1, 1, 3, 1, 0, 2, 2, 1] , [0, 2, 1, 2, 1, 2, 1, 2, 0, 1, 3, 1] , [0, 1, 1, 3, 1, 2, 2, 1, 0, 2, 1, 2] , [0, 2, 1, 1, 2, 3, 1, 1, 0, 2, 2, 1] , [0, 2, 2, 2, 1, 1, 2, 1, 0, 3, 1, 1]] \$

$$[0, 2y_5, -5y_5 + 13y_1 - 5y_2 + 13y_3 - 5y_8 - 2y_7, 2y_6, 2y_1, 2y_2, -2y_6 + 33y_1 + 33y_3 - 2y_4 - 13y_5 - 13y_2 - 13y_8, 2y_3, 0, 2y_4, 2y_8, 2y_7]$$

$$p = s + s^3 - s^7 - s^9 \quad p' = s + s^3 - s^7 - s^9$$

1651 . Coloring, {2, 4, 6, 7, 8, 10, 11}

R: [7, 8, 7, 7, A, 3, A, B, B, 2, 4, 5]

B: [6, 7, 8, 6, 3, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 9

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 3, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 2, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 1, 5, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 2, 3, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 3, 2, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 5, 1, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 3, 2, 0, 5, 1, 0]] \$$$

$$[0, y_1, y_2, y_3, 2y_2, 0, y_4, y_5, 0, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 2, 4], [2, 0, 0, 0, 0, 2, 0, 1, 4, 2, 1, 4], [1, 0, 0, 0, 0, 2, 0, 0, 4, 2, 0, 7], [0, 0, 0, 0, 1, 0, 0, 7, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[y_7, 0, y_6, 0, 0, y_5, y_6, y_3, y_4, y_2, y_6 + y_3, y_1]$$

$$p = s^6 - s^8 \quad p' = s^6 - s^8$$

1652 . Coloring, {2, 4, 6, 7, 8, 10, 12}

R: [7, 8, 7, 7, A, 3, A, B, B, 2, 1, 9]

B: [6, 7, 8, 6, 3, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 3, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 2, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 3, 3, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 2, 3, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 3, 2, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 3, 3, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 3, 2, 0, 3, 3, 0]] \$

[$y_7, y_6, y_5, 0, 0, 0, y_4, y_3, 2y_5, y_2, y_1, 0$]

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 2, 4] , [0, 0, 2, 2, 4, 2, 0, 1, 0, 2, 1, 2] , [0, 0, 4, 1, 2, 2, 0, 2, 0, 2, 0, 3] , [0, 0, 2, 0, 3, 1, 0, 4, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 2, 0, 1, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6]] \$

[0, 0, $y_1, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9$]

1653 . Coloring, {2, 4, 6, 7, 8, 11, 12}

R: [7, 8, 7, 7, A, 3, A, B, B, C, 4, 9]

B: [6, 7, 8, 6, 3, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 10

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 2, 2], [0, 0, 0, 2, 0, 0, 3, 0, 2, 3, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 3, 2, 3], [0, 0, 0, 2, 0, 0, 3, 0, 3, 2, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 3, 3, 2], [0, 0, 0, 3, 0, 0, 3, 0, 2, 2, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 3, 2, 2], [0, 0, 0, 2, 0, 0, 3, 0, 2, 3, 3, 3]] \$$

$[0, 0, y_6, y_7, 0, 0, y_5, y_6, y_3, y_4, y_2, y_1]$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {1, 2, 6, 7, 10, 11}} order: 12

See Matrix

$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 2, 2], [2, 1, 2, 0, 2, 2, 2, 1, 0, 2, 1, 1], [1, 2, 2, 0, 1, 2, 1, 2, 0, 2, 2, 1], [2, 2, 1, 0, 1, 1, 2, 2, 0, 2, 1, 2], [1, 2, 1, 0, 2, 2, 2, 1, 0, 1, 2, 2], [2, 1, 2, 0, 2, 1, 2, 1, 0, 2, 2, 1], [2, 2, 2, 0, 1, 2, 1, 2, 0, 1, 2, 1], [2, 1, 1, 0, 1, 2, 2, 2, 0, 2, 1, 2], [1, 2, 1, 0, 2, 2, 1, 1, 0, 2, 2, 2], [2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 1, 1]] \$$

$[-3y_1 + 10y_7 - 3y_6 - 3y_5 + 10y_4 - 3y_3 - 3y_2, 3y_1, 3y_7 + 3y_4 - 3y_8, 0, 3y_7, 3y_6, 3y_5, 3y_4, 0, 3y_3, 3y_2, 3y_8]$

$$p' = -s - s^3 + s^7 + s^9 \quad p = -s - s^3 + s^7 + s^9$$

1654 . Coloring, {2, 4, 6, 7, 9, 10, 11}

R: [7, 8, 7, 7, A, 3, A, C, C, 2, 4, 5]

B: [6, 7, 8, 6, 3, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 3, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 3, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 5, 0, 1, 0, 3] , [0, 1, 0, 0, 3, 0, 0, 5, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 1, 0, 3, 0, 5] , [0, 3, 0, 0, 5, 0, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 3, 0, 5, 0, 2]] \$

[0, y₁, y₂, 2 y₂, y₃, 0, y₄, y₆, 0, y₅, 0, y₇]

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 4, 2] , [4, 0, 0, 0, 0, 2, 0, 1, 2, 2, 4, 1] , [4, 0, 0, 0, 0, 4, 0, 0, 1, 2, 3, 2] , [3, 0, 0, 0, 0, 4, 0, 0, 2, 4, 1, 2] , [1, 0, 0, 0, 0, 3, 0, 0, 2, 4, 2, 4] , [2, 0, 0, 0, 0, 1, 0, 0, 4, 3, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 1, 4, 3] , [4, 0, 0, 0, 0, 2, 0, 0, 3, 2, 4, 1] , [4, 0, 0, 0, 0, 4, 0, 0, 1, 2, 3, 2]] \$

[y₈, 0, y₇, 0, 0, y₆, y₇, y₅, y₄, y₃, y₂, y₁]

$$p = s^3 - s^9$$

1655 . Coloring, {2, 4, 6, 7, 9, 10, 12}

R: [7, 8, 7, 7, A, 3, A, C, C, 2, 1, 9]

B: [6, 7, 8, 6, 3, A, B, B, B, C, 4, 5]

‘ See graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 3, 2, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 0, 3, 3, 3, 0, 4] , [0, 3, 0, 0, 0, 0, 3, 4, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 3, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[2 y_2, y_1, y_2, 0, 0, 0, y_3, y_4, y_7, y_5, 0, y_6]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{3, 4, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 4, 2], [0, 0, 2, 4, 2, 2, 0, 1, 0, 2, 2, 1], [0, 0, 2, 2, 1, 4, 0, 2, 0, 2, 1, 2], [0, 0, 1, 1, 2, 2, 0, 2, 0, 4, 2, 2], [0, 0, 2, 2, 2, 1, 0, 1, 0, 2, 2, 4], [0, 0, 2, 2, 4, 2, 0, 2, 0, 1, 1, 2], [0, 0, 4, 1, 2, 2, 0, 2, 0, 2, 2, 1], [0, 0, 2, 2, 1, 1, 0, 4, 0, 2, 2, 2], [0, 0, 1, 2, 2, 2, 0, 2, 0, 1, 4, 2]] \$$$

$$[0, 0, y_1, y_2, y_9, y_8, y_6, y_7, 0, y_5, y_4, y_3]$$

1656 . Coloring, {2, 4, 6, 7, 9, 11, 12}

R: [7, 8, 7, 7, A, 3, A, C, C, C, 4, 9]

B: [6, 7, 8, 6, 3, A, B, B, B, 2, 1, 5]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 0, 4], [0, 0, 0, 0, 0, 0, 3, 0, 4, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[0, 0, y_3, 2 y_3, 0, 0, y_4, y_3, y_1, y_2, 0, y_5]$$

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 4, 0], [4, 1, 2, 0, 0, 2, 2, 1, 0, 2, 2, 0], [2, 2, 0, 0, 0, 4, 1, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 2, 2, 0, 0, 4, 3, 0], [3, 4, 0, 0, 0, 3, 2, 0, 0, 2, 2, 0], [2, 2, 0, 0, 0, 3, 4, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 2, 0, 0, 3, 4, 0], [4, 3, 0, 0, 0, 2, 3, 0, 0, 2, 2, 0], [2, 2, 0, 0, 0, 4, 3, 0, 0, 2, 3, 0]] \$$$

$$[y_9, y_8, y_7, 0, y_6, y_5, y_4, y_3, 0, y_2, y_1, 0]$$

1657 . Coloring, {2, 4, 6, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, A, C, B, 2, 4, 9]

B: [6, 7, 8, 6, 3, A, B, B, C, C, 1, 5]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 9

Omega Rank for R : cycles: {{2, 4, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 0, 3, 2, 1, 3, 2, 1] , [0, 3, 0, 2, 0, 0, 1, 3, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 0, 2, 3, 2, 1, 1, 3] , [0, 1, 0, 1, 0, 0, 1, 3, 3, 2, 2, 3] , [0, 2, 0, 2, 0, 0, 1, 1, 3, 1, 3, 3] , [0, 1, 0, 3, 0, 0, 2, 2, 3, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 3, 1, 1, 2, 3, 2] , [0, 2, 0, 3, 0, 0, 3, 1, 2, 3, 1, 1]] \$

$$[0, y_1, y_2, y_3, 0, 0, y_4, y_7, y_5, y_6, y_8, y_9]$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 2, 0, 1, 0, 2, 2, 1] , [2, 0, 3, 0, 1, 3, 0, 2, 0, 2, 1, 2] , [1, 0, 1, 0, 2, 2, 0, 3, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 1, 0, 1, 0, 2, 3, 3] , [3, 0, 2, 0, 3, 2, 0, 2, 0, 1, 1, 2] , [1, 0, 3, 0, 2, 3, 0, 2, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 1, 0, 3, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 2, 0, 2, 0, 1, 3, 3]] \$

$$[y_1, 0, y_9, 0, y_8, y_7, y_6, y_5, 0, y_4, y_3, y_2]$$

1658 . Coloring, {2, 4, 6, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, B, B, C, 2, 4, 5]

B: [6, 7, 8, 6, 3, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 3, 1] , [0, 1, 0, 3, 1, 0, 3, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 3, 1, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 4, 2, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

[0, $y_1, y_8, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8$]

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 1, 3, 3, 2, 4] , [2, 0, 0, 0, 0, 1, 0, 0, 4, 2, 3, 4] , [3, 0, 0, 0, 2, 0, 0, 4, 1, 4, 2] , [4, 0, 0, 0, 0, 3, 0, 0, 2, 2, 4, 1] , [4, 0, 0, 0, 0, 4, 0, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 4, 0, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 4, 2, 4] , [2, 0, 0, 0, 0, 1, 0, 0, 4, 2, 3, 4]] \$

[2 $y_7 + y_2 - y_1 - y_5 - y_6 + y_4 + y_3, 0, y_7, 0, 0, y_2, y_7, y_1, y_5, y_6, y_4, y_3$]

$$p = -s^3 + s^9 \quad p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1659 . Coloring, {2, 4, 6, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, 3, B, B, C, 2, 1, 9]

B: [6, 7, 8, 6, 3, A, A, C, B, C, 4, 5]

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 3, 2, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 1, 2, 0, 5, 1], [5, 0, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1]] \$$

$[3 y_6, 3 y_5, 3 y_4, 0, 0, 0, 3 y_3, 3 y_2, 3 y_1, 3 y_4, -3 y_6 - 3 y_5 - 6 y_4 - 3 y_3 - 3 y_2 + 13 y_1 + 13 y_7, 3 y_7]$

$$p' = s^4 + s^5 - s^7 - s^8 \quad p = s^4 - s^6 - s^7 + s^9$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8
See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 0, 1, 0, 3, 0, 4], [0, 0, 3, 0, 4, 1, 0, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 3, 0, 1, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$$

$[0, 0, -y_5 + y_2 + y_1 - y_3, -y_4 + y_2 + y_1, y_4, y_5, y_3, y_2, 0, y_1, y_3, y_2 + y_1 - y_3]$

$$p = s^5 - s^9 \quad p' = s^5 - s^8 \quad p' = s^6 - s^8 \quad p' = s^7 - s^8$$

1660 . Coloring, $\{2, 4, 6, 8, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, B, B, C, C, 4, 9]

B: [6, 7, 8, 6, 3, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	4 vs 8	9 vs 10

Omega Rank for R : cycles: $\{\{9, 12\}, \{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3]] \$$

$$[0, 0, 3 y_4, 3 y_3, 0, 0, 3 y_2, 3 y_4, 3 y_1, 3 y_4, 4 y_4 - 3 y_3 - 3 y_2 + 10 y_1, 3 y_4 + 3 y_1]$$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p' = s^2 - s^5 \quad p = s^2 - s^8$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}, \{3, 5, 8, 12\}\}$ order: 12

See Matrix

$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 1, 1], [1, 3, 2, 0, 1, 2, 2, 1, 0, 3, 0, 1], [0, 3, 1, 0, 1, 1, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 1, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 4, 1, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 4, 1, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 4, 1, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 4, 1, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 3, 1, 0, 4, 0, 1]] \$$

$$[5 y_6, 5 y_5, 5 y_4, 0, 5 y_3, 5 y_2, -5 y_6 - 5 y_5 + 11 y_4 + 11 y_3 - 5 y_2 + 11 y_1 - 5 y_9 - 5 y_8 + 11 y_7, 5 y_1, 0, 5 y_9, 5 y_8, 5 y_7]$$

$$p = s^4 + s^5 + s^6 - s^8 - s^9 - s^{10}$$

1661 . Coloring, $\{2, 4, 6, 8, 10, 11, 12\}$

R: $[7, 8, 7, 7, A, 3, B, B, B, 2, 4, 9]$

B: $[6, 7, 8, 6, 3, A, A, C, C, C, 1, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	4 vs 8

Omega Rank for R : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 4, 0], [0, 1, 0, 4, 0, 0, 3, 2, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 1, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$

$$[0, y_1, y_4, y_2, 0, 0, y_6, y_3, 2y_4, y_4, y_5, 0]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\begin{aligned} \$ [& [2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 0, 4], [0, 0, 2, 0, 4, 2, 0, 1, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 0, 2, 0, 2, 0, 4], [0, 0, \\ & 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, \\ & 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$ \end{aligned}$$

$$[2y_2, 0, -y_2 + y_4 - y_1, 0, -2y_2 + y_4, y_1, y_2, y_4 - y_3, 0, y_3, 0, y_4]$$

$$p = s^4 - s^6 \quad p' = s^4 - s^5 \quad p'' = -s^5 + s^7 \quad p''' = -s^5 + s^6$$

1662 . Coloring, {2, 4, 6, 9, 10, 11, 12}

R: [7, 8, 7, 7, A, 3, B, C, C, 2, 4, 9]

B: [6, 7, 8, 6, 3, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 2, 2], [0, 1, 0, 2, 0, 0, 3, 2, 2, 0, 3, 3], [0, 0, 0, 3, 0, 0, 2, 1, 3, 0, 3, 4], [0, 0, \\ & 0, 3, 0, 0, 3, 0, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, \\ & 3, 0, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3, 4]] \$ \end{aligned}$$

$$[0, y_2, y_3, -y_3 - y_1 + 2y_2 + 2y_5 - y_4, 0, 0, y_1, y_2 - y_3 - y_6 + y_5, y_6, y_3, y_4, y_5]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7 \quad p'' = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 2, 0, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 2, 0, 2, 1, 3] , [1, 0, 3, 0, 3, 1, 0, 2, 0, 2, 2, 2] , [2, 0, 3, 0, 2, 1, 0, 3, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 2, 0, 3, 0, 1, 3, 1] , [3, 0, 2, 0, 1, 2, 0, 2, 0, 2, 3, 1] , [3, 0, 1, 0, 1, 3, 0, 2, 0, 2, 2, 2] , [2, 0, 1, 0, 2, 3, 0, 1, 0, 3, 2, 2]] \$

$$[-y_1 + y_5 + y_6, 0, y_5 + y_6 - y_2 - y_3, 0, y_1, y_2, y_3, -y_4 + y_5 + y_6, 0, y_4, y_5, y_6]$$

$$p' = -s^3 + s^4 - s^7 + s^8 \quad p' = s^2 - s^3 + s^6 - s^7 \quad p = s^2 - s^4 + s^6 - s^8$$

1663 . Coloring, {2, 4, 7, 8, 9, 10, 11}

R: [7, 8, 7, 7, A, A, A, B, C, 2, 4, 5]

B: [6, 7, 8, 6, 3, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 0, 2, 2, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 1, 4, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 1, 5, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 2, 3, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 4, 1, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 5, 1, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 3, 2, 0, 5, 1, 0]] \$

$$[0, y_1 - y_2 - y_3 + y_7 + y_4 - y_5 + y_6, 0, y_1, y_2, 0, y_3, y_7, 0, y_4, y_5, y_6]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 0, 3, 3] , [3, 0, 2, 0, 0, 2, 0, 2, 3, 0, 3, 1] , [3, 0, 2, 0, 0, 3, 0, 2, 1, 0, 3, 2] , [3, 0, 3, 0, 0, 3, 0, 2, 2, 0, 1, 2] , [1, 0, 3, 0, 0, 3, 0, 3, 2, 0, 2, 2] , [2, 0, 3, 0, 0, 1, 0, 3, 2, 0, 2, 3] , [2, 0, 1, 0, 0, 2, 0, 3, 3, 0, 2, 3] , [2, 0, 2, 0, 0, 2, 0, 1, 3, 0, 3, 3]] \$

$$[y_8, 0, y_7, 0, 0, y_6, y_5, y_3, y_4, 0, y_1, y_2]$$

1664 . Coloring, {2, 4, 7, 8, 9, 10, 12}

R: [7, 8, 7, 7, A, A, A, B, C, 2, 1, 9]

B: [6, 7, 8, 6, 3, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 0, 2, 2, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 0, 1, 4, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 0, 1, 3, 1, 1, 4, 2] , [4, 1, 0, 0, 0, 0, 2, 2, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 0, 4, 1, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 3, 1, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 0, 2, 2, 1, 3, 1, 2]] \$

$[-3 y_2 + 8 y_3 - 3 y_4 + 5 y_6, -3 y_1 + 5 y_3 - 3 y_5 + 8 y_6, 0, 0, 0, 0, 3 y_1, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6]$

$$p = -s + s^7 \quad p' = -s + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 0, 3, 3] , [0, 0, 4, 3, 3, 2, 0, 2, 0, 0, 1, 1] , [0, 0, 5, 1, 1, 3, 0, 4, 0, 0, 0, 2] , [0, 0, 4, 0, 2, 1, 0, 5, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4]] \$

$[0, 0, -y_1 + y_2 + y_3 - y_4 + y_5 + y_6 - y_7, y_1, y_2, y_3, y_4, y_5, 0, 0, y_6, y_7]$

$$p = -s^5 + s^6 - s^7 + s^8$$

1665 . Coloring, {2, 4, 7, 8, 9, 11, 12}

R: [7, 8, 7, 7, A, A, A, B, C, C, 4, 9]

B: [6, 7, 8, 6, 3, 3, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 3, 1, 6] , [0, 0, 0, 1, 0, 0, 1, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[0, 0, 0, y_7 , 0, 0, y_6 , y_5 , y_3 , y_4 , y_2 , y_1]

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 0, 3, 1] , [3, 0, 4, 0, 1, 2, 2, 2, 0, 0, 1, 1] , [1, 0, 3, 0, 1, 3, 0, 4, 0, 0, 2, 2] , [2, 0, 4, 0, 2, 1, 0, 3, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 2, 0, 4, 0, 0, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 6, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 3, 0, 0, 0, 6] , [0, 0, 3, 0, 6, 0, 0, 4, 0, 0, 0, 3]] \$

[y_3 , y_1 , y_2 , 0, y_4 , y_5 , y_6 , y_7 , 0, 0, y_8 , y_9]

1666 . Coloring, {2, 4, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, A, B, B, 2, 4, 9]

B: [6, 7, 8, 6, 3, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 2, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 2, 4, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 0, 3, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 2, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 4, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 0, 3, 3, 0, 4, 2, 0]] \$$

$$[0, y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_7, y_6, 0]$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 0, 2, 4] , [2, 0, 4, 0, 4, 2, 0, 2, 0, 0, 1, 1] , [1, 0, 6, 0, 1, 2, 0, 4, 0, 0, 0, 2] , [0, 0, 3, 0, 2, 1, 0, 6, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4]] \$$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, y_6, 0, 0, y_7, y_8]$$

1667 . Coloring, $\{2, 4, 7, 9, 10, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, A, A, C, C, 2, 4, 9]

B: [6, 7, 8, 6, 3, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 2, 2, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 0, 4, 3, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 3, 4, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$$[0, y_2, 0, y_3, 0, 0, y_1, y_5, y_6, y_7, 0, y_4]$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 0, 4, 2], [4, 0, 4, 0, 2, 2, 0, 2, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 0, 4, 0, 0, 2, 0], [2, 0, 4, 0, 0, 2, 0, 4, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 0, 4, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 0, 2, 0, 0, 4, 0], [4, 0, 4, 0, 0, 4, 0, 2, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 0, 4, 0, 0, 2, 0]] \$$$

$$[y_1, 0, y_2, 0, y_3, y_5, y_6, y_7, 0, 0, y_4, 2 y_6]$$

$$p = -s^3 + s^8$$

1668 . Coloring, {2, 4, 8, 9, 10, 11, 12}

R: [7, 8, 7, 7, A, A, B, B, C, 2, 4, 9]

B: [6, 7, 8, 6, 3, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 2, 3, 1], [0, 2, 0, 3, 0, 0, 2, 2, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 3, 2, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2]] \$$$

$$[0, 3 y_5, 0, 3 y_4, 0, 0, 3 y_3, 3 y_2, 3 y_1, -3 y_5 - 3 y_4 - 3 y_3 - 3 y_2 + 13 y_1 - 3 y_7 + 13 y_6, 3 y_7, 3 y_6]$$

$$p = s^4 + s^5 - s^7 - s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 2, 1, 3], [1, 0, 4, 0, 3, 2, 0, 2, 0, 1, 0, 3], [0, 0, 5, 0, 3, 1, 0, 4, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5]] \$$$

$$[y_6, 0, y_4, 0, y_5, y_3, y_2, y_4 - y_5 - y_3 + y_1, 0, y_6, y_2, y_1]$$

$$p' = -s^4 + s^8 \quad p' = s^4 - s^5 + s^6 - s^7 \quad p = s^4 - s^8$$

1669 . Coloring, {2, 5, 6, 7, 8, 9, 10}

R: [7, 8, 7, 6, 3, 3, A, B, C, 2, 1, 5]

B: [6, 7, 8, 7, A, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	7 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 1, 1] , [1, 2, 3, 0, 1, 0, 4, 2, 0, 2, 1, 0] , [1, 2, 1, 0, 0, 0, 4, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 2, 4, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 2, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 4, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 2, 0, 4, 2, 0]] \$

$$[y_1 - y_2 + y_3 + y_4 - y_5 - y_6 + y_8, y_1, y_2, 0, y_3, y_7, y_4, y_5, 0, y_6, y_8, y_7]$$

$$p = -s^4 + s^{10} \quad p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, 0, 0, y_1, 0, y_3, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

1670 . Coloring, {2, 5, 6, 7, 8, 9, 11}

R: [7, 8, 7, 6, 3, 3, A, B, C, C, 4, 5]

B: [6, 7, 8, 7, A, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 2, 2, 0, 0, 2, 1, 2] , [0, 0, 5, 1, 2, 1, 3, 0, 0, 2, 0, 2] , [0, 0, 3, 0, 2, 1, 5, 0, 0, 3, 0, 2] , [0, 0, 3, 0, 2, 0, 3, 0, 0, 5, 0, 3] , [0, 0, 2, 0, 3, 0, 3, 0, 0, 3, 0, 5] , [0, 0, 3, 0, 5, 0, 2, 0, 0, 3, 0, 3] , [0, 0, 5, 0, 3, 0, 3, 0, 0, 2, 0, 3] , [0, 0, 3, 0, 3, 0, 5, 0, 0, 3, 0, 2]] \$

[0, 0, y_1 , y_2 , y_3 , y_4 , y_5 , y_6 , 0, y_7 , y_8 , y_9]

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 2, 0, 1, 1, 4, 1] , [4, 1, 0, 0, 0, 3, 2, 0, 1, 2, 3, 0] , [3, 2, 0, 0, 0, 4, 1, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 2, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 3, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 1, 4, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 3, 0, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 3, 3, 0, 0, 2, 3, 0]] \$

[y_1 , y_2 , 0, 0, 0, y_7 , y_8 , y_9 , y_6 , y_5 , y_3 , y_4]

1671 . Coloring, {2, 5, 6, 7, 8, 9, 12}

R: [7, 8, 7, 6, 3, 3, A, B, C, C, 1, 9]

B: [6, 7, 8, 7, A, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6
See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 1, 3] , [1, 0, 1, 0, 0, 0, 4, 0, 3, 2, 1, 4] , [1, 0, 0, 0, 0, 0, 2, 0, 4, 4, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 5, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[y_1, 0, y_3 + y_6, 0, 0, y_3, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p' = s^6 - s^8 \quad p = -s^6 + s^8$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 4, 0, 0, 3, 2, 1] , [0, 3, 0, 2, 1, 0, 5, 0, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 5, 0, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, y_1, 0, y_8, y_7, y_6, y_5, y_6, 0, y_4, y_3, y_2]$$

$$p = s^6 - s^9$$

1672 . Coloring, {2, 5, 6, 7, 8, 10, 11}

R: [7, 8, 7, 6, 3, 3, A, B, B, 2, 4, 5]

B: [6, 7, 8, 7, A, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	9 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{2, 3, 4, 6, 7, 8, 10, 11\}\}$ order: 8

See Matrix

$\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 2, 0], [0, 2, 3, 2, 0, 2, 2, 2, 0, 2, 1, 0], [0, 2, 2, 1, 0, 2, 3, 2, 0, 2, 2, 0], [0, 2, 2, 2, 0, 1, 2, 2, 0, 3, 2, 0], [0, 3, 1, 2, 0, 2, 2, 2, 0, 2, 2, 0], [0, 2, 2, 2, 0, 2, 1, 3, 0, 2, 2, 0], [0, 2, 2, 2, 0, 2, 2, 2, 0, 1, 3, 0], [0, 1, 2, 3, 0, 2, 2, 2, 0, 2, 2, 0], [0, 2, 2, 2, 0, 3, 2, 1, 0, 2, 2, 0]] \$$

$[0, y_4, y_5, y_3, y_2, y_1, y_9, y_8, 0, y_7, y_6, 0]$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 1, 2, 5], [2, 0, 0, 0, 0, 2, 0, 0, 5, 2, 0, 5], [0, 0, 0, 0, 2, 0, 0, 5, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$[y_1, 0, 0, 0, 0, y_2, 2y_5, y_5, y_3, y_6, y_4, y_7]$

$$p = -s^6 + s^8$$

1673 . Coloring, $\{2, 5, 6, 7, 8, 10, 12\}$

R: $[7, 8, 7, 6, 3, 3, A, B, B, 2, 1, 9]$

B: $[6, 7, 8, 7, A, A, B, C, C, C, 4, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	4 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 2, 0], [2, 2, 1, 0, 0, 0, 4, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 3, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 3, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 4, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 3, 2, 0, 4, 2, 0]] \$$

$$[y_8, y_7, y_6, 0, 0, y_5, y_4, y_3, 2y_5, y_2, y_1, 0]$$

$$p = s^3 - s^9$$

Omega Rank for B : cycles: {{5, 10, 12}, {4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 2, 0, 0, 4, 2, 3], [0, 0, 0, 2, 3, 0, 2, 0, 0, 3, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 2, 0, 0, 4, 2, 3], [0, 0, 0, 2, 3, 0, 2, 0, 0, 3, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 2, 3]] \$$$

$$[0, 0, 0, y_4, y_2, y_1, y_4, y_1, 0, 5y_4 - y_2 - 2y_1 - y_3, y_4, y_3]$$

$$p = -s^2 + s^8 \quad p' = -s^3 + s^6 \quad p'' = -s^2 + s^5 \quad p = -s^2 + s^5$$

1674 . Coloring, {2, 5, 6, 7, 8, 11, 12}

R: [7, 8, 7, 6, 3, 3, A, B, B, C, 4, 9]

B: [6, 7, 8, 7, A, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 2, 2], [0, 0, 1, 2, 0, 2, 2, 0, 2, 2, 3, 2], [0, 0, 2, 3, 0, 2, 1, 0, 2, 2, 2, 2], [0, 0, 2, 2, 0, 3, 2, 0, 2, 1, 2, 2], [0, 0, 3, 2, 0, 2, 2, 0, 2, 2, 2, 1], [0, 0, 2, 2, 0, 2, 3, 0, 1, 2, 2, 2], [0, 0, 2, 2, 0, 2, 2, 0, 2, 3, 1, 2], [0, 0, 2, 1, 0, 2, 2, 0, 2, 2, 2, 3], [0, 0, 2, 2, 0, 1, 2, 0, 3, 2, 2, 2]] \$$$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6, y_7, y_9, y_8]$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 2, 2], [2, 2, 0, 0, 2, 2, 2, 0, 0, 3, 2, 1], [2, 3, 0, 0, 1, 2, 2, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 3, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 4, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 2, 3, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 3, 2, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 4, 2, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 2, 0, 0, 4, 2, 0]] \$$$

$$[y_8, y_7, 0, 0, y_6, y_5, y_4, y_3, 0, y_2, y_1, -y_8 + y_7 + y_6 + y_5 - y_4 + y_3 - y_2 + y_1]$$

$$p = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

1675 . Coloring, {2, 5, 6, 7, 9, 10, 11}

R: [7, 8, 7, 6, 3, 3, A, C, C, 2, 4, 5]

B: [6, 7, 8, 7, A, A, B, B, B, C, 1, 9]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

$$\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 0, 2], [0, 2, 3, 0, 2, 2, 2, 2, 0, 2, 0, 1], [0, 2, 4, 0, 1, 0, 3, 2, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 4, 2, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 1, 2, 0, 4, 0, 2], [0, 4, 2, 0, 2, 0, 2, 3, 0, 1, 0, 2], [0, 1, 2, 0, 2, 0, 2, 4, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 2, 1, 0, 2, 0, 4], [0, 2, 3, 0, 4, 0, 2, 2, 0, 2, 0, 1]] \$$$

$$[0, y_8, y_9, y_7, y_5, y_6, y_4, y_3, 0, y_2, 0, y_1]$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 4, 2], [4, 0, 0, 0, 0, 2, 0, 0, 2, 1, 5, 2], [5, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 1], [2, 0, 0, 0, 0, 5, 0, 0, 1, 4, 2, 2], [2, 0, 0, 0, 0, 2, 0, 0, 2, 5, 1, 4], [1, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 5], [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 4, 2], [4, 0, 0, 0, 0, 2, 0, 0, 2, 1, 5, 2]] \$$$

$$[y_1, 0, 0, 0, 0, y_2, 2y_3, y_3, y_4, y_5, y_7, y_6]$$

$$p = s^2 - s^8$$

1676 . Coloring, {2, 5, 6, 7, 9, 10, 12}

R: [7, 8, 7, 6, 3, 3, A, C, C, 2, 1, 9]
B: [6, 7, 8, 7, A, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	4 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 8
 See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 0, 2] , [0, 2, 1, 0, 0, 0, 4, 2, 2, 2, 0, 3] , [0, 2, 0, 0, 0, 0, 1, 2, 3, 4, 0, 4] , [0, 4, 0, 0, 0, 0, 0, 2, 4, 1, 0, 5] , [0, 1, 0, 0, 0, 0, 0, 4, 5, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 1, 6, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[2 y_7, y_1, y_8, 0, 0, y_7, y_6, y_5, y_4, y_3, 0, y_2]$$

$$p = s^7 - s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3
 See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 0, 2, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 2, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 0, 2, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 4, 0, 0, 2, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 4, 2] , [0, 0, 0, 4, 2, 0, 2, 0, 0, 3, 3, 2]] \$

$$[0, 0, 0, -27 y_4 - 20 y_3 + 7 y_2 + 16 y_1, 2 y_4, 2 y_3, 2 y_2, 2 y_3, 0, -16 y_4 - 12 y_3 + 4 y_2 + 10 y_1, 2 y_1, -7 y_4 - 4 y_3 + 3 y_2 + 4 y_1]$$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p' = s^2 - s^5 \quad p = s^2 - s^8$$

1677 . Coloring, {2, 5, 6, 7, 9, 11, 12}

R: [7, 8, 7, 6, 3, 3, A, C, C, C, 4, 9]
B: [6, 7, 8, 7, A, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6
See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 0, 4] , [0, 0, 1, 0, 0, 2, 2, 0, 4, 2, 0, 5] , [0, 0, 2, 0, 0, 0, 1, 0, 5, 2, 0, 6] , [0, 0, 0, 0, 0, 2, 0, 6, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[0, 0, y_1 , 2 y_4 , 0, y_2 , y_3 , y_4 , y_6 , y_5 , 0, y_7]

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6
See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 4, 2, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 3, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 4, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 3, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 2, 0, 0, 3, 3, 0]] \$

[y_2 , y_1 , 0, 0, 2 y_5 , y_3 , y_4 , y_5 , 0, y_6 , y_7 , 0]

$$p = -s^2 + s^8$$

1678 . Coloring, {2, 5, 6, 7, 10, 11, 12}

R: [7, 8, 7, 6, 3, 3, A, C, B, 2, 4, 9]

B: [6, 7, 8, 7, A, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	7 vs 8

Omega Rank for R : cycles: $\{\{2, 3, 4, 6, 7, 8, 9, 10, 11, 12\}\}$ order: 10

See Matrix

$\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 1, 1], [0, 2, 1, 1, 0, 2, 2, 2, 1, 2, 2, 1], [0, 2, 2, 2, 0, 1, 1, 2, 1, 2, 1, 2], [0, 2, 1, 1, 0, 2, 2, 2, 1, 1, 2], [0, 1, 2, 1, 0, 1, 1, 2, 2, 2, 2, 2], [0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 2, 2], [0, 1, 1, 2, 0, 2, 1, 2, 2, 2, 2, 1], [0, 2, 2, 2, 0, 2, 1, 1, 1, 1, 2, 2], [0, 1, 2, 2, 0, 2, 2, 2, 2, 1, 1, 1], [0, 1, 2, 1, 0, 2, 2, 1, 1, 2, 2, 2]] \$$

$[0, y_{10}, y_9, y_8, 0, y_7, y_6, y_5, y_4, y_3, y_2, y_1]$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 3, 3], [3, 0, 0, 0, 3, 2, 0, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 3, 0, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$

$[y_3, 0, 0, 0, y_2, y_1, 2y_6, y_6, 0, y_4, y_5, y_7]$

$$p = s^5 - s^8$$

1679 . Coloring, $\{2, 5, 6, 8, 9, 10, 11\}$

R: $[7, 8, 7, 6, 3, 3, B, B, C, 2, 4, 5]$

B: $[6, 7, 8, 7, A, A, A, C, B, C, 1, 9]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 3, 1], [0, 0, 3, 3, 1, 2, 2, 2, 0, 0, 3, 0], [0, 0, 3, 3, 0, 3, 3, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 3, 3, 0, 0, 0, 3, 0], [0, 0, 3, 3, 0, 4, 3, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 3, 3, 0, 0, 0, 3, 0], [0, 0, 3, 3, 0, 3, 4, 0, 0, 0, 3, 0], [0, 0, 3, 3, 0, 3, 3, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 3, 3, 0, 0, 0, 3, 0]] \$$

$$[0, 2y_7, y_1, y_2, y_3, y_4, y_5, 2y_3 - 3y_7, 0, 0, y_6, y_7]$$

$$p' = s^3 - s^8 \quad p = s^3 - s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 1, 3], [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 5], [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 5, 2], [5, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 1], [3, 0, 0, 0, 0, 5, 0, 0, 1, 3, 2, 2], [2, 0, 0, 0, 0, 3, 0, 0, 2, 5, 1, 3], [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 5]] \$$$

$$[y_1, 0, 0, 0, 0, y_2, 2y_3, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^2 + s^8$$

1680 . Coloring, {2, 5, 6, 8, 9, 10, 12}

R: [7, 8, 7, 6, 3, 3, B, B, C, 2, 1, 9]

B: [6, 7, 8, 7, A, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 3, 1], [3, 0, 1, 0, 0, 0, 4, 2, 1, 0, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 6, 1], [6, 0, 0, 0, 0, 0, 3, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 6, 0, 2, 0, 3, 1], [3, 0, 0, 0, 0, 0, 4, 0, 1, 0, 6, 2], [6, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 6, 0, 1, 0, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 6, 1]] \$$$

$$[3y_3, 6y_1, 3y_2, 0, 0, 3y_1, -3y_3 - 9y_2 + 13y_6 - 3y_5 + 13y_4, 6y_2 - 9y_1, 3y_6, 0, 3y_5, 3y_4]$$

$$p = -s^3 + s^9 \quad p' = -s^3 - s^4 + s^6 + s^7 \quad p = -s^3 + s^5 + s^6 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[0, 0, 0, y_2, y_1, y_4, y_5, y_4, 0, y_3, y_4, y_6]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

1681 . Coloring, {2, 5, 6, 8, 9, 11, 12}

R: [7, 8, 7, 6, 3, 3, B, B, C, C, 4, 9]

B: [6, 7, 8, 7, A, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	6 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 3, 3] , [0, 0, 1, 3, 0, 2, 2, 0, 3, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 1, 0, 2, 0, 2, 3] , [0, 0, 3, 2, 0, 3, 2, 0, 3, 0, 1, 2] , [0, 0, 3, 1, 0, 2, 3, 0, 2, 0, 2, 3] , [0, 0, 2, 2, 0, 1, 3, 0, 3, 0, 3, 2] , [0, 0, 1, 3, 0, 2, 2, 0, 2, 0, 3, 3] , [0, 0, 2, 3, 0, 3, 1, 0, 3, 0, 2, 2]] \$

$$[0, 0, -5 y_1 - 5 y_2 - 5 y_3 - 5 y_4 + 11 y_5 - 5 y_6 + 11 y_7, 5 y_1, 0, 5 y_2, 5 y_3, 5 y_4, 5 y_5, 0, 5 y_6, 5 y_7]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 2, 2, 0, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_6 + y_5, y_4, 0, 0, y_3, -2 y_6 + y_5 + y_3, y_2, y_6, 0, y_1, y_6, y_5]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

1682 . Coloring, {2, 5, 6, 8, 10, 11, 12}

R: [7, 8, 7, 6, 3, 3, B, B, B, 2, 4, 9]

B: [6, 7, 8, 7, A, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	5 vs 7

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 4, 0] , [0, 0, 1, 4, 0, 2, 2, 2, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 1, 0, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 5, 2, 0, 0, 0, 1, 0] , [0, 0, 5, 1, 0, 4, 4, 0, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 1, 5, 0, 0, 0, 4, 0] , [0, 0, 1, 4, 0, 2, 4, 0, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 1, 0, 0, 0, 4, 0]] \$

$$[0, y_6, y_5, y_4, 0, y_3, y_2, y_1, y_6, 0, y_7, 0]$$

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[2 y_3, 0, 0, 0, y_1, y_2, 2 y_3, y_3, 0, y_4, 0, y_5]$$

$$p' = s^3 - s^6 \quad p = s^3 - s^6$$

1683 . Coloring, {2, 5, 6, 9, 10, 11, 12}

R: [7, 8, 7, 6, 3, 3, B, C, C, 2, 4, 9]

B: [6, 7, 8, 7, A, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

$\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 2, 2], [0, 0, 1, 2, 0, 2, 2, 2, 2, 0, 2, 3], [0, 0, 2, 2, 0, 2, 1, 0, 3, 0, 2, 4], [0, 0, 2, 2, 0, 2, 2, 0, 4, 0, 1, 3], [0, 0, 2, 1, 0, 2, 2, 0, 3, 0, 2, 4], [0, 0, 2, 2, 0, 1, 2, 0, 4, 0, 2, 3], [0, 0, 1, 2, 0, 2, 2, 0, 3, 0, 2, 4], [0, 0, 2, 2, 0, 2, 1, 0, 4, 0, 2, 3], [0, 0, 2, 2, 0, 2, 2, 0, 3, 0, 1, 4]] \$$

$[0, 7 y_1, 9 y_1 - 7 y_8 - 7 y_7 - 7 y_6 + 9 y_5 + 9 y_4 - 7 y_3 + 9 y_2, 7 y_8, 0, 7 y_7, 7 y_6, 7 y_5, 7 y_4, 0, 7 y_3, 7 y_2]$

$$p = s^3 + s^4 - s^8 - s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 2, 2], [2, 0, 0, 0, 2, 2, 0, 0, 0, 5, 1, 4], [1, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 5], [0, 0, 0, 0, 5, 1, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6]] \$$

$[y_1, 0, 0, 0, y_2, y_3, 2 y_4, y_4, 0, y_5, y_6, y_7]$

$$p = -s^5 + s^8$$

1684 . Coloring, {2, 5, 7, 8, 9, 10, 11}

R: [7, 8, 7, 6, 3, A, A, B, C, 2, 4, 5]

B: [6, 7, 8, 7, A, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	8 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 1, 2, 0, 3, 1, 0], [0, 3, 1, 1, 0, 1, 2, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 1, 1, 3, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 0, 2, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 0, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 0, 3, 0, 3, 3, 0]] \$$

$$[0, y_1 + y_2 - y_5 - y_3 - y_4 + y_6 + y_7 - y_8 + y_9, y_1, y_2, y_5, y_3, y_4, y_6, 0, y_7, y_8, y_9]$$

$$p = -s^5 + s^6 - s^7 + s^8 - s^9 + s^{10}$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3], [3, 0, 1, 0, 0, 2, 0, 1, 3, 0, 4, 2], [4, 0, 2, 0, 0, 3, 0, 1, 2, 0, 3, 1], [3, 0, 3, 0, 0, 4, 0, 2, 1, 0, 2, 1], [2, 0, 4, 0, 0, 3, 0, 3, 1, 0, 1, 2], [1, 0, 3, 0, 0, 2, 0, 4, 2, 0, 1, 3], [1, 0, 2, 0, 0, 1, 0, 3, 3, 0, 2, 4], [2, 0, 1, 0, 0, 1, 0, 2, 4, 0, 3, 3], [3, 0, 1, 0, 0, 2, 0, 1, 3, 0, 4, 2]] \$$

$$[y_2, 0, y_1, 0, 0, y_3, 2y_5, y_6, y_7, y_5, y_4, y_8]$$

$$p = -s^2 + s^9$$

1685 . Coloring, $\{2, 5, 7, 8, 9, 10, 12\}$

R: [7, 8, 7, 6, 3, A, A, B, C, 2, 1, 9]

B: [6, 7, 8, 7, A, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	6 vs 9

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}, \{9, 12\}\}$ order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 0, 3, 2, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 0, 1, 3, 2, 3, 2, 1] , [2, 3, 0, 0, 0, 1, 3, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 0, 2, 3, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 0, 3, 1, 1, 2, 3, 2] , [3, 2, 0, 0, 0, 0, 3, 1, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 0, 3, 2, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 0, 1, 3, 2, 3, 2, 1] , [2, 3, 0, 0, 0, 0, 1, 3, 1, 1, 3, 2]] \$

$$[3 y_7, 3 y_6, 3 y_5, 0, 0, 3 y_5, 3 y_4, 3 y_3, 3 y_2, -3 y_7 - 3 y_5 - 3 y_3 + 8 y_2 + 5 y_1, -3 y_6 - 3 y_5 - 3 y_4 + 5 y_2 + 8 y_1, 3 y_1]$$

$$p' = -s^3 + s^9 \quad p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {4, 7, 11}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3] , [0, 0, 1, 3, 3, 0, 2, 1, 0, 2, 2, 2] , [0, 0, 0, 2, 2, 0, 3, 1, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 0, 0, 2, 3, 4] , [0, 0, 0, 3, 4, 0, 2, 0, 0, 3, 2, 2] , [0, 0, 0, 2, 2, 0, 3, 0, 0, 4, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 0, 0, 2, 3, 4] , [0, 0, 0, 3, 4, 0, 2, 0, 0, 3, 2, 2] , [0, 0, 0, 2, 2, 0, 3, 0, 0, 4, 2, 3]] \$

$$[0, 0, 2 y_1, 4 y_6 - 16 y_5 + 10 y_4 + 10 y_3 + 4 y_2, -2 y_1 + 7 y_6 - 27 y_5 + 16 y_4 + 16 y_3 + 7 y_2, 2 y_6, 2 y_5, 2 y_4, 0, 2 y_3, 3 y_6 - 7 y_5 + 4 y_4 + 4 y_3 + 3 y_2, 2 y_2]$$

$$p' = -s^5 + s^8 \quad p' = -s^4 + s^7 \quad p = s^4 - s^7$$

1686 . Coloring, {2, 5, 7, 8, 9, 11, 12}

R: [7, 8, 7, 6, 3, A, A, B, C, C, 4, 9]

B: [6, 7, 8, 7, A, 3, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	10 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 2, 1, 0, 3, 3, 1, 5] , [0, 0, 0, 1, 0, 1, 0, 0, 5, 3, 0, 6] , [0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, y_3, y_1, 0, y_2, y_3 + y_6, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^6 + s^8 \quad p' = -s^6 + s^8$$

Omega Rank for B : cycles: {{1, 2, 3, 5, 6, 7, 8, 10, 11, 12}} order: 10

See Matrix

$$\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1], [3, 1, 1, 0, 1, 2, 2, 1, 0, 2, 2, 1], [2, 2, 2, 0, 1, 3, 1, 1, 0, 1, 2, 1], [2, 1, 3, 0, 1, 2, 2, 2, 0, 1, 1, 1], [1, 1, 2, 0, 1, 2, 1, 3, 0, 1, 2, 2], [2, 1, 2, 0, 2, 1, 1, 2, 0, 1, 1, 3], [1, 1, 1, 0, 3, 2, 1, 2, 0, 2, 1, 2], [1, 2, 2, 0, 2, 1, 1, 1, 0, 3, 1, 2], [1, 3, 1, 0, 2, 1, 2, 2, 0, 2, 1, 1], [1, 2, 1, 0, 1, 1, 3, 1, 0, 2, 2, 2]] \$$$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_7, y_6, 0, y_8, y_9, y_{10}]$$

1687 . Coloring, {2, 5, 7, 8, 10, 11, 12}

R: [7, 8, 7, 6, 3, A, A, B, B, 2, 4, 9]

B: [6, 7, 8, 7, A, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 2, 0], [0, 3, 0, 2, 0, 2, 1, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 0, 3, 0, 3, 2, 0], [0, 3, 3, 0, 2, 0, 3, 0, 3, 0, 2, 3, 0], [0, 2, 0, 3, 0, 2, 0, 3, 0, 3, 3, 0], [0, 3, 0, 3, 0, 3, 0, 2, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 0, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 0, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 0, 3, 0, 3, 2, 0]] \$$$

$$[0, y_6, y_7, y_8, 0, y_5, y_4, y_1, 2y_7, y_3, y_2, 0]$$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 2, 4], [2, 0, 1, 0, 4, 2, 0, 1, 0, 2, 2, 2], [2, 0, 2, 0, 2, 2, 0, 1, 0, 4, 0, 3], [0, 0, 2, 0, 3, 2, 0, 2, 0, 2, 0, 5], [0, 0, 2, 0, 5, 0, 0, 2, 0, 3, 0, 4], [0, 0, 0, 0, 4, 0, 0, 2, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0,$$

$0, 0, 0, 4, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5]] \$$

$[y_2, 0, y_1, 0, y_8, y_7, y_6, y_5, 0, y_4, y_3, y_9]$

1688 . Coloring, {2, 5, 7, 9, 10, 11, 12}

R: [7, 8, 7, 6, 3, A, A, C, C, 2, 4, 9]

B: [6, 7, 8, 7, A, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 0, 2], [0, 3, 0, 0, 0, 2, 1, 2, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 0, 3, 3, 3, 0, 4], [0, 3, 0, 0, 0, 0, 3, 4, 0, 0, 6], [0, 0, 0, 0, 0, 0, 3, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$

$[0, y_1, y_3, 2y_3, 0, -3y_3 + 2y_2, y_2, y_5, y_6, y_7, 0, y_4]$

$$p = s^6 - s^8 \quad p' = -s^6 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {5, 10, 12}}

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 4, 2], [4, 0, 1, 0, 2, 2, 0, 1, 0, 2, 3, 1], [3, 0, 2, 0, 1, 4, 0, 1, 0, 2, 1, 2], [1, 0, 4, 0, 2, 3, 0, 2, 0, 1, 1, 2], [1, 0, 3, 0, 2, 1, 0, 4, 0, 2, 2, 1], [2, 0, 1, 0, 1, 1, 0, 3, 0, 2, 4, 2], [4, 0, 1, 0, 2, 2, 0, 1, 0, 1, 3, 2], [3, 0, 2, 0, 2, 4, 0, 1, 0, 2, 1, 1], [1, 0, 4, 0, 1, 3, 0, 2, 0, 2, 1, 2]] \$$

$[5y_6, 0, 5y_5, 0, 5y_4, 5y_3, 5y_2, -5y_6 - 5y_5 + 11y_4 - 5y_3 - 5y_2 + 11y_1 - 5y_8 + 11y_7, 0, 5y_1, 5y_8, 5y_7]$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1689 . Coloring, {2, 5, 8, 9, 10, 11, 12}

R: [7, 8, 7, 6, 3, A, B, B, C, 2, 4, 9]

B: [6, 7, 8, 7, A, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	8 vs 9

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 2, 1, 2, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 3, 0, 1, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 3, 0, 1, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 3, 0, 2, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 1, 0, 3, 1, 3, 2, 2] , [0, 3, 0, 2, 0, 1, 0, 3, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 2, 0, 3, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 3, 0, 1, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 3, 0, 1, 1, 3, 1, 2]] \$

[0, 3 y₄, 3 y₃, 3 y₂, 0, -3 y₄ - 3 y₃ + 8 y₈ - 3 y₆ + 5 y₅, 3 y₁, -3 y₂ - 3 y₁ + 5 y₈ - 3 y₇ + 8 y₅, 3 y₈, 3 y₇, 3 y₆, 3 y₅]

$$p' = -s^3 + s^9 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3] , [1, 0, 1, 0, 3, 2, 0, 1, 0, 4, 0, 4] , [0, 0, 2, 0, 4, 1, 0, 1, 0, 3, 0, 5] , [0, 0, 1, 0, 5, 0, 0, 2, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 1, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$

[y₁, 0, y₅, 0, y₆, y₇, 2 y₃, y₈, 0, y₂, y₃, y₄]

$$p = -s^6 + s^9$$

1690 . Coloring, {2, 6, 7, 8, 9, 10, 11}

R: [7, 8, 7, 6, A, 3, A, B, C, 2, 4, 5]

B: [6, 7, 8, 7, 3, A, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{2, 3, 4, 6, 7, 8, 10, 11\}\}$ order: 8

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1], [0, 3, 1, 1, 1, 2, 1, 2, 0, 4, 1, 0], [0, 4, 2, 1, 0, 1, 1, 3, 0, 2, 2, 0], [0, 2, 1, 2, 0, 1, 2, 4, 0, 1, 3, 0], [0, 1, 1, 3, 0, 2, 1, 2, 0, 2, 4, 0], [0, 2, 2, 4, 0, 3, 1, 1, 0, 1, 2, 0], [0, 1, 3, 2, 0, 4, 2, 2, 0, 1, 1, 0], [0, 1, 4, 1, 0, 2, 3, 1, 0, 2, 2, 0], [0, 2, 2, 2, 0, 1, 4, 1, 0, 3, 1, 0], [0, 3, 1, 1, 0, 2, 2, 2, 0, 4, 1, 0]] \$$

$[0, y_5, y_4, y_3, y_2, y_1, -y_5 + y_4 + y_3 - y_2 - y_1 + y_6 + y_9 - y_8 + y_7, y_6, 0, y_9, y_8, y_7]$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9 - s^{10}$$

Omega Rank for B : cycles: $\{\{1, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 2, 0, 1, 3, 1, 4, 2], [4, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 2], [3, 0, 0, 0, 0, 4, 0, 0, 2, 3, 2, 2], [2, 0, 0, 0, 0, 3, 0, 0, 2, 4, 2, 3], [2, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 4, 2], [4, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 2]] \$$

$[-y_7 + y_6 - y_5 - y_4 - y_3 + y_2 + y_1, 0, y_7, 0, 0, y_6, 2y_7, y_5, y_4, y_3, y_2, y_1]$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p = -s^3 + s^9$$

1691 . Coloring, $\{2, 6, 7, 8, 9, 10, 12\}$

R: [7, 8, 7, 6, A, 3, A, B, C, 2, 1, 9]

B: [6, 7, 8, 7, 3, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	8 vs 9

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1], [1, 3, 1, 0, 0, 0, 3, 2, 1, 2, 1, 2], [1, 2, 0, 0, 0, 0, 2, 3, 2, 3, 2, 1], [2, 3, 0, 0, 0, 0, 1, 2, 1, 2, 3, 2], [3, 2, 0, 0, 0, 0, 2, 3, 2, 1, 2, 1], [2, 1, 0, 0, 0, 0, 3, 2, 1, 2, 3, 2], [3, 2, 0, 0, 0, 0, 2, 1, 2, 3, 2, 1], [2, 3, 0, 0, 0, 0, 3, 2, 1, 2, 1, 2], [1, 2, 0, 0, 0, 0, 2, 3, 2, 3, 2, 1], [2, 3, 0, 0, 0, 0, 1, 2, 1, 2, 3, 2]] \$$

$[3 y_1, -3 y_8 - 3 y_7 + 5 y_6 - 3 y_4 + 8 y_2, -3 y_1 - 3 y_5 + 8 y_6 - 3 y_3 + 5 y_2, 0, 0, 3 y_8, 3 y_7, 3 y_5, 3 y_6, 3 y_3, 3 y_4, 3 y_2]$

$$p' = -s^3 + s^9 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}, \{3, 5, 8, 12\}\}$ order: 12

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3], [0, 0, 2, 3, 3, 0, 2, 1, 0, 1, 2, 2], [0, 0, 3, 2, 2, 0, 3, 2, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 2, 3, 0, 0, 3, 2], [0, 0, 2, 3, 2, 0, 2, 2, 0, 0, 2, 3], [0, 0, 2, 2, 3, 0, 3, 2, 0, 0, 2, 2], [0, 0, 3, 2, 2, 0, 2, 2, 0, 0, 3, 2], [0, 0, 2, 3, 2, 0, 2, 3, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 3, 2, 0, 0, 2, 3]] \$$

$[0, 0, 9 y_1 - 7 y_2 - 7 y_3 + 9 y_4 - 7 y_5 - 7 y_6 + 9 y_7 - 7 y_8, 7 y_1, 7 y_2, 7 y_3, 7 y_4, 7 y_5, 0, 7 y_6, 7 y_7, 7 y_8]$

$$p = s^3 + s^4 + s^5 - s^7 - s^8 - s^9$$

1692 . Coloring, $\{2, 6, 7, 8, 9, 11, 12\}$

R: [7, 8, 7, 6, A, 3, A, B, C, C, 4, 9]

B: [6, 7, 8, 7, 3, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 8
See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3] , [0, 0, 1, 1, 0, 2, 1, 0, 3, 2, 1, 5] , [0, 0, 2, 1, 0, 1, 1, 0, 5, 1, 0, 5] , [0, 0, 1, 0, 0, 1, 2, 0, 5, 1, 0, 6] , [0, 0, 1, 0, 0, 0, 1, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[0, 0, y₅, y₄, 0, y₃, y₂, y₁, y₉, y₈, y₇, y₆]

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}, {3, 5, 8, 12}} order: 12
See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 2, 1, 0, 1, 2, 1] , [2, 1, 1, 0, 1, 3, 1, 2, 0, 2, 2, 1] , [2, 2, 1, 0, 1, 2, 1, 1, 0, 3, 1, 2] , [1, 3, 1, 0, 2, 2, 2, 1, 0, 2, 1, 1] , [1, 2, 2, 0, 1, 1, 3, 1, 0, 2, 2, 1] , [2, 2, 1, 0, 1, 1, 2, 2, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 2, 2, 1, 0, 1, 2, 2] , [2, 1, 1, 0, 2, 3, 1, 1, 0, 2, 2, 1] , [2, 2, 2, 0, 1, 2, 1, 1, 0, 3, 1, 1]] \$

[3 y₇, 3 y₆, 3 y₅, 0, 3 y₄, 3 y₃, 3 y₂, 5 y₇ - 8 y₅ - 3 y₄ + 5 y₂ + 5 y₁ - 8 y₈, 0, 3 y₁, 8 y₇ - 3 y₆ - 11 y₅ - 3 y₃ + 8 y₂ + 8 y₁ - 11 y₈, 3 y₈]

p' = -s - s³ + s⁷ + s⁹ p = -s - s³ + s⁷ + s⁹

1693 . Coloring, {2, 6, 7, 8, 10, 11, 12}

R: [7, 8, 7, 6, A, 3, A, B, B, 2, 4, 9]

B: [6, 7, 8, 7, 3, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ-Rank	A+(1/2)Δ	A-(1/2)Δ	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 3, 4, 6, 7, 8, 10, 11}} order: 8
See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 2, 0] , [0, 3, 1, 2, 0, 2, 1, 2, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 2, 1, 3, 0, 1, 2, 0] , [0, 1, 2, 2, 0, 3, 2, 2, 0, 1, 3, 0] , [0, 1, 3, 3, 0, 2, 2, 1, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 3, 3, 1, 0, 2, 1, 0] , [0, 2, 3, 1, 0, 2, 2, 2, 0, 3, 1, 0] , [0, 3, 2, 1, 0, 1, 3, 2, 0, 2, 2, 0] , [0, 2, 1, 2, 0, 1, 2, 3, 0, 3, 2, 0]] \$

$$[0, y_1, y_2, y_3, 0, y_9, y_4, y_5, y_8, y_6, y_7, 0]$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 2, 4], [2, 0, 2, 0, 4, 2, 0, 1, 0, 1, 2, 2], [2, 0, 4, 0, 2, 2, 0, 2, 0, 2, 0, 2], [0, 0, 2, 0, 2, 2, 0, 4, 0, 2, 0, 4], [0, 0, 2, 0, 4, 0, 0, 2, 0, 2, 0, 6], [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6]] \$$$

$$[y_3, 0, y_2, 0, y_1, y_3 - y_2 + y_1 + y_8 + y_7 + y_6 - y_5 - y_4, y_8, y_7, 0, y_6, y_5, y_4]$$

$$p = s^6 - s^7 + s^8 - s^9$$

1694 . Coloring, {2, 6, 7, 9, 10, 11, 12}

R: [7, 8, 7, 6, A, 3, A, C, C, 2, 4, 9]

B: [6, 7, 8, 7, 3, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 0, 2], [0, 3, 1, 0, 0, 2, 1, 2, 2, 2, 0, 3], [0, 2, 2, 0, 0, 0, 1, 3, 3, 1, 0, 4], [0, 1, 0, 0, 0, 0, 2, 2, 4, 1, 0, 6], [0, 1, 0, 0, 0, 0, 0, 1, 6, 2, 0, 6], [0, 2, 0, 0, 0, 0, 0, 1, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[0, y_1, y_2, y_9, 0, y_7, y_8, y_5, y_6, y_4, 0, y_3]$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 4, 2], [4, 0, 2, 0, 2, 2, 0, 1, 0, 1, 3, 1], [3, 0, 2, 0, 1, 4, 0, 2, 0, 2, 1, 1], [1, 0, 1, 0, 1, 3, 0, 2, 0, 4, 2, 2], [2, 0, 1, 0, 2, 1, 0, 1, 0, 3, 2, 4], [2, 0, 2, 0, 4, 2, 0, 1, 0, 1, 1, 3], [1, 0, 4, 0, 3, 2, 0, 2, 0, 2, 1, 1], [1, 0, 3, 0, 1, 1, 0, 4, 0, 2, 2, 2], [2, 0, 1, 0, 2, 1, 0, 3, 0, 1, 4, 2]] \$$$

$$[y_1 - y_2 + y_3 - y_8 - y_4 - y_5 + y_6 + y_7, 0, y_1, 0, y_2, y_3, y_8, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

1695 . Coloring, {2, 6, 8, 9, 10, 11, 12}

R: [7, 8, 7, 6, A, 3, B, B, C, 2, 4, 9]

B: [6, 7, 8, 7, 3, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	5 vs 9

Omega Rank for R : cycles: {{9, 12}, {3, 4, 6, 7, 11}} order: 10

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1], [0, 1, 1, 3, 0, 2, 1, 2, 1, 0, 3, 2], [0, 0, 2, 3, 0, 3, 1, 1, 2, 0, 3, 1], [0, 0, 3, 3, 0, 3, 2, 0, 1, 0, 2, 2], [0, 0, 3, 2, 0, 3, 3, 0, 2, 0, 2, 1], [0, 0, 3, 2, 0, 2, 3, 0, 1, 0, 3, 2], [0, 0, 2, 3, 0, 2, 3, 0, 2, 0, 3, 1], [0, 0, 2, 3, 0, 3, 2, 0, 1, 0, 3, 2], [0, 0, 3, 3, 0, 3, 2, 0, 2, 0, 2, 1], [0, 0, 3, 2, 0, 3, 3, 0, 1, 0, 2, 2]] \$$$

$$[0, -3y_1 - 3y_8 - 3y_9 - 3y_5 - 3y_6 + 13y_7 - 3y_2 - 3y_3 + 13y_4, 3y_1, 3y_8, 0, 3y_9, 3y_5, 3y_6, 3y_7, 3y_2, 3y_3, 3y_4]$$

$$p = s^4 + s^5 - s^9 - s^{10}$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 2, 0, 1, 0, 3, 0, 4], [0, 0, 3, 0, 4, 1, 0, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 3, 0, 1, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$$$

$$[y_5, 0, y_3, 0, y_4, y_5 - y_3 + y_4 - 2y_1, 2y_1, y_2, 0, y_5 + y_4 - y_2, y_1, y_5 + y_4 - y_1]$$

$$p = s^5 - s^9 \quad p' = s^5 - s^8 \quad p' = s^7 - s^8 \quad p' = s^6 - s^8$$

1696 . Coloring, {2, 7, 8, 9, 10, 11, 12}

R: [7, 8, 7, 6, A, A, A, B, C, 2, 4, 9]

B: [6, 7, 8, 7, 3, 3, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 8

Omega Rank for R : cycles: {{9, 12}, {2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 0, 2, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 1, 0, 4, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 1, 0, 3, 1, 1, 4, 2] , [0, 1, 0, 4, 0, 2, 0, 2, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 4, 0, 1, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 3, 0, 1, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 0, 2, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 1, 0, 4, 2, 2, 2, 1]] \$

[0, -3 y₂ - 3 y₁ + 5 y₇ - 3 y₅ + 8 y₄, 0, 3 y₃, 0, 3 y₂, 3 y₁, -3 y₃ + 8 y₇ - 3 y₆ + 5 y₄, 3 y₇, 3 y₆, 3 y₅, 3 y₄]

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 3, 3] , [3, 0, 3, 0, 3, 2, 0, 2, 0, 0, 2, 1] , [2, 0, 5, 0, 1, 3, 0, 3, 0, 0, 0, 2] , [0, 0, 4, 0, 2, 2, 0, 5, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3]] \$

[y₁, 0, y₂, 0, y₃, y₄, y₅, y₆, 0, 0, y₇, y₈]

1697 . Coloring, {3, 4, 5, 6, 7, 8, 9}

R: [7, 7, 8, 7, 3, 3, A, B, C, C, 1, 5]

B: [6, 8, 7, 6, A, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{1, 3, 5, 7, 8, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 2, 0, 2, 0, 3, 1, 0, 2, 1, 3], [1, 0, 2, 0, 3, 0, 2, 2, 0, 3, 1, 2], [1, 0, 3, 0, 2, 0, 1, 2, 0, 2, 2, 3], [2, 0, 2, 0, 3, 0, 1, 3, 0, 1, 2, 2], [2, 0, 3, 0, 2, 0, 2, 2, 0, 1, 3, 1], [3, 0, 2, 0, 1, 0, 2, 3, 0, 2, 2, 1], [2, 0, 1, 0, 1, 0, 3, 2, 0, 2, 3, 2], [3, 0, 1, 0, 2, 0, 2, 1, 0, 3, 2, 2]] \$$

$$[y_1, 0, y_3, 0, y_2, 0, y_8, y_7, 0, y_6, y_5, y_4]$$

Omega Rank for B : cycles: $\{\{2, 4, 6, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 2, 0, 2, 0, 2, 1, 1, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 0, 2, 1, 2, 3, 1], [0, 2, 0, 3, 0, 3, 0, 2, 1, 2, 1, 2], [0, 2, 0, 1, 0, 3, 0, 2, 2, 3, 1, 2], [0, 3, 0, 1, 0, 1, 0, 2, 2, 3, 2, 2], [0, 3, 0, 2, 0, 1, 0, 3, 2, 1, 2, 2], [0, 1, 0, 2, 0, 2, 0, 3, 2, 1, 2, 3], [0, 1, 0, 2, 0, 2, 0, 1, 3, 2, 2, 3], [0, 2, 0, 2, 0, 2, 0, 1, 3, 2, 3, 1]] \$$

$$[0, y_2 - y_1 + y_3 + y_4 + y_5 + y_7 - y_8 - y_6, 0, y_2, 0, y_1, y_3, y_4, y_5, y_7, y_8, y_6]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

1698 . Coloring, $\{3, 4, 5, 6, 7, 8, 10\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, B, B, 2, 1, 5]

B: [6, 8, 7, 6, A, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6
See Matrix

\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 0, 4, 2, 0, 3, 1, 0] , [1, 3, 0, 0, 0, 0, 4, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 4, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$

$$[y_1, y_2, y_3, 0, y_4, 0, y_5, y_6, 0, y_8, y_7, 0]$$

Omega Rank for B : cycles: {{9, 12}} order: 6
See Matrix

\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 2, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 1, 5] , [0, 0, 0, 1, 0, 2, 0, 0, 5, 2, 0, 6] , [0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, 0, y_1, 0, y_1 + 2y_6 + y_5 + y_4 - y_3 - y_2, y_6, y_6, y_5, y_4, y_3, y_2]$$

$$p' = s^6 - s^7 \quad p = s^6 - s^8$$

1699 . Coloring, {3, 4, 5, 6, 7, 8, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, B, B, C, 4, 5]

B: [6, 8, 7, 6, A, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	8 vs 9

Omega Rank for R : cycles: {{3, 4, 5, 7, 8, 10, 11, 12}} order: 8
See Matrix

\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 2, 0, 3, 1, 2] , [0, 0, 2, 1, 2, 0, 2, 2, 0, 2, 2, 3] , [0, 0, 2, 2, 3, 0, 1, 2, 0, 2, 2, 2] , [0, 0, 3, 2, 2, 0, 2, 2, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 3, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 0, 2, 2, 0, 2, 3, 2] , [0, 0, 1, 3, 2, 0, 2, 2, 0, 2, 2, 2]] \$

$$[0, 0, y_1, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 2, 2, 2], [2, 2, 0, 0, 0, 2, 0, 2, 2, 2, 1, 3], [1, 2, 0, 0, 0, 2, 0, 2, 3, 2, 0, 4], [0, 2, 0, 0, 0, 1, 0, 2, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 0, 2, 5, 1, 0, 6], [0, 1, 0, 0, 0, 0, 0, 2, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 1, 7, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[y_1, y_1 - y_3 + y_4 + y_2 + y_7 + y_8 - y_6 - y_5, 0, 0, 0, y_3, y_4, y_2, y_7, y_8, y_6, y_5]$$

$$p = s^8 - s^9$$

1700 . Coloring, {3, 4, 5, 6, 7, 8, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, B, B, C, 1, 9]

B: [6, 8, 7, 6, A, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 2, 2, 2], [2, 0, 0, 0, 0, 0, 2, 2, 2, 3, 3, 2], [3, 0, 0, 0, 0, 0, 2, 0, 2, 2, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 2, 2, 2], [2, 0, 0, 0, 0, 0, 4, 0, 2, 3, 3, 2], [3, 0, 0, 0, 0, 0, 2, 0, 2, 4, 2, 3], [2, 0, 0, 0, 0, 0, 3, 0, 3, 2, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 3, 3, 2]] \$$$

$$[y_1, 0, y_2, 0, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 2, 2, 2], [0, 2, 0, 2, 2, 2, 0, 2, 0, 4, 1, 1], [0, 4, 0, 1, 1, 2, 0, 2, 0, 4, 0, 2], [0, 4, 0, 0, 2, 1, 0, 4, 0, 3, 0, 2], [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4], [0, 2, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2]] \$$$

$$[0, y_1, 0, y_4, y_2, y_3, y_5, y_6, 0, y_9, y_7, y_8]$$

1701 . Coloring, {3, 4, 5, 6, 7, 9, 10}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, C, C, 2, 1, 5]

B: [6, 8, 7, 6, A, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}, {3, 5, 8, 12}} order: 12

See Matrix

$$\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 4, 2, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 2, 2, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 3, 2, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 4, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 2, 2, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 3, 2, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 4, 2, 0, 3, 0, 2]] \$$$

$$[7 y_7, 7 y_6, 7 y_5, 0, 7 y_4, 0, 7 y_3, 7 y_2, 0, -7 y_7 - 7 y_6 + 9 y_5 + 9 y_4 - 7 y_3 + 9 y_2 + 9 y_1, 0, 7 y_1]$$

$$p = s^2 + s^3 + s^4 - s^6 - s^7 - s^8$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 2, 4, 2], [0, 0, 0, 4, 0, 2, 0, 0, 2, 2, 4, 2], [0, 0, 0, 4, 0, 4, 0, 0, 2, 2, 2, 2], [0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2, 2], [0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2, 4], [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 2, 4], [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 4, 2], [0, 0, 0, 4, 0, 2, 0, 0, 2, 2, 4, 2]] \$$$

$$[0, 0, 0, y_4, 0, y_5, y_1, y_1, -y_4 + y_5 - 2 y_1 - y_2 + y_3 + y_6, y_2, y_3, y_6]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 \quad p = -s^2 + s^8$$

1702 . Coloring, {3, 4, 5, 6, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, C, C, C, 4, 5]

B: [6, 8, 7, 6, A, A, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	7 vs 7	6 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 2, 0, 4], [0, 0, 2, 0, 4, 0, 2, 2, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 0, 2, 0, 2, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5]] \$$$

$$[0, 0, y_6, y_5, y_4, 0, y_3, y_2, 0, y_1, 0, y_7]$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 2, 4, 0], [4, 2, 0, 0, 0, 2, 0, 2, 0, 2, 4, 0], [4, 2, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 4, 0, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 0, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0], [2, 2, 0, 0, 0, 2, 0, 4, 0, 2, 4, 0], [4, 2, 0, 0, 0, 2, 0, 2, 0, 2, 4, 0]] \$$$

$$[y_1 + y_6 - 3y_5 - y_4 - y_2 + y_3, y_1, 0, 0, 0, y_6, y_5, y_4, 2y_5, y_2, y_3, 0]$$

$$p = -s^2 + s^8 \quad p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1703 . Coloring, {3, 4, 5, 6, 7, 9, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, C, C, C, 1, 9]

B: [6, 8, 7, 6, A, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 2, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 2, 4, 3, 0, 5] , [0, 0, 0, 0, 0, 0, 0, 0, 5, 2, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[y_5 - y_4, 0, y_5 - y_4, 0, 0, 0, y_5, y_4, y_3, y_2, 0, y_1]$$

$$p' = -s^4 + s^6 \quad p = s^4 - s^6$$

Omega Rank for B : cycles: {{2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 4, 0, 2, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 0, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 4, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 0, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 2, 0, 4, 2, 0]] \$

$$[0, y_1, 0, y_2, 2y_4, y_3, y_4, y_5, 0, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

1704 . Coloring, {3, 4, 5, 6, 7, 10, 11}

R: [7, 7, 8, 7, 3, 3, A, C, B, 2, 4, 5]

B: [6, 8, 7, 6, A, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{3, 5, 8, 12\}\}$ order: 12

See Matrix

$\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 2, 1, 1], [0, 2, 2, 1, 1, 0, 4, 2, 0, 3, 0, 1], [0, 3, 1, 0, 1, 0, 3, 2, 0, 4, 0, 2], [0, 4, 1, 0, 2, 0, 3, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 4, 1, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 2, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 4, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 3, 1, 0, 4, 0, 1]] \$$

$[0, 3 y_2, 3 y_1, -3 y_2 + 10 y_1 + 10 y_3 - 3 y_7 - 3 y_5 - 3 y_4, 3 y_1 - 3 y_6 + 3 y_3, 0, 3 y_7, 3 y_6, 0, 3 y_5, 3 y_4, 3 y_3]$

$$p = s^3 + s^5 - s^6 - s^8 \quad p' = s^3 + s^5 - s^6 - s^8$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 2, 4], [2, 0, 0, 0, 0, 3, 0, 0, 4, 2, 0, 5], [0, 0, 0, 0, 0, 2, 0, 0, 5, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$[y_4 - 2 y_3 - y_2 - y_1 + y_5 + y_6, 0, 0, 0, 0, y_4, y_3, y_3, y_2, y_1, y_5, y_6]$

$$p = s^6 - s^8 \quad p' = s^6 - s^7$$

1705 . Coloring, $\{3, 4, 5, 6, 7, 10, 12\}$

R: $[7, 7, 8, 7, 3, 3, A, C, B, 2, 1, 9]$

B: $[6, 8, 7, 6, A, A, B, B, C, C, 4, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 9

See Matrix

$\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 2, 1, 1], [1, 2, 0, 0, 0, 0, 4, 2, 1, 3, 2, 1], [2, 3, 0, 0, 0, 0, 3, 0, 1, 4, 1, 2], [1, 4, 0, 0, 0, 0, 5, 0, 2, 3, 1, 0], [1, 3, 0, 0, 0, 0, 5, 0, 0, 5, 2, 0], [2, 5, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0], [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0]] \$$

$$[y_1, y_3, y_2, 0, 0, 0, y_9, y_7, y_6, y_8, y_5, y_4]$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 2, 3, 3], [0, 0, 0, 3, 3, 2, 0, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 3, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$$

$$[0, 0, 0, y_3, y_2, y_1, y_5, y_5, 0, y_4, y_7, y_6]$$

$$p = -s^5 + s^8$$

1706 . Coloring, {3, 4, 5, 6, 7, 11, 12}

R: [7, 7, 8, 7, 3, 3, A, C, B, C, 4, 9]

B: [6, 8, 7, 6, A, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 2, 1, 3], [0, 0, 0, 1, 0, 0, 2, 2, 3, 3, 2, 3], [0, 0, 0, 2, 0, 0, 1, 0, 3, 2, 3, 5], [0, 0, 0, 3, 0, 0, 2, 0, 5, 1, 3, 2], [0, 0, 0, 3, 0, 0, 3, 0, 2, 2, 5, 1], [0, 0, 0, 5, 0, 0, 3, 0, 1, 3, 2, 2], [0, 0, 0, 2, 0, 0, 5, 0, 2, 3, 1, 3], [0, 0, 0, 1, 0, 0, 2, 0, 3, 5, 2, 3]] \$$$

$$[0, 0, y_6, y_5, 0, 0, y_3, y_4, y_2, y_1, y_7, y_8]$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 2, 1, 1, 0, 2, 3, 1], [3, 2, 0, 0, 1, 2, 0, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 3, 0, 2, 0, 3, 2, 0], [2, 3, 0, 0, 2, 0, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 0, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 2, 0, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 4, 0, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 0, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 3, 0, 2, 0, 3, 2, 0]] \$$$

$$[y_1, y_2, 0, 0, y_4, y_5, y_8, y_3, 0, y_6, y_7, y_8]$$

$$p = s^3 - s^9$$

1707 . Coloring, {3, 4, 5, 6, 8, 9, 10}

R: [7, 7, 8, 7, 3, 3, B, B, C, 2, 1, 5]

B: [6, 8, 7, 6, A, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 0, 3, 1] , [3, 0, 2, 0, 1, 0, 4, 2, 0, 0, 4, 0] , [4, 0, 1, 0, 0, 0, 3, 2, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 4, 1, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0] , [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[y_7, 2y_1, y_6, 0, y_5, 0, y_4, y_3, 0, 0, y_2, y_1]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 2, 5] , [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 1, 5, 2] , [0, 0, 0, 5, 0, 3, 0, 0, 2, 2, 3, 1] , [0, 0, 0, 3, 0, 5, 0, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 3, 0, 0, 2, 5, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 0, 3, 3, 2, 5]] \$

$$[0, 0, 0, y_2, 0, y_1, y_3, y_3, y_4, y_5, y_7, y_6]$$

$$p = s^2 - s^8$$

1708 . Coloring, {3, 4, 5, 6, 8, 9, 11}

R: [7, 7, 8, 7, 3, 3, B, B, C, C, 4, 5]
B: [6, 8, 7, 6, A, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
 See Matrix

\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 0, 3, 3] , [0, 0, 2, 3, 3, 0, 2, 2, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 0, 3, 2, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 4, 3, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0]] \$

[0, 0, $y_7, y_5, y_6, 0, y_3, y_4, 0, 0, y_2, y_1$]

Omega Rank for B : cycles: {{1, 2, 6, 8, 9, 10, 11, 12}} order: 8
 See Matrix

\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 2, 0, 2, 1, 3, 2, 1] , [2, 3, 0, 0, 0, 1, 0, 4, 1, 2, 1, 2] , [1, 2, 0, 0, 0, 2, 0, 3, 2, 1, 1, 4] , [1, 1, 0, 0, 0, 1, 0, 2, 4, 2, 2, 3] , [2, 2, 0, 0, 0, 1, 0, 1, 3, 1, 4, 2] , [4, 1, 0, 0, 0, 2, 0, 2, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 4, 0, 1, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 3, 0, 1, 2, 4, 1, 1]] \$

[$y_1, y_2, 0, 0, 0, y_3, y_4, y_5, y_9, y_7, y_8, y_6$]

1709 . Coloring, {3, 4, 5, 6, 8, 9, 12}

R: [7, 7, 8, 7, 3, 3, B, B, C, C, 1, 9]
B: [6, 8, 7, 6, A, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {1, 7, 11}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 0, 3, 3] , [3, 0, 0, 0, 0, 0, 2, 2, 3, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 3] , [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 3]] \$

$$[-5 y_1 - 5 y_2 - 5 y_3 + 11 y_4 - 5 y_5 + 11 y_6, 0, 5 y_1, 0, 0, 0, 5 y_2, 5 y_3, 5 y_4, 0, 5 y_5, 5 y_6]$$

$$p = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 2, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 1, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4]] \$

$$[0, y_8, 0, y_6, y_7, y_5, y_3, y_4, 0, y_2, y_3, y_1]$$

$$p = -s^4 + s^9$$

1710 . Coloring, {3, 4, 5, 6, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, B, B, 2, 4, 5]

B: [6, 8, 7, 6, A, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	5 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 0, 4, 2, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 4, 2, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[0, y_6, y_5, y_4, y_6, 0, y_3, y_2, 0, 0, y_1, 0]$$

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 4

See Matrix

$$\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 4, 0, 4], [0, 0, 0, 0, 0, 2, 0, 0, 4, 3, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$$$

$$[2 y_4, 0, 0, 0, 0, y_5, y_4, y_4, y_3, y_2, 0, y_1]$$

$$p' = -s^4 + s^6 \quad p = s^4 - s^6$$

1711 . Coloring, {3, 4, 5, 6, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, B, B, 2, 1, 9]

B: [6, 8, 7, 6, A, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	5 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 3

See Matrix

$$\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 0, 4, 0], [4, 0, 0, 0, 0, 0, 4, 2, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0], [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$$$

$$[y_1, y_4, y_4, 0, 0, 0, y_2, y_3, y_4, 0, y_5, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[0, 0, 0, 2y_3, y_1, y_2, y_3, y_3, 0, y_4, 0, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

1712 . Coloring, {3, 4, 5, 6, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, B, B, C, 4, 9]

B: [6, 8, 7, 6, A, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	9 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 2, 2, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$$[0, 0, -2y_3 + 2y_4, y_1, 0, 0, y_2, y_3, y_4, 0, y_5, -2y_3 + 2y_4]$$

$$p = s^3 - s^6 \quad p' = s^3 - s^6$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 1, 1, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 2, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 5, 0, 1, 0, 4] , [0, 1, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 1, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 0, 4, 0, 4, 0, 2]] \$

$$[2y_4, y_7, 0, 0, y_6, y_5, y_4, y_3, 0, y_2, 0, y_1]$$

$$p = -s^3 + s^8$$

1713 . Coloring, {3, 4, 5, 6, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, C, C, 2, 4, 5]

B: [6, 8, 7, 6, A, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 5, 8, 12}, {4, 7, 11}} order: 12

See Matrix

$$\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 4, 2, 0, 0, 3, 1], [0, 0, 2, 3, 1, 0, 2, 2, 0, 0, 4, 2], [0, 0, 1, 4, 2, 0, 3, 2, 0, 0, 2, 2], [0, 0, 2, 2, 2, 0, 4, 1, 0, 0, 3, 2], [0, 0, 2, 3, 2, 0, 2, 2, 0, 0, 4, 1], [0, 0, 2, 4, 1, 0, 3, 2, 0, 0, 2, 2], [0, 0, 1, 2, 2, 0, 4, 2, 0, 0, 3, 2]] \$$$

$$[0, 9y_1 - 7y_2 + 9y_3 - 7y_4 + 9y_5 - 7y_6 + 9y_7, 7y_1, 7y_2, 7y_3, 0, 7y_4, 7y_5, 0, 0, 7y_6, 7y_7]$$

$$p = s^2 + s^3 + s^4 - s^6 - s^7 - s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 4, 2, 2], [2, 0, 0, 0, 0, 2, 0, 0, 2, 3, 3, 4], [3, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 3], [2, 0, 0, 0, 0, 3, 0, 0, 3, 2, 4, 2], [4, 0, 0, 0, 0, 2, 0, 0, 2, 3, 3, 2], [3, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 3], [2, 0, 0, 0, 0, 3, 0, 0, 3, 4, 2, 2], [2, 0, 0, 0, 0, 2, 0, 0, 2, 3, 3, 4]] \$$$

$$[y_1, 0, 0, 0, 0, y_2, y_3, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^2 + s^8$$

1714 . Coloring, {3, 4, 5, 6, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, C, C, 2, 1, 9]

B: [6, 8, 7, 6, A, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 2, 0, 0, 0, 3, 1, 2, 0, 2, 2], [2, 0, 0, 0, 0, 0, 4, 2, 2, 0, 3, 3], [3, 0, 0, 0, 0, 0, 2, 0, 3, 0, 4, 4], [4, 0, \\ & 0, 0, 0, 0, 3, 0, 4, 0, 2, 3], [2, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 4], [3, 0, 0, 0, 0, 0, 2, 0, 4, 0, 4, 3], [4, 0, 0, 0, 0, 0, \\ & 3, 0, 3, 0, 2, 4], [2, 0, 0, 0, 0, 0, 4, 0, 4, 0, 3, 3]] \$ \end{aligned}$$

$$[2y_1, 7y_1 + 7y_4 - 9y_3 - 9y_2 + 7y_5 - 9y_6, 7y_1 + 7y_4 - 9y_3 - 9y_2 + 7y_5 - 9y_6, 0, 0, 0, 2y_4, 2y_3, 2y_2, 0, 2y_5, 2y_6]$$

$$p' = s^3 + s^4 - s^6 - s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 0, 2, 2, 2, 1, 1, 0, 4, 2, 2], [0, 0, 0, 2, 2, 2, 0, 0, 0, 5, 1, 4], [0, 0, 0, 1, 4, 2, 0, 0, 0, 4, 0, 5], [0, 0, \\ & 0, 0, 5, 1, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, \\ & 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$ \end{aligned}$$

$$[0, 0, 0, y_6, y_5, y_4, y_3, y_3, 0, y_2, y_1, y_7]$$

$$p = s^5 - s^8$$

1715 . Coloring, {3, 4, 5, 6, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, C, C, C, 4, 9]

B: [6, 8, 7, 6, A, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 2, 4, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 3, 0, 6, 0, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 0, 3, 6] , [0, 0, 0, 3, 0, 0, 2, 0, 6, 0, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 0, 2, 6]] \$

$$[0, 0, 9y_1 + 9y_5 - 7y_4 - 7y_3 + 9y_2 - 7y_6, 7y_1, 0, 0, 7y_5, 7y_4, 7y_3, 0, 7y_2, 7y_6]$$

$$p = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 1, 1, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 2, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 1, 0, 5, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 1, 5, 0] , [5, 1, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 5, 0, 1, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 2, 0, 5, 1, 0]] \$

$$[y_1, y_2, 0, 0, 2y_4, y_3, y_4, y_5, 0, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

1716 . Coloring, {3, 4, 5, 6, 10, 11, 12}

R: [7, 7, 8, 7, 3, 3, B, C, B, 2, 4, 9]

B: [6, 8, 7, 6, A, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 0, 3, 1], [0, 0, 0, 3, 0, 0, 4, 2, 1, 0, 5, 1], [0, 0, 0, 5, 0, 0, 3, 0, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, 5, 0, 2, 0, 4, 0], [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0], [0, 0, 0, 7, 0, 0, 4, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 7, 0, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 5, 0, 0, 0, 7, 0]] \$

$[0, y_1, y_1, y_2, 0, 0, y_3, y_4, y_5, 0, y_6, y_7]$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 4, 1, 3], [1, 0, 0, 0, 3, 2, 0, 0, 0, 5, 1, 4], [1, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$[y_1, 0, 0, 0, y_5, y_6, y_7, y_7, 0, y_2, y_3, y_4]$

$$p = -s^5 + s^8$$

1717 . Coloring, {3, 4, 5, 7, 8, 9, 10}

$$\Omega p(\Delta)=0: p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, A, B, C, 2, 1, 5]

B: [6, 8, 7, 6, A, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 9
 See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 1, 1], [1, 3, 2, 0, 1, 0, 4, 1, 0, 3, 1, 0], [1, 3, 1, 0, 0, 0, 4, 2, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 4, 1, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 5, 0, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$[y_1, y_3, y_2, 0, y_4, 0, y_6, y_5, 0, y_9, y_8, y_7]$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5
 See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 3, 3], [0, 0, 2, 3, 0, 2, 1, 0, 3, 0, 3, 2], [0, 0, 2, 3, 0, 3, 2, 0, 2, 0, 4, 0], [0, 0, 3, 4, 0, 3, 2, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 4, 3, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 3, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 2, 4, 0, 0, 0, 3, 0], [0, 0, 2, 3, 0, 3, 4, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 3, 2, 0, 0, 0, 4, 0]] \$$

$[0, 0, y_1, y_2, 0, y_4, y_3, y_6, y_5, y_6, y_8, y_7]$

$$p = s^4 - s^9$$

1718 . Coloring, $\{3, 4, 5, 7, 8, 9, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: $[7, 7, 8, 7, 3, A, A, B, C, C, 4, 5]$

B: $[6, 8, 7, 6, A, 3, B, C, B, 2, 1, 9]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{3, 4, 5, 7, 8, 10, 11, 12\}\}$ order: 8
 See Matrix

$\$ [[0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 0, 2, 1, 0, 3, 1, 3], [0, 0, 3, 1, 3, 0, 1, 2, 0, 2, 1, 3], [0, 0, 3, 1, 3, 0, 1, 3, 0, 1, 2, 2], [0, 0, 3, 2, 2, 0, 1, 3, 0, 1, 3, 1], [0, 0, 2, 3, 1, 0, 2, 3, 0, 1, 3, 1], [0, 0, 1, 3, 1, 0, 3, 2, 0, 2, 3, 1], [0, 0, 1, 3, 1, 0, 3, 1, 0, 3, 2, 2]] \$$

$$[0, 0, y_2, y_1, -y_1 + y_4 + y_3, 0, -y_2 + y_4 + y_3, -y_5 + y_4 + y_3, 0, y_5, y_4, y_3]$$

$$p' = -s^2 + s^3 - s^6 + s^7 \quad p' = s - s^2 + s^5 - s^6 \quad p = s - s^3 + s^5 - s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 10

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 3, 1], [3, 1, 2, 0, 0, 2, 1, 2, 1, 0, 3, 1], [3, 0, 2, 0, 0, 3, 2, 1, 1, 0, 2, 2], [2, 0, 3, 0, 0, 3, 2, 0, 2, 0, 3, 1], [3, 0, 3, 0, 0, 2, 3, 0, 1, 0, 4, 0], [4, 0, 2, 0, 0, 3, 3, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 3, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 3, 4, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 2, 4, 0, 0, 0, 4, 0]] \$$$

$$[y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, y_7, y_8, y_9, y_{10}]$$

1719 . Coloring, {3, 4, 5, 7, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, A, B, C, C, 1, 9]

B: [6, 8, 7, 6, A, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	5 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 1, 3], [1, 0, 0, 0, 0, 0, 2, 1, 3, 3, 1, 5], [1, 0, 0, 0, 0, 0, 1, 0, 5, 2, 1, 6], [1, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 7], [0, 0, 0, 0, 0, 0, 1, 0, 7, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[y_1 + y_4 - y_2 - y_3 - y_5 + y_6 + y_7, 0, y_1, 0, 0, 0, y_4, y_2, y_3, y_5, y_6, y_7]$$

$$p = s^7 - s^8$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}, {2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 1, 2, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 3, 2, 1, 0, 1, 1, 2] , [0, 1, 3, 1, 2, 1, 2, 2, 0, 1, 2, 1] , [0, 1, 1, 2, 1, 1, 3, 1, 0, 2, 2, 2] , [0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 1, 2, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 3, 2, 1, 0, 1, 1, 2] , [0, 1, 3, 1, 2, 1, 2, 2, 0, 1, 2, 1] , [0, 1, 1, 2, 1, 1, 3, 1, 0, 2, 2, 2]] \$

[0, y₄, y₃, y₄ + y₃ - 2 y₂ + 3 y₁ - 2 y₅, -y₄ - 7 y₃ + 13 y₂ - 8 y₁ + 6 y₅, 3 y₄ + 8 y₃ - 14 y₂ + 9 y₁ - 7 y₅, -2 y₄ - 6 y₃ + 11 y₂ - 7 y₁ + 7 y₅, y₂, 0, y₁, -2 y₄ - 13 y₃ + 23 y₂ - 14 y₁ + 11 y₅, y₅]

$$p' = -s^4 + s^9 \quad p' = -s + s^6 \quad p' = -s^3 + s^8 \quad p' = -s^2 + s^7 \quad p = -s + s^6$$

1720 . Coloring, {3, 4, 5, 7, 8, 10, 11}

R: [7, 7, 8, 7, 3, A, A, B, B, 2, 4, 5]

B: [6, 8, 7, 6, A, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	6 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 0, 4, 1, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 0, 5, 2, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 4, 0, 0, 5, 2, 0] , [0, 5, 0, 2, 0, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 7, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 4, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 5, 0, 0, 4, 0, 0]] \$

[0, y₁, y₄, y₂, y₃, 0, y₇, y₅, 0, y₆, y₈, 0]

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 2, 4] , [2, 0, 2, 0, 0, 2, 1, 0, 4, 0, 1, 4] , [1, 0, 2, 0, 0, 2, 2, 0, 4, 0, 1, 4] , [1, 0, 2, 0, 0, 1, 2, 0, 4, 0, 2, 4] , [2, 0, 1, 0, 0, 1, 2, 0, 4, 0, 2, 4] , [2, 0, 1, 0, 0, 2, 1, 0, 4, 0, 2, 4] , [2, 0, 2, 0, 0, 2, 1, 0, 4, 0, 1, 4] , [1, 0, 2, 0, 0, 2, 2, 0, 4, 0, 1, 4] , [1, 0, 2, 0, 0, 1, 2, 0, 4, 0, 2, 4]] \$

[y₂, 0, y₁, 0, 0, -y₂ - y₁ - y₃ + 2 y₆ - y₅, y₃, y₄, -2 y₄ + y₆, y₄, y₅, y₆]

$$p' = s^2 - s^7 \quad p' = s^3 - s^8 \quad p = s^2 - s^7$$

1721 . Coloring, {3, 4, 5, 7, 8, 10, 12}

R: [7, 7, 8, 7, 3, A, A, B, B, 2, 1, 9]

B: [6, 8, 7, 6, A, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 4, 1, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 5, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_3, y_1, y_2, 0, 0, 0, y_5, y_4, 2y_2, y_6, y_7, 0]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {3, 4, 6, 7, 11}}

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 2, 4] , [0, 0, 2, 2, 4, 2, 1, 0, 0, 2, 1, 2] , [0, 0, 2, 1, 2, 2, 2, 0, 0, 4, 1, 2] , [0, 0, 2, 1, 2, 1, 2, 0, 0, 2, 2, 4] , [0, 0, 1, 2, 4, 1, 2, 0, 0, 2, 2, 2] , [0, 0, 1, 2, 2, 2, 1, 0, 0, 4, 2, 2] , [0, 0, 2, 2, 2, 2, 1, 0, 0, 2, 1, 4] , [0, 0, 2, 1, 4, 2, 2, 0, 0, 2, 1, 2] , [0, 0, 2, 1, 2, 1, 2, 0, 0, 4, 2, 2]] \$

$$[0, 0, y_5, y_6, y_2, y_3, y_4, y_5 + y_6 - y_2 + y_3 + y_4 - y_1 + y_7 - y_8, 0, y_1, y_7, y_8]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1722 . Coloring, {3, 4, 5, 7, 8, 11, 12}

R: [7, 7, 8, 7, 3, A, A, B, B, C, 4, 9]

B: [6, 8, 7, 6, A, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	5 vs 10

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 2, 2], [0, 0, 0, 2, 0, 0, 2, 1, 2, 3, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 2, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 2, 3, 2], [0, 0, 0, 3, 0, 0, 3, 0, 2, 3, 3, 2], [0, 0, 0, 3, 0, 0, 3, 0, 2, 3, 2, 3], [0, 0, 0, 2, 0, 0, 3, 0, 3, 3, 2, 3], [0, 0, 0, 2, 0, 0, 2, 0, 3, 3, 3, 3]] \$$

$$[0, 0, y_1, y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {2, 5, 8, 10, 12}} order: 5

See Matrix

$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 2, 2], [2, 1, 2, 0, 2, 2, 1, 2, 0, 2, 1, 1], [1, 2, 2, 0, 1, 2, 2, 1, 0, 2, 1, 2], [1, 2, 2, 0, 2, 1, 2, 2, 0, 1, 2, 1], [2, 1, 1, 0, 1, 1, 2, 2, 0, 2, 2, 2], [2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 2, 2], [2, 1, 2, 0, 2, 2, 1, 2, 0, 2, 1, 1], [1, 2, 2, 0, 1, 2, 2, 1, 0, 2, 1, 2], [1, 2, 2, 0, 2, 1, 2, 2, 0, 1, 2, 1], [2, 1, 1, 0, 1, 1, 2, 2, 0, 2, 2, 2]] \$$

$$[-y_4 + y_2 + y_1, y_5 + y_4 - y_2, y_4 - y_2 - y_1 + y_5 + y_3, 0, y_5 - y_2 + y_3, y_5, y_4, y_3, 0, y_2, y_1, -y_3 + y_2 + y_1]$$

$$p' = -s + s^6 \quad p' = -s^3 + s^8 \quad p' = -s^2 + s^7 \quad p = -s + s^6 \quad p' = -s^4 + s^9$$

1723 . Coloring, {3, 4, 5, 7, 9, 10, 11}

R: [7, 7, 8, 7, 3, A, A, C, C, 2, 4, 5]

B: [6, 8, 7, 6, A, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{3, 5, 8, 12\}\}$ order: 12
See Matrix

$\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 4, 1, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 3, 2, 0, 4, 0, 1], [0, 4, 1, 0, 1, 0, 3, 2, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 4, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 3, 1, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, 3, 2, 0, 3, 0, 1], [0, 3, 1, 0, 1, 0, 4, 2, 0, 3, 0, 2]] \$$

$[0, -3y_1 + 10y_2 - 3y_3 + 10y_4 - 3y_5, 3y_2 + 3y_4 - 3y_6, 3y_1, 3y_2, 0, 3y_3, 3y_4, 0, 3y_5, 0, 3y_6]$

$$p' = -s^2 - s^4 + s^5 + s^7 \quad p = s^2 + s^4 - s^5 - s^7$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5
See Matrix

$\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 4, 2], [4, 0, 2, 0, 0, 2, 1, 0, 2, 0, 4, 1], [4, 0, 2, 0, 0, 4, 2, 0, 1, 0, 3, 0], [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0]] \$$

$[y_2, 0, y_3, 0, 0, y_8, y_1, y_7, y_5, y_7, y_6, y_4]$

$$p = -s^4 + s^9$$

1724 . Coloring, $\{3, 4, 5, 7, 9, 10, 12\}$

R: [7, 7, 8, 7, 3, A, A, C, C, 2, 1, 9]

B: [6, 8, 7, 6, A, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 1, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3]] \$

[6 y₂ + 6 y₃ - 6 y₅, 4 y₂ + 4 y₃ + 6 y₅ - 3 y₁ - 3 y₄, 3 y₂ + 3 y₃ - 3 y₅, 0, 0, 0, 3 y₁, 3 y₂, 3 y₃, 3 y₄, 0, 3 y₅]

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}, {5, 10, 12}}

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 2, 1, 0, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 4, 2, 0, 0, 2, 1, 2] , [0, 0, 4, 1, 2, 2, 0, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 1, 4, 0, 0, 2, 2, 1] , [0, 0, 1, 2, 1, 2, 2, 0, 0, 2, 4, 2] , [0, 0, 2, 4, 2, 2, 1, 0, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 4, 2, 0, 0, 2, 1, 1] , [0, 0, 4, 1, 1, 2, 2, 0, 0, 2, 2, 2]] \$

[0, 0, 5 y₂, 5 y₃, 5 y₄, 5 y₁, -5 y₂ - 5 y₃ + 11 y₄ - 5 y₁ - 5 y₈ + 11 y₇ - 5 y₅ + 11 y₆, 5 y₈, 0, 5 y₇, 5 y₅, 5 y₆]

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1725 . Coloring, {3, 4, 5, 7, 9, 11, 12}

R: [7, 7, 8, 7, 3, A, A, C, C, C, 4, 9]

B: [6, 8, 7, 6, A, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 1, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_3 - 2y_4, 2y_3 - 4y_4, 0, 0, y_3, y_4, y_2, y_1, 0, -y_4 + y_2 + y_1]$$

$$p' = -s^5 + s^6 \quad p = s^4 - s^6 \quad p' = s^4 - s^5$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 4, 0], [4, 1, 2, 0, 0, 2, 1, 2, 0, 2, 2, 0], [2, 2, 2, 0, 0, 4, 2, 1, 0, 0, 3, 0], [3, 0, \\ & 4, 0, 0, 2, 2, 2, 0, 0, 3, 0], [3, 0, 2, 0, 0, 3, 4, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 3, 2, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 4, \\ & 3, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 3, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 2, 4, 0, 0, 0, 3, 0]] \$ \end{aligned}$$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9, 0]$$

1726 . Coloring, {3, 4, 5, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, A, C, B, 2, 4, 9]

B: [6, 8, 7, 6, A, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 4, 1, 1, 3, 2, 1], [0, 3, 0, 2, 0, 0, 4, 0, 1, 4, 1, 1], [0, 4, \\ & 0, 1, 0, 0, 5, 0, 1, 4, 1, 0], [0, 4, 0, 1, 0, 0, 5, 0, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, \\ & 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$ \end{aligned}$$

$$[0, y_9, y_8, y_7, 0, 0, y_6, y_5, y_4, y_3, y_2, y_1]$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 7, 11}}

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 2, 1, 0, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 3, 2, 0, 0, 3, 1, 2] , [1, 0, 3, 0, 2, 2, 2, 0, 0, 1, 2, 3] , [2, 0, 2, 0, 3, 1, 3, 0, 0, 2, 2, 1] , [2, 0, 1, 0, 1, 2, 2, 0, 0, 3, 3, 2] , [3, 0, 2, 0, 2, 2, 1, 0, 0, 1, 2, 3] , [2, 0, 2, 0, 3, 3, 2, 0, 0, 2, 1, 1] , [1, 0, 3, 0, 1, 2, 2, 0, 0, 3, 2, 2]] \$

$[-3y_8 + 5y_7 - 3y_6 - 3y_5 - 3y_4 + 5y_3 - 3y_2 + 5y_1, 0, 3y_8, 0, 3y_7, 3y_6, 3y_5, 3y_4, 0, 3y_3, 3y_2, 3y_1]$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1727 . Coloring, {3, 4, 5, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, B, B, C, 2, 4, 5]

B: [6, 8, 7, 6, A, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 0, 4, 1, 0, 0, 4, 0] , [0, 0, 1, 4, 0, 0, 4, 2, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$[0, y_1, y_2, y_3, y_1, 0, y_7, y_5, 0, y_6, y_4, y_6]$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 1, 3] , [1, 0, 2, 0, 0, 2, 1, 0, 3, 1, 2, 4] , [2, 0, 2, 0, 0, 1, 2, 0, 4, 1, 3, 1] , [3, 0, 1, 0, 0, 2, 2, 0, 1, 2, 4, 1] , [4, 0, 2, 0, 0, 3, 1, 0, 1, 2, 1, 2] , [1, 0, 3, 0, 0, 4, 2, 0, 2, 1, 1, 2] , [1, 0, 4, 0, 0, 1, 3, 0, 2, 2, 2, 1] , [2, 0, 1, 0, 0, 1, 4, 0, 1, 3, 2, 2] , [2, 0, 1, 0, 0, 2, 1, 0, 2, 4, 1, 3]] \$

$$[y_1, 0, y_2, 0, 0, y_3, y_6, y_7, y_8, y_9, y_5, y_4]$$

1728 . Coloring, {3, 4, 5, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, B, B, C, 2, 1, 9]

B: [6, 8, 7, 6, A, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 4, 1, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1]] \$$$

$$[-9y_3 - 6y_6 - 3y_1 + 13y_5 - 3y_4 + 13y_2, 3y_3 + 3y_6, 3y_3, 0, 0, 0, 3y_1, 3y_6, 3y_5, 3y_3, 3y_4, 3y_2]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 1, 0, 0, 3, 0, 4], [0, 0, 2, 0, 4, 1, 2, 0, 0, 4, 0, 3], [0, 0, 1, 0, 3, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 6, 0, 5], [0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, y_7, 0, y_6, y_7, y_8]$$

$$p = s^6 - s^9$$

1729 . Coloring, {3, 4, 5, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 - 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, B, B, C, C, 4, 9]

B: [6, 8, 7, 6, A, 3, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	10 vs 10

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 1, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 3, 3]] \$

$$[0, 0, 3 y_2, -3 y_2 - 3 y_1 - 3 y_5 - 3 y_3 + 10 y_4, 0, 0, 3 y_1, 3 y_5, -3 y_2 + 3 y_4, 3 y_2, 3 y_3, 3 y_4]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 1, 2, 0, 3, 0, 1] , [0, 3, 2, 0, 1, 1, 2, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 2, 3, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 1, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 2, 0, 4, 0, 3]] \$

$$[y_6, y_7, y_5, 0, y_4, y_3, y_1, y_2, 0, y_9, y_{10}, y_8]$$

1730 . Coloring, {3, 4, 5, 8, 10, 11, 12}

R: [7, 7, 8, 7, 3, A, B, B, B, 2, 4, 9]

B: [6, 8, 7, 6, A, 3, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 3
See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 4, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, y_3 + y_4, y_3, y_1, 0, 0, y_5, y_4, 2y_3, y_3, y_2, 0]$$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 2, 1, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 2, 0, 0, 5, 0, 3] , [0, 0, 0, 0, 3, 0, 2, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[2y_5, 0, y_1, 0, y_2, y_3, y_4, y_5, 0, y_6, 0, y_7]$$

$$p = -s^5 + s^8$$

1731 . Coloring, {3, 4, 5, 9, 10, 11, 12}

R: [7, 7, 8, 7, 3, A, B, C, C, 2, 4, 9]

B: [6, 8, 7, 6, A, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	9 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 2, 2] , [0, 1, 0, 2, 0, 0, 4, 1, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3]] \$

[0, 3 y₅, 3 y₄, 3 y₃, 0, 0, 3 y₁, 3 y₅ - 3 y₄, 3 y₂, 3 y₄, -3 y₃ - 3 y₁ + 7 y₅ - 13 y₄ + 10 y₂, 3 y₅ - 6 y₄ + 3 y₂]

$$p' = -s^5 + s^8 \quad p' = s^3 - s^6 \quad p' = s^4 - s^7 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 2, 1, 0, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 2, 0, 0, 3, 0, 3] , [0, 0, 2, 0, 3, 1, 2, 0, 0, 5, 0, 3] , [0, 0, 1, 0, 3, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

[y₉, 0, y₈, 0, y₇, y₆, y₅, y₄, 0, y₃, y₂, y₁]

1732 . Coloring, {3, 4, 6, 7, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, A, B, C, 2, 1, 5]

B: [6, 8, 7, 6, 3, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 0, 3, 1, 0, 3, 1, 1] , [1, 3, 0, 0, 1, 0, 4, 1, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 4, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

$$[y_1, y_2, y_7, 0, y_7 + y_4, 0, y_3, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 0, 2, 1, 1, 2, 1, 3, 3], [0, 0, 0, 3, 0, 2, 1, 0, 3, 2, 3, 2], [0, 0, 0, 3, 0, 3, 0, 0, 2, 2, 4, 2], [0, 0, \\ & 0, 4, 0, 3, 0, 0, 2, 3, 2, 2], [0, 0, 0, 2, 0, 4, 0, 0, 2, 3, 2, 3], [0, 0, 0, 2, 0, 2, 0, 0, 3, 4, 2, 3], [0, 0, 0, 2, 0, 2, \\ & 0, 0, 3, 2, 3, 4], [0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 3, 2], [0, 0, 0, 3, 0, 3, 0, 0, 2, 2, 4, 2]] \$ \end{aligned}$$

$$[0, 0, y_4, y_1, 0, y_2, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p = -s^3 + s^9$$

1733 . Coloring, {3, 4, 6, 7, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, A, B, C, C, 4, 5]

B: [6, 8, 7, 6, 3, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 8	10 vs 10

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 2, 0, 3, 1, 0, 3, 1, 3], [0, 0, 0, 1, 3, 0, 2, 1, 0, 5, 1, 3], [0, 0, 0, 1, 3, 0, 1, 0, 0, 5, 1, 5], [0, 0, \\ & 0, 1, 5, 0, 1, 0, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, \\ & 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$ \end{aligned}$$

$$[0, 0, y_1, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 0, 2, 1, 1, 2, 1, 3, 1] , [3, 1, 0, 0, 0, 2, 1, 2, 1, 2, 3, 1] , [3, 2, 0, 0, 0, 3, 0, 1, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 3, 0, 2, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 2, 0, 2, 1, 3, 2, 2] , [2, 3, 0, 0, 0, 1, 0, 3, 2, 2, 1, 2] , [1, 2, 0, 0, 0, 2, 0, 3, 2, 1, 2, 3] , [2, 1, 0, 0, 0, 1, 0, 2, 3, 2, 2, 3] , [2, 2, 0, 0, 0, 2, 0, 1, 3, 1, 3, 2] , [3, 1, 0, 0, 0, 2, 0, 2, 2, 2, 3, 1]] \$

[y₁₀, y₈, y₉, 0, 0, y₇, y₆, y₄, y₅, y₃, y₁, y₂]

1734 . Coloring, {3, 4, 6, 7, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, A, B, C, C, 1, 9]

B: [6, 8, 7, 6, 3, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 3, 1, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 1, 3, 3, 1, 5] , [1, 0, 0, 0, 0, 0, 1, 0, 5, 2, 1, 6] , [1, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 1, 0, 7, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

[y₁ + y₇ - y₂ - y₃ - y₄ + y₅ + y₆, 0, y₁, 0, 0, 0, y₇, y₂, y₃, y₄, y₅, y₆]

$$p = -s^7 + s^8$$

Omega Rank for B : cycles: {{2, 3, 4, 5, 6, 7, 8, 10, 11, 12}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 1, 1, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 1, 2, 0, 2, 1, 1] , [0, 2, 1, 1, 1, 3, 2, 1, 0, 2, 1, 2] , [0, 2, 1, 1, 2, 1, 1, 2, 0, 3, 2, 1] , [0, 3, 2, 2, 1, 1, 1, 2, 0, 1, 1, 2] , [0, 1, 1, 1, 2, 2, 2, 3, 0, 1, 1, 2] , [0, 1, 2, 1, 2, 1, 1, 1, 0, 2, 2, 3] , [0, 2, 2, 2, 3, 1, 2, 1, 0, 1, 1, 1] , [0, 1, 3, 1, 1, 2, 2, 2, 0, 1, 2, 1] , [0, 1, 1, 2, 1, 1, 1, 3, 1, 0, 2, 2, 2]] \$

$$[0, y_6, y_7, y_1, y_2, y_3, y_4, y_5, 0, y_8, y_9, y_{10}]$$

1735 . Coloring, {3, 4, 6, 7, 8, 10, 11}

R: [7, 7, 8, 7, A, 3, A, B, B, 2, 4, 5]

B: [6, 8, 7, 6, 3, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 4, 1, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 5, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_1, y_2, y_3, 2 y_2, 0, y_4, y_5, 0, y_6, y_7, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 2, 4] , [2, 0, 0, 0, 0, 2, 1, 0, 4, 2, 1, 4] , [1, 0, 0, 0, 0, 2, 0, 0, 4, 2, 1, 6] , [1, 0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[y_8, 0, y_7, 0, 0, y_5, y_6, y_7, y_3, y_4, y_1, y_2]$$

$$p = -s^7 + s^9$$

1736 . Coloring, {3, 4, 6, 7, 8, 10, 12}

R: [7, 7, 8, 7, A, 3, A, B, B, 2, 1, 9]

B: [6, 8, 7, 6, 3, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 4, 1, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 5, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_2, y_1, y_3, 0, 0, 0, y_4, y_6, 2y_3, y_5, y_7, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{3, 4, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 2, 4] , [0, 0, 2, 2, 4, 2, 1, 0, 0, 2, 1, 2] , [0, 0, 4, 1, 2, 2, 2, 0, 0, 2, 1, 2] , [0, 0, 2, 1, 2, 1, 4, 0, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 1, 2, 0, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 2, 2, 0, 0, 1, 2, 1] , [0, 0, 2, 2, 1, 4, 2, 0, 0, 2, 2, 1] , [0, 0, 1, 2, 1, 2, 2, 0, 0, 4, 2, 2] , [0, 0, 1, 2, 2, 2, 1, 0, 0, 2, 2, 4]] \$

$$[0, 0, y_9, y_8, y_7, y_6, y_5, y_4, 0, y_3, y_2, y_1]$$

1737 . Coloring, {3, 4, 6, 7, 8, 11, 12}

R: [7, 7, 8, 7, A, 3, A, B, B, C, 4, 9]

B: [6, 8, 7, 6, 3, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 1, 2, 3, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 3, 3, 3]] \$

$$[0, 0, y_1 - y_2 + y_3 + y_4 + y_5 - y_6 - y_7, y_1, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{1, 2, 3, 5, 6, 7, 8, 10, 11, 12}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 2, 1, 2, 0, 2, 1, 1] , [1, 2, 2, 0, 1, 2, 2, 1, 0, 2, 1, 2] , [1, 2, 1, 0, 2, 1, 2, 2, 0, 2, 2, 1] , [2, 2, 2, 0, 1, 1, 1, 2, 0, 1, 2, 2] , [2, 1, 1, 0, 2, 2, 2, 2, 0, 1, 1, 2] , [1, 1, 2, 0, 2, 2, 1, 1, 0, 2, 2, 2] , [2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 1, 1] , [1, 2, 2, 0, 1, 2, 2, 2, 0, 1, 2, 1] , [2, 1, 1, 0, 1, 1, 2, 2, 0, 2, 2, 2]] \$

$$[y_{10}, y_9, y_8, 0, y_7, y_6, y_5, y_4, 0, y_3, y_2, y_1]$$

1738 . Coloring, {3, 4, 6, 7, 9, 10, 11}

R: [7, 7, 8, 7, A, 3, A, C, C, 2, 4, 5]

B: [6, 8, 7, 6, 3, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 4, 1, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 0, 3, 0, 0, 6, 0, 1] , [0, 6, 0, 0, 1, 0, 5, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[0, y_2, y_1, 2y_1, y_3, 0, y_4, y_5, 0, y_6, 0, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 4, 2], [4, 0, 0, 0, 0, 2, 1, 0, 2, 2, 4, 1], [4, 0, 0, 0, 0, 4, 0, 0, 1, 2, 3, 2], [3, 0, \\ 0, 0, 0, 4, 0, 0, 2, 4, 1, 2], [1, 0, 0, 0, 0, 3, 0, 0, 2, 4, 2, 4], [2, 0, 0, 0, 0, 1, 0, 0, 4, 3, 2, 4], [2, 0, 0, 0, 0, 2, \\ 0, 0, 4, 1, 4, 3], [4, 0, 0, 0, 0, 2, 0, 0, 3, 2, 4, 1], [4, 0, 0, 0, 0, 4, 0, 0, 1, 2, 3, 2]] \$ \end{aligned}$$

$$[y_1, 0, y_4, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7, y_8]$$

$$p = -s^3 + s^9$$

1739 . Coloring, {3, 4, 6, 7, 9, 10, 12}

R: [7, 7, 8, 7, A, 3, A, C, C, 2, 1, 9]

B: [6, 8, 7, 6, 3, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	9 vs 9

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 1, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3], [0, 4, \\ 0, 0, 0, 0, 3, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3], [0, 4, 0, 0, 0, 0, \\ 3, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3]] \$ \end{aligned}$$

$$[6y_3 + 6y_2 - 6y_5, -3y_1 + 4y_3 + 4y_2 - 3y_4 + 6y_5, 3y_3 + 3y_2 - 3y_5, 0, 0, 0, 3y_1, 3y_3, 3y_2, 3y_4, 0, 3y_5]$$

$$p = s^3 - s^6 \quad p' = s^3 - s^6 \quad p'' = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 4, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 2, 1, 0, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 4, 2, 0, 0, 2, 1, 2] , [0, 0, 1, 1, 2, 2, 2, 0, 0, 4, 2, 2] , [0, 0, 2, 2, 2, 1, 1, 0, 0, 2, 2, 4] , [0, 0, 2, 2, 4, 2, 2, 0, 0, 1, 1, 2] , [0, 0, 4, 1, 2, 2, 2, 0, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 1, 4, 0, 0, 2, 2, 2] , [0, 0, 1, 2, 2, 2, 2, 0, 0, 1, 4, 2]] \$

[0, 0, y₄, y₅, y₉, y₆, y₇, y₈, 0, y₁, y₂, y₃]

1740 . Coloring, {3, 4, 6, 7, 9, 11, 12}

R: [7, 7, 8, 7, A, 3, A, C, C, C, 4, 9]

B: [6, 8, 7, 6, 3, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	4 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 4
See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 1, 4, 3, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

[0, 0, y₁ - 2 y₂ - 2 y₃ + 2 y₄, 2 y₁ - 4 y₂ - 4 y₃ + 4 y₄, 0, 0, y₁, y₂ + y₃ - y₄, y₂, y₃, 0, y₄]

p = - s⁴ + s⁵ p = - s⁴ + s⁶ p = - s⁴ + s⁷

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 4, 0] , [4, 1, 2, 0, 0, 2, 1, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 4, 2, 1, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 0, 2, 0, 4, 3, 0] , [3, 4, 0, 0, 0, 3, 0, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 0, 4, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 0, 2, 0, 3, 4, 0] , [4, 3, 0, 0, 0, 2, 0, 3, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 4, 0, 3, 0, 2, 3, 0]] \$

[y₁, y₂, y₃, 0, y₄, y₅, y₆, y₉, 0, y₇, y₈, 0]

1741 . Coloring, {3, 4, 6, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, A, C, B, 2, 4, 9]

B: [6, 8, 7, 6, 3, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 0, 4, 1, 1, 3, 2, 1] , [0, 3, 0, 2, 0, 0, 4, 0, 1, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 5, 0, 1, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 5, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

[0, y₁, y₉, y₈, 0, 0, y₇, y₆, y₅, y₄, y₃, y₂]

Omega Rank for B : cycles: {{1, 3, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 2, 1, 0, 0, 2, 2, 1] , [2, 0, 3, 0, 1, 3, 2, 0, 0, 2, 1, 2] , [1, 0, 1, 0, 2, 2, 3, 0, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 1, 1, 0, 0, 2, 3, 3] , [3, 0, 2, 0, 3, 2, 2, 0, 0, 1, 1, 2] , [1, 0, 3, 0, 2, 3, 2, 0, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 1, 3, 0, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 2, 2, 0, 0, 1, 3, 3]] \$

[y₁, 0, y₆, 0, y₄, y₅, y₃, y₂, 0, y₈, y₉, y₇]

1742 . Coloring, {3, 4, 6, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, B, B, C, 2, 4, 5]

B: [6, 8, 7, 6, 3, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 1, 3, 1] , [0, 1, 0, 3, 1, 0, 4, 1, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 4, 0, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

$$[0, y_5, y_6, y_4, y_3, 0, y_2, -y_6 + y_3, 0, y_1, y_7, y_6]$$

$$p = s^5 - s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6
See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 2, 1, 0, 3, 3, 2, 4] , [2, 0, 0, 0, 0, 1, 0, 0, 4, 3, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 4, 3] , [4, 0, 0, 0, 0, 3, 0, 0, 3, 2, 3, 1] , [3, 0, 0, 0, 0, 4, 0, 0, 1, 3, 3, 2] , [3, 0, 0, 0, 0, 3, 0, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 3, 0, 0, 3, 3, 2, 4] , [2, 0, 0, 0, 0, 1, 0, 0, 4, 3, 3, 3]] \$

$$[y_8, 0, y_7, 0, 0, y_6, y_5, y_7, y_4, y_3, y_2, y_1]$$

$$p = s^3 - s^9$$

1743 . Coloring, {3, 4, 6, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, B, B, C, 2, 1, 9]

B: [6, 8, 7, 6, 3, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 4, 1, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1], [5, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1]] \$$

$[-9y_2 - 3y_5 - 6y_4 + 13y_3 - 3y_1 + 13y_6, 3y_2 + 3y_4, 3y_2, 0, 0, 0, 3y_5, 3y_4, 3y_3, 3y_2, 3y_1, 3y_6]$

$$p = -s^3 + s^9 \quad p = s^3 - s^5 - s^6 + s^8 \quad p = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 1, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 1, 2, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3]] \$$

$[0, 0, y_2, y_3, y_8, y_7, y_6, y_5, 0, y_4, y_5, y_1]$

$$p = s^4 - s^9$$

1744 . Coloring, $\{3, 4, 6, 8, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: $[7, 7, 8, 7, A, 3, B, B, C, C, 4, 9]$

B: $[6, 8, 7, 6, 3, A, A, C, B, 2, 1, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	5 vs 8	10 vs 10

Omega Rank for R : cycles: $\{\{9, 12\}, \{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 1, 3, 3], [0, 0, 0, 3, 0, 0, 2, 1, 3, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3]] \$$

$$[0, 0, 3 y_2, 3 y_3, 0, 0, 3 y_1, -3 y_3 - 3 y_1 - 3 y_2 - 3 y_5 + 10 y_4, -3 y_2 + 3 y_4, 3 y_2, 3 y_5, 3 y_4]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 3, 1, 1], [1, 3, 2, 0, 1, 2, 1, 2, 0, 3, 0, 1], [0, 3, 1, 0, 1, 1, 2, 3, 0, 3, 0, 2], [0, 3, 1, 0, 2, 0, 1, 3, 0, 3, 0, 3], [0, 3, 2, 0, 3, 0, 1, 3, 0, 1, 0, 3], [0, 1, 3, 0, 3, 0, 2, 3, 0, 1, 0, 3], [0, 1, 3, 0, 3, 0, 3, 1, 0, 2, 0, 3], [0, 2, 3, 0, 3, 0, 3, 1, 0, 3, 0, 1], [0, 3, 3, 0, 1, 0, 3, 2, 0, 3, 0, 1], [0, 3, 1, 0, 1, 0, 3, 3, 0, 3, 0, 2]] \$$$

$$[y_9, y_{10}, y_7, 0, y_8, y_6, y_5, y_4, 0, y_2, y_3, y_1]$$

1745 . Coloring, {3, 4, 6, 8, 10, 11, 12}

R: [7, 7, 8, 7, A, 3, B, B, B, 2, 4, 9]

B: [6, 8, 7, 6, 3, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 4, 0], [0, 1, 0, 4, 0, 0, 4, 1, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$$$

$$[0, y_5, y_4, y_3, 0, 0, y_2, y_5 - y_4, 2 y_4, y_4, y_1, 0]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6 \quad p'' = -s^4 + s^7$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 0, 4], [0, 0, 2, 0, 4, 2, 1, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0,$$

$3, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3]] \$$

$[2 y_2, 0, y_6, 0, y_5, y_4, y_3, y_2, 0, y_1, 0, y_7]$

$$p = -s^3 + s^8$$

1746 . Coloring, {3, 4, 6, 9, 10, 11, 12}

R: [7, 7, 8, 7, A, 3, B, C, C, 2, 4, 9]

B: [6, 8, 7, 6, 3, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 2, 2], [0, 1, 0, 2, 0, 0, 4, 1, 2, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3], [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3]] \$$

$[0, 3 y_1 + 3 y_3, 3 y_1, 4 y_1 - 3 y_3 - 3 y_2 + 10 y_5 - 3 y_4, 0, 0, 3 y_2, 3 y_3, 3 y_1 - 3 y_3 + 3 y_5, 3 y_1, 3 y_4, 3 y_5]$

$$p' = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p = -s^3 + s^9 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 2, 2], [2, 0, 2, 0, 2, 2, 1, 0, 0, 3, 1, 3], [1, 0, 2, 0, 3, 2, 2, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 1, 2, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3]] \$$

$[y_1, 0, y_9, 0, y_7, y_8, y_4, y_5, 0, y_6, y_2, y_3]$

1747 . Coloring, {3, 4, 7, 8, 9, 10, 11}

R: [7, 7, 8, 7, A, A, A, B, C, 2, 4, 5]

B: [6, 8, 7, 6, 3, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 0, 3, 1, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 0, 4, 0, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[0, y_1, 0, y_2, y_5 + y_6, 0, y_3, y_5, 0, y_4, y_6, y_5]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 0, 2, 1, 1, 2, 0, 3, 3] , [3, 0, 2, 0, 0, 2, 2, 0, 3, 0, 3, 1] , [3, 0, 2, 0, 0, 3, 2, 0, 1, 0, 5, 0] , [5, 0, 3, 0, 0, 3, 2, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 5, 3, 0, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 3, 3, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 2, 5, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 3, 3, 0, 0, 0, 5, 0]] \$

$$[y_5, 0, y_4, 0, 0, y_3, y_2, y_1, y_6, 0, y_7, y_8]$$

1748 . Coloring, {3, 4, 7, 8, 9, 10, 12}

R: [7, 7, 8, 7, A, A, A, B, C, 2, 1, 9]

B: [6, 8, 7, 6, 3, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 0, 3, 1, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 4, 0, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2]] \$$

$[3 y_2, 3 y_3, 0, 0, 0, 0, -3 y_2 - 3 y_3 - 3 y_1 + 13 y_4 - 3 y_5 - 3 y_6 + 13 y_7, 3 y_1, 3 y_4, 3 y_5, 3 y_6, 3 y_7]$

$$p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 2, 1, 1, 0, 0, 3, 3], [0, 0, 4, 3, 3, 2, 2, 0, 0, 0, 1, 1], [0, 0, 5, 1, 1, 3, 4, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 1, 5, 0, 0, 0, 4, 0], [0, 0, 1, 4, 0, 2, 4, 0, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 1, 0, 0, 0, 4, 0], [0, 0, 4, 4, 0, 5, 2, 0, 0, 0, 1, 0], [0, 0, 5, 1, 0, 4, 4, 0, 0, 0, 2, 0]] \$$

$[0, 0, y_8, y_7, y_6, y_5, y_4, y_3, 0, 0, y_2, y_1]$

1749 . Coloring, $\{3, 4, 7, 8, 9, 11, 12\}$

R: [7, 7, 8, 7, A, A, A, B, C, C, 4, 9]

B: [6, 8, 7, 6, 3, 3, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6
See Matrix

\$ [[0, 0, 0, 2, 0, 0, 3, 1, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 3, 1, 6] , [0, 0, 0, 1, 0, 0, 1, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[0, 0, 0, y₁, 0, 0, y₂, y₆, y₇, y₅, y₃, y₄]

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5
See Matrix

\$ [[2, 2, 2, 0, 2, 2, 1, 1, 0, 0, 3, 1] , [3, 0, 4, 0, 1, 2, 2, 2, 0, 0, 1, 1] , [1, 0, 3, 0, 1, 3, 4, 0, 0, 0, 2, 2] , [2, 0, 4, 0, 2, 1, 3, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 4, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 4, 3, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 3, 2, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 3, 0, 0, 0, 4, 0]] \$

[y₅, y₆, y₇, 0, y₈, y₉, y₃, y₄, 0, 0, y₂, y₁]

1750 . Coloring, {3, 4, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, A, B, B, 2, 4, 9]

B: [6, 8, 7, 6, 3, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6
See Matrix

\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 4, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[0, y_6, 0, y_5, 0, 0, y_4, y_3, 2y_3, y_2, y_1, 0]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 0, 2, 4], [2, 0, 4, 0, 4, 2, 2, 0, 0, 0, 1, 1], [1, 0, 6, 0, 1, 2, 4, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 1, 6, 0, 0, 0, 4, 0], [4, 0, 1, 0, 0, 2, 3, 0, 0, 0, 6, 0], [6, 0, 2, 0, 0, 4, 1, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 6, 2, 0, 0, 0, 1, 0], [1, 0, 6, 0, 0, 3, 4, 0, 0, 0, 2, 0]] \$$$

$$[y_4, 0, y_3, 0, y_1, y_2, y_8, y_7, 0, 0, y_5, y_6]$$

1751 . Coloring, {3, 4, 7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, A, A, C, C, 2, 4, 9]

B: [6, 8, 7, 6, 3, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 4, 0, 3], [0, 4, 0, 0, 0, 0, 4, 0, 3, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 0, 2, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 4, 0, 2]] \$$$

$$[0, y_1, 0, 10y_1 + 10y_5 - 22y_4 + 10y_3 - 22y_2, 0, 0, y_5, 5y_1 + 5y_5 - 11y_4 + 5y_3 - 11y_2, y_4, y_3, 0, y_2]$$

$$p = -s^2 + s^4 + s^5 - s^7 \quad p = s^2 + s^3 - s^5 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 0, 4, 2] , [4, 0, 4, 0, 2, 2, 2, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 2, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 4, 2, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 4, 0, 0, 0, 2, 0]] \$

$$[y_1, 0, y_2, 0, y_7, y_4, y_5, y_6, 0, 0, y_3, 2y_6]$$

$$p = s^3 - s^8$$

1752 . Coloring, {3, 4, 8, 9, 10, 11, 12}

R: [7, 7, 8, 7, A, A, B, B, C, 2, 4, 9]

B: [6, 8, 7, 6, 3, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 0, 4, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2]] \$

$$[0, 3y_1, 0, -3y_1 - 3y_4 - 9y_5 + 13y_3 - 3y_2 + 13y_6, 0, 0, 3y_4, 3y_5, 3y_3, 6y_5, 3y_2, 3y_6]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 2, 1, 3] , [1, 0, 4, 0, 3, 2, 2, 0, 0, 1, 0, 3] , [0, 0, 5, 0, 3, 1, 4, 0, 0, 2, 0, 1] , [0, 0, 4, 0, 1, 0, 5, 0, 0, 4, 0, 2] , [0, 0, 1, 0, 2, 0, 4, 0, 0, 5, 0, 4] , [0, 0, 2, 0, 4, 0, 1, 0, 0, 4, 0, 5] , [0, 0, 4, 0, 5, 0, 2, 0, 0, 1, 0, 4] , [0, 0, 5, 0, 4, 0, 4, 0, 0, 2, 0, 1] , [0, 0, 4, 0, 1, 0, 5, 0, 0, 4, 0, 2]] \$

$$[y_2, 0, y_1, 0, y_8, y_7, y_6, y_5, 0, y_4, y_5, y_3]$$

$$p = s^4 - s^9$$

1753 . Coloring, {3, 5, 6, 7, 8, 9, 10}

R: [7, 7, 8, 6, 3, 3, A, B, C, 2, 1, 5]

B: [6, 8, 7, 7, A, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 2, 0, 2, 1, 2, 1, 0, 2, 1, 1] , [1, 2, 3, 0, 1, 0, 4, 2, 0, 2, 1, 0] , [1, 2, 1, 0, 0, 0, 3, 3, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 3, 1, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 6, 0, 0, 3, 1, 0] , [1, 3, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

[y₆, y₅, y₄, 0, y₃, y₇, y₂, y₁, 0, y₉, y₈, y₇]

$$p = s^7 - s^{10}$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 1, 2, 1, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

[0, 0, 0, y₁, 0, y₆, y₇, y₆, y₄, y₅, y₃, y₂]

$$p = -s^5 + s^8$$

1754 . Coloring, {3, 5, 6, 7, 8, 9, 11}

R: [7, 7, 8, 6, 3, 3, A, B, C, C, 4, 5]
B: [6, 8, 7, 7, A, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 2, 1, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 2, 0, 2, 0, 2, 1, 2] , [0, 0, 5, 1, 2, 1, 0, 3, 0, 0, 2, 2] , [0, 0, 3, 2, 2, 1, 0, 5, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 2, 0, 3, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 3, 0, 3, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 5, 0, 2, 0, 0, 3, 0] , [0, 0, 5, 3, 0, 3, 0, 3, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 0, 5, 0, 0, 3, 0]] \$

[0, 0, $y_6, y_5, y_4, y_3, y_2, y_1, 0, y_9, y_8, y_7$]

Omega Rank for B : cycles: {{1, 2, 6, 8, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 2, 1, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 0, 2, 1, 1, 4, 1] , [4, 1, 0, 0, 0, 3, 0, 2, 1, 2, 1, 2] , [1, 2, 0, 0, 0, 4, 0, 1, 2, 3, 1, 2] , [1, 3, 0, 0, 0, 1, 0, 2, 2, 4, 2, 1] , [2, 4, 0, 0, 0, 1, 0, 3, 1, 1, 2, 2] , [2, 1, 0, 0, 0, 2, 0, 4, 2, 1, 1, 3] , [1, 1, 0, 0, 0, 2, 0, 1, 3, 2, 2, 4] , [2, 2, 0, 0, 0, 1, 0, 1, 4, 2, 3, 1]] \$

[$y_1, y_2, 0, 0, 0, y_3, y_4, y_9, y_5, y_6, y_7, y_8$]

1755 . Coloring, {3, 5, 6, 7, 8, 9, 12}

R: [7, 7, 8, 6, 3, 3, A, B, C, C, 1, 9]
B: [6, 8, 7, 7, A, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 2, 1, 2, 2, 1, 3] , [1, 0, 1, 0, 0, 0, 2, 2, 3, 2, 1, 4] , [1, 0, 0, 0, 0, 0, 1, 1, 4, 2, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 5, 1, 1, 6] , [1, 0, 0, 0, 0, 0, 2, 0, 6, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_3, 0, y_2, 0, 0, y_1, y_3 - y_2 + y_1 + y_8 + y_6 + y_7 - y_5 - y_4, y_8, y_6, y_7, y_5, y_4]$$

$$p = s^8 - s^9$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}, {4, 7, 11}}

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 2, 1, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 2, 2, 0, 3, 2, 1] , [0, 3, 0, 2, 1, 0, 3, 2, 0, 1, 2, 2] , [0, 1, 0, 2, 2, 0, 2, 3, 0, 1, 3, 2] , [0, 1, 0, 3, 2, 0, 2, 1, 0, 2, 2, 3] , [0, 2, 0, 2, 3, 0, 3, 1, 0, 2, 2, 1] , [0, 2, 0, 2, 1, 0, 2, 2, 0, 3, 3, 1] , [0, 3, 0, 3, 1, 0, 2, 2, 0, 1, 2, 2] , [0, 1, 0, 2, 2, 0, 3, 3, 0, 1, 2, 2]] \$

$$[0, 9y_1 - 7y_2 - 7y_3 + 9y_4 - 7y_5 - 7y_6 + 9y_7 - 7y_8, 0, 7y_1, 7y_2, 7y_3, 7y_4, 7y_5, 0, 7y_6, 7y_7, 7y_8]$$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

1756 . Coloring, {3, 5, 6, 7, 8, 10, 11}

R: [7, 7, 8, 6, 3, 3, A, B, B, 2, 4, 5]

B: [6, 8, 7, 7, A, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}, {3, 4, 6, 8, 11}}

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 2, 0] , [0, 2, 3, 2, 0, 2, 2, 2, 0, 2, 1, 0] , [0, 2, 2, 1, 0, 2, 2, 3, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 1, 2, 2, 0, 2, 3, 0] , [0, 2, 1, 3, 0, 2, 2, 2, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 3, 2, 1, 0, 2, 2, 0] , [0, 2, 3, 2, 0, 2, 2, 2, 0, 2, 1, 0] , [0, 2, 2, 1, 0, 2, 2, 3, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 1, 2, 2, 0, 2, 3, 0]] \$

$$[0, y_2, 5y_2 - y_5 - y_3 - y_4 - y_1 - y_6, y_5, y_3, y_4, y_2, y_1, 0, y_2, y_6, 0]$$

$$p' = -s^2 + s^7 \quad p' = -s^3 + s^8 \quad p = -s^2 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 1, 2, 5], [2, 0, 0, 0, 0, 2, 0, 0, 5, 2, 0, 5], [0, 0, 0, 0, 0, 2, 0, 0, 5, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[y_1, 0, 0, 0, 0, y_3, 2y_2, y_2, y_4, y_7, y_6, y_5]$$

$$p = s^6 - s^8$$

1757 . Coloring, {3, 5, 6, 7, 8, 10, 12}

R: [7, 7, 8, 6, 3, 3, A, B, B, 2, 1, 9]

B: [6, 8, 7, 7, A, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	4 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 2, 0], [2, 2, 1, 0, 0, 0, 4, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 4, 1, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 5, 0, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$$

$$[y_1, y_7, y_8, 0, 0, y_6, y_4, y_5, 2y_6, y_2, y_3, 0]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}, {4, 7, 11}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 2, 4] , [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 0, 0, 4, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 0, 0, 3, 2, 4] , [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 0, 0, 4, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 0, 0, 3, 2, 4] , [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 2, 3]] \$

$$[0, 0, 0, y_3, 5y_3 - 2y_1 - y_2 - y_4, y_1, y_3, y_1, 0, y_2, y_3, y_4]$$

$$p' = s^2 - s^5 \quad p = -s^2 + s^5 \quad p' = -s^3 + s^6 \quad p = -s^2 + s^8$$

1758 . Coloring, {3, 5, 6, 7, 8, 11, 12}

R: [7, 7, 8, 6, 3, 3, A, B, B, C, 4, 9]

B: [6, 8, 7, 7, A, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	9 vs 9	9 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 2, 2] , [0, 0, 1, 2, 0, 2, 0, 2, 2, 2, 3, 2] , [0, 0, 2, 3, 0, 2, 0, 1, 2, 0, 4, 2] , [0, 0, 2, 4, 0, 3, 0, 2, 2, 0, 3, 0] , [0, 0, 3, 3, 0, 4, 0, 2, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 3, 0, 3, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 4, 0, 4, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 2, 0, 3, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 3, 0, 4, 0, 0, 3, 0]] \$

$$[0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6, y_7, y_8, y_9]$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 2, 0, 2, 0, 3, 2, 1] , [2, 3, 0, 0, 1, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 2, 0, 3, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 3, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 4, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 2, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 3, 0, 3, 0, 2]] \$

$$[y_1, y_2, 0, 0, y_8, y_9, y_3, y_4, 0, y_5, y_6, y_7]$$

1759 . Coloring, {3, 5, 6, 7, 9, 10, 11}

R: [7, 7, 8, 6, 3, 3, A, C, C, 2, 4, 5]
B: [6, 8, 7, 7, A, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}, {3, 5, 8, 12}} order: 12
 See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 2, 2, 2, 0, 2, 0, 1] , [0, 2, 4, 0, 1, 0, 2, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 2, 4, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 2, 1, 0, 2, 0, 4] , [0, 2, 3, 0, 4, 0, 2, 2, 0, 2, 0, 1] , [0, 2, 4, 0, 1, 0, 2, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 2, 4, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 2, 1, 0, 2, 0, 4]] \$

$$[0, y_6, y_5, y_4, y_3, y_2, y_6, y_1, 0, y_6, 0, -y_5 - y_4 - y_3 - y_2 + 5y_6 - y_1]$$

$$p' = s^4 - s^8 \quad p' = s^3 - s^7 \quad p = s^3 - s^7$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6
 See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 4, 2] , [4, 0, 0, 0, 0, 2, 0, 0, 2, 1, 5, 2] , [5, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 1] , [2, 0, 0, 0, 0, 5, 0, 0, 1, 4, 2, 2] , [2, 0, 0, 0, 0, 2, 0, 0, 2, 5, 1, 4] , [1, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 4, 2] , [4, 0, 0, 0, 0, 2, 0, 0, 2, 1, 5, 2]] \$

$$[y_1, 0, 0, 0, 0, y_7, 2y_2, y_2, y_3, y_4, y_5, y_6]$$

$$p = -s^2 + s^8$$

1760 . Coloring, {3, 5, 6, 7, 9, 10, 12}

R: [7, 7, 8, 6, 3, 3, A, C, C, 2, 1, 9]
B: [6, 8, 7, 7, A, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 9	4 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 0, 2], [0, 2, 1, 0, 0, 0, 4, 2, 2, 2, 0, 3], [0, 2, 0, 0, 0, 0, 2, 1, 3, 4, 0, 4], [0, 4, 0, 0, 0, 0, 2, 0, 4, 2, 0, 4], [0, 2, 0, 0, 0, 0, 4, 0, 4, 2, 0, 4], [0, 2, 0, 0, 0, 0, 2, 0, 4, 4, 0, 4], [0, 4, 0, 0, 0, 0, 2, 0, 4, 2, 0, 4], [0, 2, 0, 0, 0, 0, 4, 0, 4, 2, 0, 4], [0, 2, 0, 0, 0, 0, 2, 0, 4, 4, 0, 4]] \$$

$$[2y_6, 2y_4 + 2y_3 - y_5 - y_2, y_6 + y_4 + y_3 - y_1, 0, 0, y_6, y_5, y_4, y_3, y_2, 0, y_1]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}, \{4, 7, 11\}\}$ order: 3
See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 2, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 2, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 2, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 2, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 2, 0, 0, 3, 3, 2]] \$$

$$[0, 0, 0, -27y_1 - 20y_2 + 7y_3 + 16y_4, 2y_1, 2y_2, 2y_3, 2y_2, 0, -16y_1 - 12y_2 + 4y_3 + 10y_4, 2y_4, -7y_1 - 4y_2 + 3y_3 + 4y_4]$$

$$p = s^2 - s^8 \quad p' = s^2 - s^5 \quad p' = s^3 - s^6 \quad p' = s^4 - s^7$$

1761 . Coloring, $\{3, 5, 6, 7, 9, 11, 12\}$

R: [7, 7, 8, 6, 3, 3, A, C, C, C, 4, 9]

B: [6, 8, 7, 7, A, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 0, 4] , [0, 0, 1, 0, 0, 2, 0, 2, 4, 2, 0, 5] , [0, 0, 2, 0, 0, 0, 0, 1, 5, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$

$$[0, 0, y_1, -2y_2 + 2y_5, 0, y_2, -2y_2 + 2y_5, y_3, y_4, y_5, 0, y_6]$$

$$p = -s^5 + s^7 \quad p' = -s^5 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 0, 3, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 0, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 3, 3, 0]] \$

$$[y_1, y_2, 0, 0, y_6, y_5, y_6, y_7, 0, y_3, y_4, 0]$$

$$p = -s^2 + s^8$$

1762 . Coloring, {3, 5, 6, 7, 10, 11, 12}

R: [7, 7, 8, 6, 3, 3, A, C, B, 2, 4, 9]

B: [6, 8, 7, 7, A, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}, {3, 4, 6, 8, 9, 11, 12}}

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 1, 1] , [0, 2, 1, 1, 0, 2, 2, 2, 1, 2, 2, 1] , [0, 2, 2, 2, 0, 1, 2, 1, 1, 2, 1, 2] , [0, 2, 1, 1, 0, 2, 2, 2, 2, 1, 1] , [0, 2, 2, 1, 0, 1, 2, 1, 1, 2, 2, 2] , [0, 2, 1, 2, 0, 1, 2, 2, 2, 2, 1, 1] , [0, 2, 1, 1, 0, 2, 2, 1, 1, 2, 2, 2] , [0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 1, 1] , [0, 2, 1, 1, 0, 2, 2, 2, 1, 2, 2, 1] , [0, 2, 2, 2, 0, 1, 2, 1, 1, 2, 1, 2, 1, 2]] \$

$$[0, y_7, y_6, y_5, 0, y_4, y_7, y_3, y_2, y_7, y_1, 5y_7 - y_6 - y_5 - y_4 - y_3 - y_2 - y_1]$$

$$p' = -s^2 + s^9 \quad p' = -s + s^8 \quad p = -s + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 3, 3], [3, 0, 0, 0, 3, 2, 0, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 3, 0, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$$

$$[y_1, 0, 0, 0, y_2, y_3, 2y_4, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

1763 . Coloring, {3, 5, 6, 8, 9, 10, 11}

R: [7, 7, 8, 6, 3, 3, B, B, C, 2, 4, 5]

B: [6, 8, 7, 7, A, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 0, 3, 1], [0, 0, 3, 3, 1, 2, 2, 2, 0, 0, 3, 0], [0, 0, 3, 3, 0, 3, 0, 3, 0, 0, 4, 0], [0, 0, 3, 4, 0, 3, 0, 3, 0, 0, 3, 0], [0, 0, 3, 3, 0, 4, 0, 3, 0, 0, 3, 0], [0, 0, 4, 3, 0, 3, 0, 3, 0, 0, 3, 0], [0, 0, 3, 3, 0, 3, 0, 4, 0, 0, 3, 0], [0, 0, 3, 3, 0, 3, 0, 3, 0, 0, 4, 0], [0, 0, 3, 4, 0, 3, 0, 3, 0, 0, 3, 0]] \$$$

$$[0, 2y_7, y_1, y_2, y_5, y_4, 2y_5 - 2y_7, y_3, 0, 0, y_6, y_7]$$

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 5, 2] , [5, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 1] , [3, 0, 0, 0, 0, 5, 0, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 3, 0, 0, 2, 5, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 5]] \$

$$[y_7, 0, 0, 0, 0, y_6, 2y_5, y_5, y_4, y_3, y_2, y_1]$$

$$p = s^2 - s^8$$

1764 . Coloring, {3, 5, 6, 8, 9, 10, 12}

R: [7, 7, 8, 6, 3, 3, B, B, C, 2, 1, 9]

B: [6, 8, 7, 7, A, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 0, 3, 1] , [3, 0, 1, 0, 0, 0, 4, 2, 1, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 1, 2, 0, 6, 1] , [6, 0, 0, 0, 0, 3, 0, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 6, 0, 2, 0, 3, 1] , [3, 0, 0, 0, 0, 0, 4, 0, 1, 0, 6, 2] , [6, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 6, 0, 1, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 6, 1]] \$

$$[3y_2, 6y_1, -3y_2 - 9y_1 - 3y_7 - 3y_5 + 13y_6 - 3y_3 + 13y_4, 0, 0, 3y_1, 3y_7, 3y_5, 3y_6, 0, 3y_3, 3y_4]$$

$$p = -s^4 - s^5 + s^7 + s^8 \quad p = s^4 - s^6 - s^7 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 1, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[0, 0, 0, y_3, y_2, y_4, y_1, y_4, 0, y_6, y_4, y_5]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1765 . Coloring, {3, 5, 6, 8, 9, 11, 12}

R: [7, 7, 8, 6, 3, 3, B, B, C, C, 4, 9]

B: [6, 8, 7, 7, A, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}, {9, 12}} order: 10

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 0, 3, 3] , [0, 0, 1, 3, 0, 2, 0, 2, 3, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 0, 1, 2, 0, 2, 3] , [0, 0, 3, 2, 0, 3, 0, 2, 3, 0, 1, 2] , [0, 0, 3, 1, 0, 2, 0, 3, 2, 0, 2, 3] , [0, 0, 2, 2, 0, 1, 0, 3, 3, 0, 3, 2] , [0, 0, 1, 3, 0, 2, 0, 2, 2, 0, 3, 3] , [0, 0, 2, 3, 0, 3, 0, 1, 3, 0, 2, 2]] \$

$$[0, 0, 5 y_7, 5 y_6, 0, 5 y_5, 5 y_4, 5 y_3, 5 y_2, 0, -5 y_7 - 5 y_6 - 5 y_5 - 5 y_4 - 5 y_3 + 11 y_2 + 11 y_1, 5 y_1]$$

$$p = s^2 + s^3 - s^7 - s^8$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 2, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 1, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4]] \$

$$[y_6, y_5, 0, 0, y_4, y_3, 2 y_7, y_2, 0, y_1, y_7, y_8]$$

$$p = -s^4 + s^9$$

1766 . Coloring, {3, 5, 6, 8, 10, 11, 12}

R: [7, 7, 8, 6, 3, 3, B, B, B, 2, 4, 9]

B: [6, 8, 7, 7, A, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	7 vs 8	5 vs 7

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 4, 0], [0, 0, 1, 4, 0, 2, 2, 2, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 0, 1, 0, 0, 4, 0], [0, 0, 4, 4, 0, 5, 0, 2, 0, 0, 1, 0], [0, 0, 5, 1, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 1, 0, 5, 0, 0, 4, 0], [0, 0, 1, 4, 0, 2, 0, 4, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 0, 1, 0, 0, 4, 0]] \$$

$[0, y_6, y_1, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, 0]$

$$p = -s^3 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$

$[2y_2, 0, 0, 0, y_3, y_1, 2y_2, y_2, 0, y_4, 0, y_5]$

$$p = s^3 - s^6 \quad p' = s^3 - s^6$$

1767 . Coloring, {3, 5, 6, 9, 10, 11, 12}

R: [7, 7, 8, 6, 3, 3, B, C, C, 2, 4, 9]

B: [6, 8, 7, 7, A, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 2, 2] , [0, 0, 1, 2, 0, 2, 2, 2, 2, 0, 2, 3] , [0, 0, 2, 2, 0, 2, 0, 1, 3, 0, 2, 4] , [0, 0, 2, 2, 0, 2, 0, 2, 4, 0, 0, 4] , [0, 0, 2, 0, 0, 2, 0, 2, 4, 0, 0, 6] , [0, 0, 2, 0, 0, 0, 0, 2, 6, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, y_1 + y_2 - y_3 + y_4 - y_5 - y_6 - y_8 + y_7, y_1, y_2, 0, y_3, y_4, y_5, y_6, 0, y_8, y_7]$$

$$p = -s^8 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 2, 0, 0, 0, 5, 1, 4] , [1, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 1, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

$$[y_7, 0, 0, 0, y_6, y_5, 2y_4, y_4, 0, y_3, y_2, y_1]$$

$$p = -s^5 + s^8$$

1768 . Coloring, {3, 5, 7, 8, 9, 10, 11}

R: [7, 7, 8, 6, 3, A, A, B, C, 2, 4, 5]

B: [6, 8, 7, 7, A, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 2, 2, 1, 0, 3, 1, 0] , [0, 3, 1, 1, 0, 1, 3, 2, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 1, 3, 1, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 1, 4, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 2, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 1, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[0, y_7, y_8, y_6, y_4, y_5, y_3, y_2, 0, y_1, y_9, y_{10}]$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

$$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3], [3, 0, 1, 0, 0, 2, 1, 0, 3, 0, 4, 2], [4, 0, 2, 0, 0, 3, 1, 0, 2, 0, 4, 0], [4, 0, 3, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 3, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 3, 4, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 2, 4, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 3, 3, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 4, 2, 0, 0, 0, 3, 0]] \$$$

$$[y_8, 0, y_7, 0, 0, y_5, y_6, y_4, y_3, y_4, y_2, y_1]$$

$$p = s^4 - s^9$$

1769 . Coloring, $\{3, 5, 7, 8, 9, 10, 12\}$

R: [7, 7, 8, 6, 3, A, A, B, C, 2, 1, 9]

B: [6, 8, 7, 7, A, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	5 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 4, 1, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 4, 0, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2]] \$$$

$$[-3y_1 - 6y_2 - 3y_3 - 3y_4 + 13y_5 - 3y_6 - 3y_7 + 13y_8, 3y_1, 3y_2, 0, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9 \quad p = s^5 - s^7 - s^8 + s^{10}$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3] , [0, 0, 1, 3, 3, 0, 3, 0, 0, 2, 2, 2] , [0, 0, 0, 2, 2, 0, 4, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 2, 0, 0, 2, 4, 3] , [0, 0, 0, 4, 3, 0, 3, 0, 0, 2, 2, 2] , [0, 0, 0, 2, 2, 0, 4, 0, 0, 3, 3, 2] , [0, 0, 0, 3, 2, 0, 2, 0, 0, 2, 4, 3] , [0, 0, 0, 4, 3, 0, 3, 0, 0, 2, 2, 2] , [0, 0, 0, 2, 2, 0, 4, 0, 0, 3, 3, 2]] \$

$[0, 0, 2y_1, 2y_2, 3y_1 + 3y_2 + 4y_5 + 4y_4 - 7y_3, 2y_5, 7y_1 + 7y_2 + 16y_5 + 16y_4 - 27y_3, 2y_5, 0, 4y_1 + 4y_2 + 8y_5 + 10y_4 - 16y_3, 2y_4, 2y_3]$

$$p = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p = -s^3 + s^9 \quad p' = -s^3 + s^6$$

1770 . Coloring, {3, 5, 7, 8, 9, 11, 12}

R: [7, 7, 8, 6, 3, A, A, B, C, C, 4, 9]

B: [6, 8, 7, 7, A, 3, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 1, 3, 3, 1, 5] , [0, 0, 0, 1, 0, 1, 0, 0, 5, 2, 1, 6] , [0, 0, 0, 1, 0, 1, 0, 0, 6, 1, 0, 7] , [0, 0, 0, 0, 0, 1, 0, 0, 7, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$[0, 0, y_1, 3y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7, 0, y_2, 2y_1, y_3, y_4, y_5, y_6, y_7]$

$$p = -s^7 + s^8 \quad p = -s^7 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 2, 1, 2, 0, 2, 2, 1] , [2, 2, 2, 0, 1, 3, 1, 1, 0, 1, 1, 2] , [1, 1, 3, 0, 2, 2, 2, 0, 1, 1, 1] , [1, 1, 2, 0, 1, 1, 3, 1, 0, 2, 2, 2] , [2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 2, 1, 2, 0, 2, 2, 1] , [2, 2, 2, 0, 1, 3, 1, 1, 0, 1, 1, 2] , [1, 1, 3, 0, 2, 2, 2, 0, 1, 1, 1] , [1, 1, 2, 0, 1, 1, 3, 1, 0, 2, 2, 2]] \$

$$[2y_2, 6y_2 + 8y_1 - 12y_3 + 4y_5 - 8y_4, 2y_1, 0, 8y_2 + 13y_1 - 18y_3 + 8y_5 - 15y_4, -4y_2 - 8y_1 + 14y_3 - 8y_5 + 12y_4, 8y_2 + 15y_1 - 22y_3 + 12y_5 - 17y_4, 2y_3, 0, 2y_5, 12y_2 + 18y_1 - 28y_3 + 14y_5 - 22y_4, 2y_4]$$

$$p' = -s^4 + s^9 \quad p' = -s^3 + s^8 \quad p' = -s^2 + s^7 \quad p = -s + s^6 \quad p' = -s + s^6$$

1771 . Coloring, {3, 5, 7, 8, 10, 11, 12}

R: [7, 7, 8, 6, 3, A, A, B, B, 2, 4, 9]

B: [6, 8, 7, 7, A, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 2, 0], [0, 3, 0, 2, 0, 2, 2, 1, 0, 3, 3, 0], [0, 3, 0, 3, 0, 2, 3, 0, 0, 4, 1, 0], [0, 4, 0, 1, 0, 3, 3, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 1, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$$

$$[0, y_6, y_5, y_4, 0, y_3, y_2, y_1, 2y_5, y_8, y_7, 0]$$

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 7, 11}}

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 2, 4], [2, 0, 1, 0, 4, 2, 1, 0, 0, 2, 2, 2], [2, 0, 2, 0, 2, 2, 1, 0, 0, 4, 1, 2], [1, 0, 2, 0, 2, 2, 0, 0, 2, 1, 4], [1, 0, 2, 0, 4, 1, 2, 0, 0, 2, 2, 2], [2, 0, 1, 0, 2, 1, 2, 0, 0, 4, 2, 2], [2, 0, 1, 0, 2, 2, 1, 0, 0, 2, 2, 4], [2, 0, 2, 0, 4, 2, 1, 0, 0, 2, 1, 2], [1, 0, 2, 0, 2, 2, 2, 0, 0, 4, 1, 2]] \$$$

$$[y_7, 0, y_6, 0, y_5, y_4, y_3, y_2, 0, y_1, -y_7 - y_6 + y_5 - y_4 - y_3 + y_2 + y_1 + y_8, y_8]$$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

1772 . Coloring, {3, 5, 7, 9, 10, 11, 12}

R: [7, 7, 8, 6, 3, A, A, C, C, 2, 4, 9]

B: [6, 8, 7, 7, A, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 2, 2, 1, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3]] \$

$[0, y_2, -6y_5 - 4y_3 + 3y_2 + 3y_1 + 3y_4, -12y_5 - 8y_3 + 6y_2 + 6y_1 + 6y_4, 0, -8y_5 - 2y_3 + 3y_2 + 3y_1 + 3y_4, y_1, 3y_2 - 7y_5 - 3y_3 + 3y_1 + 3y_4, y_5, y_4, 0, y_3]$

$$p = -s^3 + s^6 \quad p = -s^3 + s^9 \quad p' = s^4 - s^7 \quad p' = s^3 - s^6$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 7, 11}}

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 4, 2] , [4, 0, 1, 0, 2, 2, 1, 0, 0, 2, 3, 1] , [3, 0, 2, 0, 1, 4, 1, 0, 0, 2, 1, 2] , [1, 0, 4, 0, 2, 3, 2, 0, 0, 1, 1, 2] , [1, 0, 3, 0, 2, 1, 4, 0, 0, 2, 2, 1] , [2, 0, 1, 0, 1, 1, 3, 0, 0, 2, 4, 2] , [4, 0, 1, 0, 2, 2, 1, 0, 0, 1, 3, 2] , [3, 0, 2, 0, 2, 4, 1, 0, 0, 2, 1, 1] , [1, 0, 4, 0, 1, 3, 2, 0, 0, 2, 1, 2]] \$

$[5y_6, 0, 5y_5, 0, 5y_4, 5y_3, 5y_2, -5y_6 - 5y_5 + 11y_4 - 5y_3 - 5y_2 + 11y_1 - 5y_8 + 11y_7, 0, 5y_1, 5y_8, 5y_7]$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

1773 . Coloring, {3, 5, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 5s^4 - 8s^5 + 8s^7 - 16s^8$$

R: [7, 7, 8, 6, 3, A, B, B, C, 2, 4, 9]

B: [6, 8, 7, 7, A, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 10	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 4, 6, 7, 10, 11}} order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 2, 1, 1, 1, 3, 2], [0, 1, 0, 3, 0, 3, 1, 0, 2, 2, 3, 1], [0, 2, 0, 3, 0, 3, 1, 0, 1, 3, 1, 2], [0, 3, 0, 1, 0, 3, 2, 0, 2, 3, 1, 1], [0, 3, 0, 1, 0, 1, 3, 0, 1, 3, 2, 2], [0, 3, 0, 2, 0, 1, 3, 0, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 3, 0, 1, 1, 3, 2], [0, 1, 0, 3, 0, 3, 1, 0, 2, 2, 3, 1], [0, 2, 0, 3, 0, 3, 1, 0, 1, 3, 1, 2]] \$$

$[0, -3 y_1 - 3 y_2 + 8 y_8 - 3 y_6 + 5 y_7, 3 y_1, -3 y_3 - 3 y_4 + 5 y_8 - 3 y_5 + 8 y_7, 0, 3 y_2, 3 y_3, 3 y_4, 3 y_8, 3 y_5, 3 y_6, 3 y_7]$

$$p' = -s^3 + s^9 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3], [1, 0, 1, 0, 3, 2, 1, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 1, 1, 0, 0, 4, 0, 4], [0, 0, 1, 0, 4, 0, 2, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$

$[y_6, 0, y_5, 0, y_4, y_2, y_3, y_8, 0, y_1, y_8, y_7]$

$$p = s^6 - s^9$$

1774 . Coloring, {3, 6, 7, 8, 9, 10, 11}

R: [7, 7, 8, 6, A, 3, A, B, C, 2, 4, 5]

B: [6, 8, 7, 7, 3, A, B, C, B, C, 1, 9]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{3, 4, 6, 8, 11\}\}$

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 2, 1, 0, 3, 1, 1], [0, 3, 1, 1, 1, 2, 2, 1, 0, 4, 1, 0], [0, 4, 2, 1, 0, 1, 3, 1, 0, 3, 1, 0], [0, 3, 1, 1, 0, 1, 4, 2, 0, 3, 1, 0], [0, 3, 1, 1, 0, 1, 3, 1, 0, 4, 2, 0], [0, 4, 1, 2, 0, 1, 3, 1, 0, 3, 1, 0], [0, 3, 1, 1, 0, 2, 4, 1, 0, 3, 1, 0], [0, 3, 2, 1, 0, 1, 3, 1, 0, 4, 1, 0], [0, 4, 1, 1, 0, 1, 3, 2, 0, 3, 1, 0], [0, 3, 1, 1, 0, 1, 4, 1, 0, 3, 2, 0]] \$$

$[0, 5y_1 + 5y_2 - 3y_3 + 5y_4 - 3y_5 + 5y_6 - 3y_7 + 5y_8 - 3y_9, 3y_1, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 0, 3y_7, 3y_8, 3y_9]$

$$p = -s^3 - s^4 - s^5 + s^8 + s^9 + s^{10}$$

Omega Rank for B : cycles: $\{\{1, 6, 9, 10, 11, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 2, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 2, 1, 0, 3, 1, 4, 2], [4, 0, 0, 0, 0, 3, 0, 0, 2, 2, 4, 1], [4, 0, 0, 0, 0, 4, 0, 0, 1, 3, 2, 2], [2, 0, 0, 0, 0, 4, 0, 0, 2, 4, 1, 3], [1, 0, 0, 0, 0, 2, 0, 0, 3, 4, 2, 4], [2, 0, 0, 0, 0, 1, 0, 0, 4, 2, 3, 4], [3, 0, 0, 0, 0, 2, 0, 0, 4, 1, 4, 2], [4, 0, 0, 0, 0, 3, 0, 0, 2, 2, 4, 1]] \$$

$[y_1 - y_2 - y_4 - y_7 + y_5 + y_6, 0, y_3, 0, 0, y_1, y_2, y_3, y_4, y_7, y_5, y_6]$

$$p = -s^3 + s^9 \quad p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1775 . Coloring, $\{3, 6, 7, 8, 9, 10, 12\}$

R: [7, 7, 8, 6, A, 3, A, B, C, 2, 1, 9]

B: [6, 8, 7, 7, 3, A, B, C, B, C, 4, 5]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	8 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 2, 1, 2, 3, 1, 1], [1, 3, 1, 0, 0, 0, 4, 1, 1, 2, 1, 2], [1, 2, 0, 0, 0, 0, 4, 1, 2, 4, 1, 1], [1, 4, 0, 0, 0, 3, 0, 1, 4, 1, 2], [1, 4, 0, 0, 0, 0, 5, 0, 2, 3, 0, 1], [0, 3, 0, 0, 0, 0, 5, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 3, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 5, 0, 1, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 3, 0, 1, 5, 0, 2]] \$$

$[-3y_1 - 3y_2 - 3y_3 - 3y_9 - 3y_4 + 13y_5 - 3y_6 - 3y_7 + 13y_8, 3y_1, 3y_2, 0, 0, 3y_3, 3y_9, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8]$

$$p = -s^6 - s^7 + s^9 + s^{10}$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 2, 1, 0, 1, 3, 3], [0, 0, 2, 3, 3, 0, 3, 0, 0, 1, 2, 2], [0, 0, 3, 2, 2, 0, 5, 0, 0, 0, 3, 1], [0, 0, 2, 3, 1, 0, 5, 0, 0, 0, 5, 0], [0, 0, 1, 5, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$

$[0, 0, y_3, y_2, y_1, y_5, y_4, y_5, 0, y_8, y_6, y_7]$

$$p = s^6 - s^9$$

1776 . Coloring, $\{3, 6, 7, 8, 9, 11, 12\}$

R: [7, 7, 8, 6, A, 3, A, B, C, C, 4, 9]

B: [6, 8, 7, 7, 3, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 10

Omega Rank for R : cycles: {{9, 12}, {3, 4, 6, 8, 11}} order: 10

See Matrix

\$ [[0, 0, 1, 2, 0, 1, 2, 1, 2, 3, 1, 3] , [0, 0, 1, 1, 0, 2, 0, 1, 3, 2, 1, 5] , [0, 0, 2, 1, 0, 1, 0, 1, 5, 0, 1, 5] , [0, 0, 1, 1, 0, 1, 0, 2, 5, 0, 1, 5] , [0, 0, 1, 1, 0, 1, 0, 1, 5, 0, 2, 5] , [0, 0, 1, 2, 0, 1, 0, 1, 5, 0, 1, 5] , [0, 0, 1, 1, 0, 2, 0, 1, 5, 0, 1, 5] , [0, 0, 2, 1, 0, 1, 0, 1, 5, 0, 1, 5] , [0, 0, 1, 1, 0, 1, 0, 2, 5, 0, 1, 5]] \$

[0, 0, 5 y₆, 5 y₇, 0, -5 y₆ - 5 y₇ - 5 y₁ + 6 y₂ + 6 y₃ - 5 y₄, 5 y₂ + 5 y₃ - 5 y₅, 5 y₁, 5 y₂, 5 y₃, 5 y₄, 5 y₅]

$$p' = -s^3 + s^8 \quad p = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 2, 3, 5, 6, 7, 8, 10, 11, 12}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 2, 1, 2, 1, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 1, 2, 0, 1, 2, 1] , [2, 1, 1, 0, 1, 3, 2, 1, 0, 2, 1, 2] , [1, 2, 1, 0, 2, 2, 1, 1, 0, 3, 2, 1] , [2, 3, 2, 0, 1, 1, 1, 2, 0, 2, 1, 1] , [1, 2, 1, 0, 1, 2, 2, 3, 0, 1, 1, 2] , [1, 1, 1, 0, 2, 1, 1, 2, 0, 2, 2, 3] , [2, 2, 2, 0, 3, 1, 1, 1, 0, 1, 1, 2] , [1, 1, 3, 0, 2, 2, 2, 2, 0, 1, 1, 1] , [1, 1, 2, 0, 1, 1, 3, 1, 0, 2, 2, 2]] \$

[y₁, y₂, y₁ - y₂ + y₈ - y₇ + y₅ + y₆ + y₃ - y₄ - y₉, 0, y₈, y₇, y₅, y₆, 0, y₃, y₄, y₉]

$$p = s - s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9 - s^{10}$$

1777 . Coloring, {3, 6, 7, 8, 10, 11, 12}

R: [7, 7, 8, 6, A, 3, A, B, B, 2, 4, 9]

B: [6, 8, 7, 7, 3, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}, {2, 7, 10}}

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 2, 0] , [0, 3, 1, 2, 0, 2, 2, 1, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 2, 3, 1, 0, 2, 1, 0] , [0, 2, 2, 1, 0, 3, 2, 2, 0, 3, 1, 0] , [0, 3, 3, 1, 0, 1, 2, 2, 0, 2, 2, 0] , [0, 2, 1, 2, 0, 1, 3, 3, 0, 2, 2, 0] , [0, 2, 1, 2, 0, 2, 2, 1, 0, 3, 3, 0] , [0, 3, 2, 3, 0, 2, 2, 1, 0, 2, 1, 0] , [0, 2, 2, 1, 0, 3, 3, 2, 0, 2, 1, 0]] \$

$$[0, 7y_1, 9y_1 - 7y_2 - 7y_3 + 9y_4 - 7y_5 - 7y_6 + 9y_7 - 7y_8, 7y_2, 0, 7y_3, 7y_4, 7y_5, 7y_6, 7y_7, 7y_8, 0]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

Omega Rank for B : cycles: $\{\{1, 3, 5, 6, 7, 10, 11, 12\}\}$ order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 2, 4], [2, 0, 2, 0, 4, 2, 1, 0, 0, 1, 2, 2], [2, 0, 4, 0, 2, 2, 2, 0, 0, 2, 1, 1], [1, 0, 2, 0, 1, 2, 4, 0, 0, 2, 2, 2], [2, 0, 1, 0, 2, 1, 2, 0, 0, 2, 4, 2], [4, 0, 2, 0, 2, 2, 1, 0, 0, 1, 2, 2], [2, 0, 2, 0, 2, 4, 2, 0, 0, 2, 1, 1], [1, 0, 2, 0, 1, 2, 2, 0, 0, 4, 2, 2], [2, 0, 1, 0, 2, 1, 2, 0, 0, 2, 2, 4]] \$$$

$$[y_1, 0, y_1 + y_7 - y_4 + y_5 + y_6 + y_3 - y_2 - y_8, 0, y_7, y_4, y_5, y_6, 0, y_3, y_2, y_8]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

1778 . Coloring, $\{3, 6, 7, 9, 10, 11, 12\}$

R: [7, 7, 8, 6, A, 3, A, C, C, 2, 4, 9]

B: [6, 8, 7, 7, 3, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 0, 2], [0, 3, 1, 0, 0, 2, 2, 1, 2, 2, 0, 3], [0, 2, 2, 0, 0, 0, 3, 1, 3, 2, 0, 3], [0, 2, 0, 0, 0, 0, 2, 2, 3, 3, 0, 4], [0, 3, 0, 0, 0, 0, 2, 0, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 3, 0, 5, 2, 0, 4], [0, 2, 0, 0, 0, 0, 2, 0, 4, 3, 0, 5], [0, 3, 0, 0, 0, 0, 2, 0, 5, 2, 0, 4], [0, 2, 0, 0, 0, 0, 3, 0, 4, 2, 0, 5]] \$$$

$$[0, 7y_2, 7y_1, 9y_2 - 7y_1 - 7y_8 + 9y_7 - 7y_6 - 7y_5 + 9y_4 - 7y_3, 0, 7y_8, 7y_7, 7y_6, 7y_5, 7y_4, 0, 7y_3]$$

$$p = s^5 + s^6 - s^8 - s^9$$

Omega Rank for B : cycles: $\{\{1, 3, 5, 6, 7, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 4, 2], [4, 0, 2, 0, 2, 2, 1, 0, 0, 1, 3, 1], [3, 0, 2, 0, 1, 4, 2, 0, 0, 2, 1, 1], [1, 0, 1, 0, 1, 3, 2, 0, 0, 4, 2, 2], [2, 0, 1, 0, 2, 1, 1, 0, 0, 3, 2, 4], [2, 0, 2, 0, 4, 2, 1, 0, 0, 1, 1, 3], [1, 0, 4, 0, 3, 2, 2, 0, 0, 2, 1, 1], [1, 0, 3, 0, 1, 1, 4, 0, 0, 2, 2, 2], [2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 4, 2]] \$$

$$[y_1 - y_2 + y_3 - y_4 - y_5 - y_6 + y_7 + y_8, 0, y_1, 0, y_2, y_3, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

1779 . Coloring, $\{3, 6, 8, 9, 10, 11, 12\}$

R: $[7, 7, 8, 6, A, 3, B, B, C, 2, 4, 9]$

B: $[6, 8, 7, 7, 3, A, A, C, B, C, 1, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	8 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 1, 3, 1], [0, 1, 1, 3, 0, 2, 2, 1, 1, 0, 3, 2], [0, 0, 2, 3, 0, 3, 1, 1, 2, 0, 3, 1], [0, 0, 3, 3, 0, 3, 0, 2, 1, 0, 2, 2], [0, 0, 3, 2, 0, 3, 0, 3, 2, 0, 2, 1], [0, 0, 3, 2, 0, 2, 0, 3, 1, 0, 3, 2], [0, 0, 2, 3, 0, 2, 0, 3, 2, 0, 3, 1], [0, 0, 2, 3, 0, 3, 0, 2, 1, 0, 3, 2], [0, 0, 3, 3, 0, 3, 0, 2, 2, 0, 2, 1], [0, 0, 3, 2, 0, 3, 0, 3, 1, 0, 2, 2]] \$$

$$[0, -3y_3 - 3y_1 - 3y_2 - 3y_4 - 3y_5 + 13y_6 - 3y_7 - 3y_8 + 13y_9, 3y_3, 3y_1, 0, 3y_2, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8, 3y_9]$$

$$p = -s^4 - s^5 + s^9 + s^{10}$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 2, 1, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 1, 2, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3]] \$$

$$[y_7, 0, y_6, 0, y_5, y_4, y_3, y_2, 0, y_1, y_2, y_8]$$

$$p = s^4 - s^9$$

1780 . Coloring, {3, 7, 8, 9, 10, 11, 12}

R: [7, 7, 8, 6, A, A, A, B, C, 2, 4, 9]

B: [6, 8, 7, 7, 3, 3, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 8

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 1, 2, 1, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 2, 2, 0, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 1, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 1, 3, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1]] \$

$$[0, -3y_1 - 3y_2 - 3y_3 - 3y_4 + 13y_5 - 3y_6 - 3y_7 + 13y_8, 0, 3y_1, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 1, 2, 1, 0, 0, 3, 3] , [3, 0, 3, 0, 3, 2, 2, 0, 0, 0, 2, 1] , [2, 0, 5, 0, 1, 3, 3, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 5, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 2, 4, 0, 0, 0, 5, 0] , [5, 0, 2, 0, 0, 3, 2, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 5, 2, 0, 0, 0, 2, 0] , [2, 0, 5, 0, 0, 4, 3, 0, 0, 0, 2, 0]] \$

$$[y_7, 0, y_6, 0, y_5, y_4, y_3, y_2, 0, 0, y_1, y_8]$$

1781 . Coloring, {4, 5, 6, 7, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, B, C, 2, 1, 5]

B: [6, 8, 8, 6, A, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 2, 0, 4, 0, 0, 2, 1, 1] , [1, 2, 2, 0, 1, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_3, y_1, y_2, 0, y_3, 0, y_6, 0, 0, y_4, y_5, y_5]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 2, 0, 2, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 2, 4] , [0, 0, 0, 2, 0, 3, 0, 0, 4, 2, 3, 2] , [0, 0, 0, 3, 0, 2, 0, 0, 2, 3, 4, 2] , [0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 2, 3] , [0, 0, 0, 2, 0, 4, 0, 0, 3, 3, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 3, 3]] \$

$$[0, 0, 0, y_1 - y_5 - y_6 - y_2 + y_3 + y_4, 0, y_1, 0, y_5, y_6, y_2, y_3, y_4]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1782 . Coloring, {4, 5, 6, 7, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, B, C, C, 4, 5]

B: [6, 8, 8, 6, A, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 0, 4, 0, 0, 2, 1, 3], [0, 0, 2, 1, 3, 0, 4, 0, 0, 4, 0, 2], [0, 0, 3, 0, 2, 0, 3, 0, 0, 4, 0, 4], [0, 0, 2, 0, 4, 0, 3, 0, 0, 3, 0, 4], [0, 0, 4, 0, 4, 0, 2, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 4, 0, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 4, 0, 2]] \$$

$$[0, 0, y_1, y_2, y_3, 0, y_4, 0, 0, y_5, y_6, y_7]$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 2, 0, 0, 0, 2, 0, 2, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 0, 2, 1, 2, 2, 2], [2, 2, 0, 0, 0, 3, 0, 2, 2, 2, 1, 2], [1, 2, 0, 0, 0, 2, 0, 2, 2, 3, 2, 2], [2, 3, 0, 0, 0, 1, 0, 2, 2, 2, 2, 2], [2, 2, 0, 0, 0, 2, 0, 3, 2, 1, 2, 2], [2, 1, 0, 0, 0, 2, 0, 2, 2, 2, 2, 3], [2, 2, 0, 0, 0, 2, 0, 1, 3, 2, 2, 2]] \$$

$$[y_1, y_1 - y_2 + y_7 + y_5 + y_4 - y_6 - y_3, 0, 0, 0, y_2, 0, y_7, y_5, y_4, y_6, y_3]$$

$$p = s - s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1783 . Coloring, $\{4, 5, 6, 7, 8, 9, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, B, C, C, 1, 9]

B: [6, 8, 8, 6, A, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 2, 0, 0, 0, 4, 0, 2, 2, 1, 3] , [1, 0, 0, 0, 0, 0, 4, 0, 3, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 1, 0, 4, 4, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_4 - y_5 - y_1 - y_2 + y_3, 0, 2y_2, 0, 0, 0, y_4, 0, y_5, y_1, y_2, y_3]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 0, 2, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 3, 0, 2, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 3, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 5, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 2, 0, 4, 0, 5] , [0, 4, 0, 0, 5, 0, 0, 2, 0, 3, 0, 2]] \$

$$[0, y_4, 0, y_3, y_2, y_1, 0, y_8, 0, y_7, y_6, y_5]$$

1784 . Coloring, {4, 5, 6, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^2 - 14s^3 + 24s^5 + 32s^6 + 32s^7 - 128s^8 \quad p' = -3s^2 + 2s^3 + 8s^4 + 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, 3, A, B, B, 2, 4, 5]

B: [6, 8, 8, 6, A, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 7	5 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 4, 0, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$

$$[0, y_1, y_2, y_2, y_5, 0, y_3, 0, 0, y_4, y_5, 0]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 2, 0, 2, 2, 2, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 0, 6], [0, 0, 0, 0, 0, 2, 0, 0, 6, 2, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 8, 0, 0, 0, 8]] \$$$

$$[y_1 - y_2 - y_3 + y_5, 0, 0, 0, 0, y_1, 0, y_4, y_2, y_3, y_4, y_5]$$

$$p = s^5 - s^7 \quad p' = s^5 - s^6$$

1785 . Coloring, {4, 5, 6, 7, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^2 + 2s^3 + 8s^5 + 32s^7 \quad p = -9s^2 + 4s^4 + 24s^5 + 16s^6 + 96s^7 + 64s^8$$

R: [7, 7, 7, 7, 3, 3, A, B, B, 2, 1, 9]

B: [6, 8, 8, 6, A, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 7	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 0, 4, 0, 2, 2, 2, 0], [2, 2, 0, 0, 0, 0, 6, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], [6, 0, 0, 4, 0, 0]] \$$$

$$[y_5, y_4, y_3, 0, 0, 0, y_2, 0, y_3, y_1, y_6, 0]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 0, 2, 0, 2, 2, 4] , [0, 0, 0, 2, 4, 2, 0, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

[0, 0, 0, $y_4, y_5, y_6, 0, y_3, 0, y_1, y_3, y_2$]

$$p = -s^4 + s^7$$

1786 . Coloring, {4, 5, 6, 7, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -9s^2 + 4s^4 - 24s^5 + 16s^6 - 96s^7 + 64s^8 \quad p = 3s^2 + 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, 3, A, B, B, C, 4, 9]

B: [6, 8, 8, 6, A, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 4, 0, 2, 2, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 0, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 0, 2, 4, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 2, 2, 2]] \$

[0, 0, $y_6, y_5, 0, 0, y_4, 0, y_3, y_2, y_6 + y_5 - y_4 + y_3 + y_2 - y_1, y_1$]

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 0, 2, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 2, 0, 4, 0, 2]] \$

$$[y_4, y_5, 0, 0, y_6, y_7, 0, y_1, 0, y_2, y_3, y_8]$$

1787 . Coloring, {4, 5, 6, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, 3, 3, A, C, C, 2, 4, 5]

B: [6, 8, 8, 6, A, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 7	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 2, 0, 4, 0, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 6, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$$$

$$[0, y_4, y_3, y_5, y_2, 0, y_1, 0, 0, y_6, 0, y_5]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 2, 0, 2, 2, 2, 4, 2], [4, 0, 0, 0, 0, 2, 0, 0, 2, 2, 4, 2], [4, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 2], [2, 0, 0, 0, 0, 4, 0, 0, 2, 4, 2, 2], [2, 0, 0, 0, 0, 2, 0, 0, 2, 4, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 4, 2]] \$$$

$$[y_6 - y_4 - y_5 - y_1 + y_2 + y_3, 0, 0, 0, 0, y_6, 0, y_4, y_5, y_1, y_2, y_3]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1788 . Coloring, {4, 5, 6, 7, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, 3, A, C, C, 2, 1, 9]

B: [6, 8, 8, 6, A, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	7 vs 7

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [[2, 2, 2, 0, 0, 0, 4, 0, 2, 2, 0, 2], [0, 2, 0, 0, 0, 0, 6, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 2, 0, 2, 6, 0, 2], [0, 6, \\ 0, 0, 0, 0, 4, 0, 2, 2, 0, 2], [0, 2, 0, 0, 0, 0, 6, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 2, 0, 2, 6, 0, 2], [0, 6, 0, 0, 0, 0, \\ 4, 0, 2, 2, 0, 2]] \$ \end{aligned}$$

$$[y_3, y_4, y_3, 0, 0, 0, y_2, 0, y_1, -2y_3 - y_4 - y_2 + 6y_1, 0, y_1]$$

$$p = s^2 - s^5 \quad p' = s^3 - s^6 \quad p'' = s^2 - s^5$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [[0, 0, 0, 2, 2, 2, 0, 2, 0, 2, 4, 2], [0, 0, 0, 4, 2, 2, 0, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 4, 0, 0, 0, 4, 0, 4], [0, 0, \\ 0, 0, 4, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, \\ 0, 0, 0, 6, 0, 4]] \$ \end{aligned}$$

$$[0, 0, 0, y_4, y_3, y_2, 0, y_1, 0, y_7, y_6, y_5]$$

1789 . Coloring, {4, 5, 6, 7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7 \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8$$

R: [7, 7, 7, 7, 3, 3, A, C, C, C, 4, 9]

B: [6, 8, 8, 6, A, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 6	7 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 4
See Matrix

\$ [[0, 0, 2, 2, 0, 0, 4, 0, 2, 2, 0, 4] , [0, 0, 0, 0, 0, 0, 4, 0, 4, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 0, 0, 4, 4, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_4, y_4, 0, 0, y_3, 0, y_2, y_1, 0, 2y_4 - y_3 + y_2 + y_1]$$

$$p' = s^4 - s^5 \quad p = s^4 - s^6$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6
See Matrix

\$ [[2, 2, 0, 0, 2, 2, 0, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 2, 0, 4, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 4, 0, 2, 0, 2, 4, 0]] \$

$$[y_1, y_2, 0, 0, y_3, y_4, 0, y_5, 0, y_7, y_6, 0]$$

1790 . Coloring, {4, 5, 6, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, C, B, 2, 4, 9]

B: [6, 8, 8, 6, A, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 0, 4, 0, 2, 2, 1, 1] , [0, 2, 0, 1, 0, 0, 6, 0, 1, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 3, 0, 0, 6, 1, 0] , [0, 6, 0, 1, 0, 0, 6, 0, 0, 3, 0, 0] , [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 3, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 6, 0, 0, 3, 0, 0] , [0, 3, 0, 0, 0, 0, 7, 0, 0, 6, 0, 0]] \$

$$[0, y_1, 2y_3, y_2, 0, 0, y_7, 0, y_6, y_5, y_4, y_3]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 2, 0, 2, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 2, 0, 0, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 3, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_1, 0, 0, 0, y_3, y_2, 0, y_5, 0, y_4, y_7, y_6]$$

1791 . Coloring, {4, 5, 6, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, B, C, 2, 4, 5]

B: [6, 8, 8, 6, A, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 4, 0, 0, 0, 3, 1] , [0, 0, 2, 3, 1, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 1, 4, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0]] \$

$$[0, 2 y_5, y_1, y_2, y_4, 0, y_3, 0, 0, 0, y_6, y_5]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 2, 0, 2, 2, 4, 1, 3], [1, 0, 0, 0, 0, 2, 0, 0, 3, 2, 2, 6], [2, 0, 0, 0, 0, 1, 0, 0, 6, 2, 3, 2], [3, 0, 0, 0, 0, 2, 0, 0, 2, 1, 6, 2], [6, 0, 0, 0, 0, 3, 0, 0, 2, 2, 2, 1], [2, 0, 0, 0, 0, 6, 0, 0, 1, 3, 2, 2], [2, 0, 0, 0, 0, 2, 0, 0, 2, 6, 1, 3]] \$$$

$$[y_1, 0, 0, 0, 0, y_2, 0, y_3, y_4, y_5, y_7, y_6]$$

1792 . Coloring, {4, 5, 6, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, B, C, 2, 1, 9]

B: [6, 8, 8, 6, A, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	6 vs 7

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 0, 4, 0, 2, 0, 3, 1], [3, 0, 0, 0, 0, 0, 6, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 1], [6, 0, 0, 0, 0, 4, 0, 1, 0, 3, 2], [3, 0, 0, 0, 0, 0, 6, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 3, 0, 1, 0, 6, 2], [6, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 1]] \$$$

$$[3 y_4, 3 y_3, 3 y_3, 0, 0, 0, 3 y_2, 0, 3 y_1, 0, -3 y_4 - 6 y_3 - 3 y_2 + 13 y_1 + 13 y_5, 3 y_5]$$

$$p = s^2 - s^4 - s^5 + s^7 \quad p = -s^2 - s^3 + s^5 + s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 0, 2, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 2, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 1, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5]] \$

$$[0, 0, 0, y_4, y_3, y_2, 0, 2y_6, 0, y_1, y_6, y_5]$$

$$p = s^4 - s^7$$

1793 . Coloring, {4, 5, 6, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, B, C, C, 4, 9]

B: [6, 8, 8, 6, A, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 6	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 4, 0, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 4, 0, 3, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4, 2]] \$

$$[0, 0, -5y_1 - 5y_2 + 11y_3 - 5y_4 + 11y_5, 5y_1, 0, 0, 5y_2, 0, 5y_3, 0, 5y_4, 5y_5]$$

$$p = s^2 + s^3 - s^5 - s^6$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 0, 2, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 1, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2]] \$

$$[y_8, y_7, 0, 0, y_5, y_6, 0, y_4, 0, y_3, y_1, y_2]$$

1794 . Coloring, {4, 5, 6, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, 3, B, B, B, 2, 4, 9]

B: [6, 8, 8, 6, A, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 6	5 vs 6

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 2, 2, 2, 0, 0, 4, 0, 2, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$$$

$$[0, y_3, y_3, y_1, 0, 0, y_2, 0, y_3, 0, y_4, 0]$$

$$p' = -s^2 + s^5 \quad p = -s^2 + s^5$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 2, 0, 2, 0, 4, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$$$

$$[y_2, 0, 0, 0, y_4, y_3, 0, y_2, 0, y_1, 0, y_5]$$

$$p = s^3 - s^6$$

1795 . Coloring, {4, 5, 6, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 + 32s^7 \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 + 32s^7 + 64s^8$$

R: [7, 7, 7, 7, 3, 3, B, C, C, 2, 4, 9]
B: [6, 8, 8, 6, A, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	7 vs 7

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6
 See Matrix

\$ [[0, 2, 2, 2, 0, 0, 4, 0, 2, 0, 2, 2] , [0, 0, 0, 2, 0, 0, 6, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 4, 0, 2, 0, 2, 2] , [0, 0, 0, 2, 0, 0, 6, 0, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 0, 2, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 4, 0, 2, 0, 2, 2]] \$

$$[0, y_1, y_1, -2y_1 - y_2 - y_3 + 6y_4, 0, 0, y_2, 0, y_4, 0, y_3, y_4]$$

$$p = s^2 - s^5 \quad p' = s^2 - s^5 \quad p'' = s^3 - s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
 See Matrix

\$ [[2, 0, 0, 0, 2, 2, 0, 2, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 2, 0, 0, 0, 4, 2, 4] , [2, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 0] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4]] \$

$$[y_1, 0, 0, 0, y_2, y_3, 0, y_4, 0, y_7, y_6, y_5]$$

1796 . Coloring, {4, 5, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, A, A, B, C, 2, 4, 5]
B: [6, 8, 8, 6, A, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 3, 1, 1], [0, 3, 2, 1, 1, 0, 5, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$$

$[0, y_4, y_5, y_6, y_6, 0, y_1, 0, 0, y_2, y_3, y_3]$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 8, 9, 11, 12\}\}$ order: 7
See Matrix

$\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 1, 3, 3], [3, 0, 2, 0, 0, 2, 0, 1, 3, 0, 2, 3], [2, 0, 2, 0, 0, 3, 0, 2, 3, 0, 3, 1], [3, 0, 3, 0, 0, 2, 0, 2, 1, 0, 3, 2], [3, 0, 2, 0, 0, 3, 0, 3, 2, 0, 1, 2], [1, 0, 3, 0, 0, 3, 0, 2, 2, 0, 2, 3], [2, 0, 3, 0, 0, 1, 0, 3, 3, 0, 2, 2], [2, 0, 1, 0, 0, 2, 0, 3, 2, 0, 3, 3]] \$$

$[y_1, 0, y_2, 0, 0, y_6, 0, y_3, y_4, y_5, y_7, y_8]$

1797 . Coloring, $\{4, 5, 7, 8, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^5 - 32s^7 \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 - 32s^7 - 64s^8$$

R: [7, 7, 7, 7, 3, A, A, B, C, 2, 1, 9]

B: [6, 8, 8, 6, A, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2]] \$

[3 y₁, -3 y₁ - 6 y₃ - 3 y₆ + 13 y₅ - 3 y₄ + 13 y₂, 3 y₃, 0, 0, 0, 3 y₆, 0, 3 y₅, 3 y₄, 3 y₃, 3 y₂]

$$p' = s^3 + s^4 - s^6 - s^7 \quad p = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 2, 0, 1, 0, 2, 0, 3] , [0, 0, 2, 0, 3, 3, 0, 2, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 2, 0, 3, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 3, 0, 3, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 5]] \$

[0, 0, y₁, y₂, y₃, y₄, 0, y₅, 0, y₆, y₇, y₈]

1798 . Coloring, {4, 5, 7, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^5 + 32s^7 \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 + 32s^7 - 64s^8$$

R: [7, 7, 7, 7, 3, A, A, B, C, C, 4, 9]

B: [6, 8, 8, 6, A, 3, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 4, 0, 5] , [0, 0, 0, 0, 0, 0, 1, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_4, y_3, 0, 0, y_1, 0, y_2, -y_3 + y_1 - y_2 + y_5, y_4, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 1, 3, 1], [3, 1, 2, 0, 1, 2, 0, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 3, 0, 3, 0, 1, 0, 3], [0, 1, 3, 0, 3, 0, 0, 4, 0, 2, 0, 3], [0, 2, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 2, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 4, 0, 2, 0, 3]] \$$$

$$[y_1, y_2, y_5, 0, y_3, y_4, 0, y_6, 0, y_7, y_8, y_9]$$

1799 . Coloring, {4, 5, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, A, B, B, 2, 4, 9]

B: [6, 8, 8, 6, A, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 3, 2, 0], [0, 3, 0, 2, 0, 0, 5, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[0, y_2, y_1, y_6, 0, 0, y_5, 0, 2y_1, y_4, y_3, 0]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 1, 2, 4] , [2, 0, 2, 0, 4, 2, 0, 1, 0, 2, 0, 3] , [0, 0, 2, 0, 3, 2, 0, 2, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 0, 0, 2, 0, 3, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 2, 0, 3, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, 0, y_8, 0, y_5, y_6, y_7]$$

1800 . Coloring, {4, 5, 7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, A, A, C, C, 2, 4, 9]

B: [6, 8, 8, 6, A, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2]] \$

$$[0, y_2, y_1, 2y_1, 0, 0, -y_2 - 3y_1 + 6y_3 - y_4, 0, y_3, y_4, 0, y_3]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 8, 11}}

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 1, 4, 2] , [4, 0, 2, 0, 2, 2, 0, 1, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 4, 0, 2, 0, 2, 1, 2] , [1, 0, 4, 0, 2, 2, 0, 2, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 1, 0, 4, 0, 2, 2, 1] , [2, 0, 1, 0, 1, 2, 0, 2, 0, 2, 4, 2] , [4, 0, 2, 0, 2, 2, 0, 1, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 4, 0, 2, 0, 2, 1, 1]] \$

$$[-5y_1 + 11y_2 - 5y_3 - 5y_4 + 11y_5 - 5y_6 + 11y_7, 0, 5y_1, 0, 5y_2, 5y_3, 0, 5y_4, 0, 5y_5, 5y_6, 5y_7]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

1801 . Coloring, {4, 5, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = -s^2 + 2s^3 + 8s^4 - 8s^5 + 32s^7 \quad p = s^2 - 6s^3 + 40s^5 - 32s^6 - 32s^7 + 128s^8$$

R: [7, 7, 7, 7, 3, A, B, B, C, 2, 4, 9]

B: [6, 8, 8, 6, A, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 0, 0, 4, 0, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 5, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1], [0, 0, \\ & 0, 5, 0, 0, 4, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, \\ & 4, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2]] \$ \end{aligned}$$

$$[0, -6y_4 - 3y_1 - 3y_2 + 13y_3 - 3y_5 + 13y_6, 3y_4, 3y_1, 0, 0, 3y_2, 0, 3y_3, 3y_4, 3y_5, 3y_6]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 0, 1, 0, 2, 2, 0, 2, 0, 3, 1, 3], [1, 0, 2, 0, 3, 2, 0, 1, 0, 2, 0, 5], [0, 0, 2, 0, 5, 1, 0, 2, 0, 3, 0, 3], [0, 0, \\ & 1, 0, 3, 0, 0, 2, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 1, 0, 3, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, \\ & 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$ \end{aligned}$$

$$[y_1, 0, y_2, 0, y_3, y_4, 0, y_5, 0, y_6, y_7, y_8]$$

1802 . Coloring, {4, 6, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p' = -3s^2 + 2s^3 + 8s^5 + 32s^7 \quad p = 3s^2 - 2s^3 - 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, 3, A, B, C, 2, 4, 5]

B: [6, 8, 8, 8, 6, 3, A, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	8 vs 9	5 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 4, 0, 0, 3, 1, 1] , [0, 3, 0, 1, 1, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$[0, y_3, y_5, y_2, y_2, 0, y_1, 0, 0, y_4, y_5, y_5]$

$$p = -s^3 + s^6 \quad p' = -s^4 + s^7 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 0, 2, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 1, 3, 2, 2, 3] , [2, 0, 0, 0, 0, 3, 0, 0, 3, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 3, 3, 2] , [3, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 3, 0, 0, 3, 3, 2, 2] , [2, 0, 0, 0, 0, 3, 0, 0, 2, 3, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 3]] \$

$[y_6, 0, y_5, 0, 0, y_4, 0, y_3, y_1, y_2, y_8, y_7]$

1803 . Coloring, {4, 6, 7, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p' = 3s^2 - 2s^3 - 8s^4 - 8s^5 + 32s^7 \quad p = 9s^2 - 28s^4 - 40s^5 - 16s^6 + 96s^7 + 64s^8$$

R: [7, 7, 7, 7, A, 3, A, B, C, 2, 1, 9]

B: [6, 8, 8, 8, 6, 3, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 4, 0, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2]] \$$

$$[-3y_1 - 6y_4 - 3y_2 + 13y_3 - 3y_5 + 13y_6, 3y_1, 3y_4, 0, 0, 0, 3y_2, 0, 3y_3, 3y_5, 3y_4, 3y_6]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8
See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 0, 2, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 0, 1, 0, 2, 0, 3], [0, 0, 3, 0, 3, 3, 0, 2, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6], [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3], [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3], [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4]] \$$

$$[0, 0, y_8, y_7, y_6, y_5, 0, y_4, 0, y_3, y_2, y_1]$$

1804 . Coloring, $\{4, 6, 7, 8, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = 3s^2 + 14s^3 - 24s^5 + 32s^6 - 32s^7 - 128s^8 \quad p' = 3s^2 + 2s^3 - 8s^4 + 8s^5 - 32s^7$$

R: [7, 7, 7, 7, A, 3, A, B, C, C, 4, 9]

B: [6, 8, 8, 6, 3, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 7	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 4, 0, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 4, 0, 5] , [0, 0, 0, 0, 0, 0, 1, 0, 5, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_4, y_2 - y_1 - y_3 + y_5, 0, 0, y_2, 0, y_1, y_3, y_4, y_5]$$

$$p = s^5 - s^7 \quad p' = s^5 - s^6$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 0, 2, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 0, 3, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 3, 0, 3, 0, 2, 0, 3] , [0, 2, 2, 0, 3, 0, 0, 3, 0, 3, 0, 3] , [0, 3, 3, 0, 3, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3]] \$

$$[y_9, y_8, y_7, 0, y_6, y_5, 0, y_4, 0, y_3, y_2, y_1]$$

1805 . Coloring, {4, 6, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, A, B, B, 2, 4, 9]

B: [6, 8, 8, 6, 3, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 5, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[0, y_4, y_3, y_2, 0, 0, y_1, 0, 2y_3, y_6, y_5, 0]$$

$$p = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 1, 2, 4], [2, 0, 2, 0, 4, 2, 0, 1, 0, 2, 0, 3], [0, 0, 4, 0, 3, 2, 0, 2, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 0, 4, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6], [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3], [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3], [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4]] \$$$

$$[y_4, 0, y_1, 0, y_2, y_3, 0, y_7, 0, y_5, y_6, y_8]$$

1806 . Coloring, {4, 6, 7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, A, 3, A, C, C, 2, 4, 9]

B: [6, 8, 8, 6, 3, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	4 vs 7	8 vs 8

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 3, 0, 2]] \$$$

$$[0, -3y_1 - y_2 + 6y_4 - y_3, y_1, 2y_1, 0, 0, y_2, 0, y_4, y_3, 0, y_4]$$

$$p' = -s^3 + s^6 \quad p = -s^2 + s^5 \quad p' = -s^2 + s^5$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 1, 4, 2] , [4, 0, 2, 0, 2, 2, 0, 1, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 4, 0, 2, 0, 2, 1, 2] , [1, 0, 1, 0, 2, 2, 0, 2, 0, 4, 2, 2] , [2, 0, 2, 0, 2, 1, 0, 1, 0, 2, 2, 4] , [2, 0, 2, 0, 4, 2, 0, 2, 0, 1, 1, 2] , [1, 0, 4, 0, 2, 2, 0, 2, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 1, 0, 4, 0, 2, 2, 2]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, 0, y_5, 0, y_6, y_7, y_8]$$

1807 . Coloring, {4, 6, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7 \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8$$

R: [7, 7, 7, 7, A, 3, B, B, C, 2, 4, 9]

B: [6, 8, 8, 6, 3, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 5, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2]] \$

$$[0, -6y_4 - 3y_1 - 3y_2 + 13y_3 - 3y_5 + 13y_6, 3y_4, 3y_1, 0, 0, 3y_2, 0, 3y_3, 3y_4, 3y_5, 3y_6]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p' = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 1, 0, 2, 0, 5] , [0, 0, 3, 0, 5, 1, 0, 2, 0, 2, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 3, 0, 1, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 3, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 5, 0, 3, 0, 0, 4, 0, 0, 0, 4]] \$

$$[y_8, 0, y_7, 0, y_6, y_5, 0, y_4, 0, y_3, y_2, y_1]$$

1808 . Coloring, {4, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, A, A, A, B, C, 2, 4, 9]

B: [6, 8, 8, 6, 3, 3, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	7 vs 7

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 2, 0, 2, 0, 0, 4, 0, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, \\ & 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, \\ & 4, 0, 2, 5, 0, 1]] \$ \end{aligned}$$

$$[0, -3y_6 - 3y_1 + 13y_2 - 3y_3 - 3y_4 + 13y_5, 0, 3y_6, 0, 0, 3y_1, 0, 3y_2, 3y_3, 3y_4, 3y_5]$$

$$p = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

$$\begin{aligned} \$ [& [2, 0, 2, 0, 2, 2, 0, 2, 0, 0, 3, 3], [3, 0, 4, 0, 3, 2, 0, 2, 0, 0, 0, 2], [0, 0, 5, 0, 2, 3, 0, 4, 0, 0, 0, 2], [0, 0, \\ & 5, 0, 2, 0, 0, 5, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 5, 0, 0, 0, 5], [0, 0, 4, 0, 5, 0, 0, 2, 0, 0, 0, 5], [0, 0, 5, 0, 5, 0, \\ & 0, 4, 0, 0, 0, 2]] \$ \end{aligned}$$

$$[y_1, 0, y_2, 0, y_3, y_4, 0, y_5, 0, 0, y_6, y_7]$$

1809 . Coloring, {5, 6, 7, 8, 9, 10, 11}

R: [7, 7, 7, 6, 3, 3, A, B, C, 2, 4, 5]

B: [6, 8, 8, 7, A, A, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 3, 0, 0, 2, 1, 1] , [0, 2, 3, 1, 1, 2, 4, 0, 0, 3, 0, 0] , [0, 3, 3, 0, 0, 1, 5, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

[0, y_1 , y_2 , y_3 , y_3 , y_4 , y_5 , 0, 0, y_6 , y_7 , y_7]

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 1, 2, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 3, 4] , [3, 0, 0, 0, 0, 3, 0, 0, 4, 2, 3, 1] , [3, 0, 0, 0, 0, 3, 0, 0, 1, 3, 4, 2] , [4, 0, 0, 0, 0, 3, 0, 0, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 4, 0, 0, 3, 3, 2, 3] , [2, 0, 0, 0, 0, 1, 0, 0, 3, 4, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 3, 4]] \$

[y_7 , 0, 0, 0, 0, y_6 , y_5 , 2 y_5 , y_4 , y_3 , y_2 , y_1]

$$p = -s^2 + s^8$$

1810 . Coloring, {5, 6, 7, 8, 9, 10, 12}

R: [7, 7, 7, 6, 3, 3, A, B, C, 2, 1, 9]

B: [6, 8, 8, 7, A, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 9	4 vs 8

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 3, 0, 2, 2, 1, 1] , [1, 2, 1, 0, 0, 0, 6, 0, 1, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 6, 0, 1] , [0, 6, 0, 0, 0, 0, 3, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 6, 0, 2, 3, 0, 1] , [0, 3, 0, 0, 0, 0, 4, 0, 1, 6, 0, 2] , [0, 6, 0, 0, 0, 0, 3, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 6, 0, 1, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 6, 0, 1]] \$

[3 y₁, -6 y₁ - 6 y₅ - 3 y₂ + 13 y₆ - 3 y₄ + 13 y₃, 3 y₁, 0, 0, 3 y₅, 3 y₂, 0, 3 y₆, 3 y₄, 3 y₅, 3 y₃]

$$p = s^3 + s^4 - s^6 - s^7 \quad p = -s^3 + s^5 + s^6 - s^8 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}, {4, 7, 11}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 1, 2, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 1, 4] , [0, 0, 0, 1, 4, 0, 3, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 1, 0, 0, 4, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 1, 4] , [0, 0, 0, 1, 4, 0, 3, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 1, 0, 0, 4, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 1, 4]] \$

[0, 0, 0, -18 y₃ + 14 y₂ + 9 y₁ + 2 y₄, y₃, -5 y₃ + 4 y₂ + 2 y₁ + y₄, y₂, -10 y₃ + 8 y₂ + 4 y₁ + 2 y₄, 0, y₁, y₄, -16 y₃ + 13 y₂ + 8 y₁ + 2 y₄]

$$p = s^2 - s^5 \quad p' = -s^4 + s^7 \quad p' = -s^3 + s^6 \quad p' = -s^2 + s^5$$

1811 . Coloring, {5, 6, 7, 8, 9, 11, 12}

R: [7, 7, 7, 6, 3, 3, A, B, C, C, 4, 9]

B: [6, 8, 8, 7, A, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 3, 0, 2, 2, 1, 3] , [0, 0, 1, 1, 0, 2, 2, 0, 3, 3, 0, 4] , [0, 0, 2, 0, 0, 1, 1, 0, 4, 2, 0, 6] , [0, 0, 1, 0, 0, 0, 2, 0, 6, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, -y_1 + y_6 + y_7 - y_5 - y_2 + y_3 + y_4, y_1, 0, y_6, y_7, 0, y_5, y_2, y_3, y_4]$$

$$p = s^7 - s^8$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

$$\$ [[2, 2, 0, 0, 2, 1, 1, 2, 0, 2, 3, 1], [3, 2, 0, 0, 1, 2, 0, 2, 0, 3, 1, 2], [1, 3, 0, 0, 2, 3, 0, 2, 0, 3, 0, 2], [0, 3, 0, 0, 2, 1, 0, 3, 0, 5, 0, 2], [0, 5, 0, 0, 2, 0, 0, 3, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 5, 0, 2, 0, 3], [0, 2, 0, 0, 3, 0, 0, 3, 0, 3, 0, 5], [0, 3, 0, 0, 5, 0, 0, 2, 0, 3, 0, 3], [0, 3, 0, 0, 3, 0, 0, 3, 0, 5, 0, 2]] \$$$

$$[y_1, y_2, 0, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

1812 . Coloring, {5, 6, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 6s^2 + s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, B, B, 2, 4, 9]

B: [6, 8, 8, 7, A, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 2, 2, 0], [0, 2, 1, 2, 0, 2, 4, 0, 0, 3, 2, 0], [0, 3, 2, 2, 0, 2, 3, 0, 0, 4, 0, 0], [0, 4, 2, 0, 0, 2, 5, 0, 0, 3, 0, 0], [0, 3, 2, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$$

$$[0, y_4, y_5, y_6, 0, y_7, y_8, 0, y_1, y_2, y_3, 0]$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 2, 2, 4], [2, 0, 0, 0, 4, 2, 0, 0, 0, 3, 1, 4], [1, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 3], [0, 0, 0, 0, 3, 1, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$$$

$$[y_1, 0, 0, 0, y_2, y_3, y_4, 2y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

1813 . Coloring, {5, 6, 7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + 3s^3 - 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, 3, A, C, C, 2, 4, 9]

B: [6, 8, 8, 7, A, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 2, 0, 2], [0, 2, 1, 0, 0, 2, 4, 0, 2, 3, 0, 2], [0, 3, 2, 0, 0, 0, 3, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 5, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 0, 2, 5, 0, 2], [0, 5, 0, 0, 0, 0, 3, 0, 2, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 0, 2, 5, 0, 2]] \$$$

$$[0, -y_1 - y_2 - y_3 - y_4 + 6y_6 - y_5, y_1, y_2, 0, y_3, y_4, 0, y_6, y_5, 0, y_6]$$

$$p = -s^4 + s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 2, 4, 2], [4, 0, 0, 0, 2, 2, 0, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 4, 0, 0, 0, 4, 0, 3], [0, 0, 0, 0, 3, 3, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$$$

$$[y_1, 0, 0, 0, y_4, y_2, y_3, 2y_3, 0, y_5, y_6, y_7]$$

$$p = s^5 - s^8$$

Â» SYNC'D !RANK'D

1814 . Coloring, {5, 6, 8, 9, 10, 11, 12}

R: [7, 7, 7, 6, 3, 3, B, B, C, 2, 4, 9]

B: [6, 8, 8, 7, A, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 7, 11}, {9, 12}} order: 10

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 0, 3, 1] , [0, 0, 1, 3, 0, 2, 4, 0, 1, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 1, 0, 2, 0, 4, 1] , [0, 0, 3, 4, 0, 3, 2, 0, 1, 0, 1, 2] , [0, 0, 3, 1, 0, 4, 3, 0, 2, 0, 2, 1] , [0, 0, 4, 2, 0, 1, 3, 0, 1, 0, 3, 2] , [0, 0, 1, 3, 0, 2, 4, 0, 2, 0, 3, 1] , [0, 0, 2, 3, 0, 3, 1, 0, 1, 0, 4, 2]] \$

$[0, -3y_1 - 3y_2 - 3y_3 - 3y_7 + 13y_4 - 3y_5 + 13y_6, 3y_1, 3y_2, 0, 3y_3, 3y_7, 0, 3y_4, 0, 3y_5, 3y_6]$

$$p = -s^2 - s^3 + s^7 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 1, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$

$[y_1, 0, 0, 0, y_4, y_5, y_3, 2y_3, 0, y_2, y_3, y_6]$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

1815 . Coloring, {5, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 7, 6, 3, A, A, B, C, 2, 4, 9]

B: [6, 8, 8, 7, A, 3, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 2, 3, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 1, 3, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1]] \$

[0, 3 y₅, 3 y₆, 3 y₇, 0, 3 y₃, 3 y₄, 0, 3 y₂, -3 y₅ - 6 y₆ - 3 y₇ - 3 y₃ - 3 y₄ + 13 y₂ + 13 y₁, 3 y₆, 3 y₁]

$$p = -s^4 - s^5 + s^7 + s^8 \quad p' = s^4 + s^5 - s^7 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 3, 3] , [3, 0, 1, 0, 3, 2, 0, 1, 0, 2, 1, 3] , [1, 0, 2, 0, 3, 3, 0, 1, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 1, 0, 2, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 0, 0, 3, 0, 3, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 1, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

[y₁, 0, y₉, 0, y₈, y₇, y₆, y₅, 0, y₄, y₃, y₂]

1816 . Coloring, {6, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -9s^3 + 2s^4 + 16s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 6, A, 3, A, B, C, 2, 4, 9]

B: [6, 8, 8, 7, 3, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 3, 0, 2, 3, 1, 1], [0, 3, 1, 1, 0, 2, 3, 0, 1, 3, 0, 2], [0, 3, 2, 0, 0, 1, 4, 0, 2, 3, 0, 1], [0, 3, 1, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1]] \$$

$[0, 3 y_3, 3 y_2, 3 y_1, 0, -3 y_3 - 3 y_2 - 3 y_1 - 3 y_8 + 13 y_7 - 3 y_6 - 3 y_5 + 13 y_4, 3 y_8, 0, 3 y_7, 3 y_6, 3 y_5, 3 y_4]$

$$p = s^5 + s^6 - s^8 - s^9$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8
See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 1, 2, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 0, 1, 0, 1, 1, 3], [1, 0, 3, 0, 3, 3, 0, 2, 0, 2, 0, 2], [0, 0, 3, 0, 2, 1, 0, 3, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 0, 3, 0, 1, 0, 6], [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6]] \$$

$[y_1 - y_2 + y_3 - y_4 - y_5 - y_6 + y_7 + y_8, 0, y_1, 0, y_2, y_3, y_4, y_5, 0, y_6, y_7, y_8]$

$$p = -s^6 + s^7 - s^8 + s^9$$

1817 . Coloring, $\{2, 3, 4, 5, 6, 7, 8, 9\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, B, C, C, 1, 5]

B: [6, 7, 7, 6, A, A, B, C, B, 2, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 3, 5, 7, 8, 10, 11, 12}} order: 8
See Matrix

\$ [[2, 0, 2, 0, 2, 0, 2, 2, 0, 2, 1, 3] , [1, 0, 2, 0, 3, 0, 2, 2, 0, 2, 2, 2] , [2, 0, 3, 0, 2, 0, 1, 2, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 3, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 2, 0, 2, 3, 1] , [3, 0, 2, 0, 1, 0, 2, 2, 0, 2, 2, 2] , [2, 0, 1, 0, 2, 0, 3, 2, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 0, 2, 1, 0, 3, 2, 2]] \$

$$[-y_5 + y_2 + y_3, 0, y_4, 0, y_5, 0, -y_4 + y_2 + y_3, y_2, 0, y_3, y_2 + y_3 - y_1, y_1]$$

$$p = -s + s^2 - s^5 + s^6 \quad p = -s + s^3 - s^5 + s^7 \quad p = -s + s^4 - s^5 + s^8$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6
See Matrix

\$ [[0, 2, 0, 2, 0, 2, 2, 0, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 2, 2, 0, 1, 2, 4, 0] , [0, 2, 0, 4, 0, 3, 2, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 4, 2, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 2, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 3, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 4, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 2, 3, 0, 0, 2, 4, 0]] \$

$$[0, y_3, 0, y_3 + y_1 - y_2 - y_4 - y_5 + y_7 + y_6, 0, y_1, y_2, 0, y_4, y_5, y_7, y_6]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1818 . Coloring, {2, 3, 4, 5, 6, 7, 8, 10}

$$\Omega p(\Delta)=0: \quad p = -3s^2 + 2s^3 - 8s^5 + 32s^7 \quad p = -9s^2 + 4s^4 - 24s^5 - 16s^6 + 96s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, 3, A, B, B, 2, 1, 5]
B: [6, 7, 7, 6, A, A, B, C, C, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 8	6 vs 7

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6
See Matrix

\$ [[2, 2, 2, 0, 2, 0, 2, 2, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 0, 2, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 2, 4, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 4, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 4, 0, 2, 2, 0]] \$

$$[y_1 + y_2 - y_3 + y_4 - y_5 - y_6 + y_7, y_1, y_2, 0, y_3, 0, y_4, y_5, 0, y_6, y_7, 0]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 2, 2, 0, 2, 2, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 0, 6] , [0, 0, 0, 0, 0, 2, 0, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[0, 0, 0, y_5 - y_4 - y_3 - y_2 + y_1 + y_6, 0, y_5, y_4, 0, y_3, y_2, y_1, y_6]$$

$$p = s^6 - s^7$$

1819 . Coloring, {2, 3, 4, 5, 6, 7, 8, 11}

$$\Omega p(\Delta)=0: \quad p' = s^7 \quad p' = s^6 \quad p' = s^5 \quad p' = s^4 \quad p' = s^3 \quad p' = s^2 \quad p = s^2$$

R: [7, 8, 8, 7, 3, 3, A, B, B, C, 4, 5]

B: [6, 7, 7, 6, A, A, B, C, C, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
1 vs 8	1 vs 8	1 vs 8	1 vs 8	1 vs 8

Omega Rank for R : cycles: {{3, 4, 5, 7, 8, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 0, 2, 2, 2, 0, 2, 2, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 2, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 2, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 2, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 2, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 2, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 2, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 2, 0, 2, 2, 2]] \$$$

$$[0, 0, y_1, y_1, y_1, 0, y_1, y_1, 0, y_1, y_1, y_1]$$

$$p' = s^6 - s^7 \quad p' = s^5 - s^7 \quad p' = s^4 - s^7 \quad p' = s^3 - s^7 \quad p' = s^2 - s^7 \quad p' = s - s^7 \quad p = s - s^8$$

Omega Rank for B : cycles: {{9, 12}, {1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 2, 2] , [2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 2, 2] , [2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 2, 2] , [2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 2, 2] , [2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 2, 2] , [2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 2, 2] , [2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 2, 2] , [2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 2, 2]] \$

$[y_1, y_1, 0, 0, 0, y_1, y_1, 0, y_1, y_1, y_1, y_1]$

$$p' = -s^3 + s^7 \quad p' = -s^3 + s^6 \quad p' = -s^3 + s^4 \quad p' = -s^3 + s^5 \quad p' = s^2 - s^3 \quad p' = s - s^3 \quad p = s - s^4$$

‘ See 8-level graph

‘

M \; N

\$ [[0, 1, 0, 0, 0, 1, 1, 0, 1, 1, 1, 1] , [1, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 1] , [0, 0, 0, 1, 1, 0, 1, 1, 0, 1, 1, 1] , [0, 0, 1, 0, 1, 0, 1, 1, 0, 1, 1, 1] , [0, 0, 1, 1, 0, 0, 1, 1, 0, 1, 1, 1] , [1, 1, 0, 0, 0, 1, 0, 1, 1, 1, 1, 1] , [1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 2, 2] , [0, 0, 1, 1, 1, 0, 1, 0, 0, 1, 1, 1] , [1, 1, 0, 0, 0, 1, 1, 0, 0, 1, 1, 1] , [1, 1, 1, 1, 1, 1, 2, 1, 1, 0, 2, 2] , [1, 1, 1, 1, 1, 1, 2, 1, 1, 2, 0, 2] , [1, 1, 1, 1, 1, 1, 2, 1, 1, 2, 2, 0]] \$ \$ [[0, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1] , [1, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1] , [1, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1] , [0, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1] , [1, 1, 1, 0, 0, 1, 1, 1, 1, 1, 1, 1] , [1, 1, 1, 1, 0, 0, 1, 1, 1, 1, 1, 1] , [1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1] , [1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1] , [1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1] , [1, 1, 1, 1, 1, 1, 1, 0, 0, 1, 1, 1] , [1, 1, 1, 1, 1, 1, 1, 0, 0, 1, 1, 1] , [1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1] , [1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1] , [1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1] , [1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1]] \$

$$\tau = 20, r' = 7/8$$

R: [7, 8, 8, 7, 3, 3, A, B, B, C, 4, 5]

B: [6, 7, 7, 6, A, A, B, C, C, 2, 1, 9]

Ranges

Action of R on ranges, [[2], [2]]

Action of B on ranges, [[1], [1]]

Cycles: R, {{3, 4, 5, 7, 8, 10, 11, 12}}, B, {{9, 12}, {1, 2, 6, 7, 10, 11}}

$$\beta(\{1, 2, 6, 7, 9, 10, 11, 12\}) = 1/2$$

$$\beta(\{3, 4, 5, 7, 8, 10, 11, 12\}) = 1/2$$

Partitions

$$\alpha(\{\{12\}, \{10\}, \{11\}, \{2, 3\}, \{5, 6\}, \{1, 4\}, \{8, 9\}, \{7\}\}) = 1/1$$

b1 = {12} ‘ , ‘ b2 = {10} ‘ , ‘ b3 = {11} ‘ , ‘ b4 = {2, 3} ‘ , ‘ b5 = {5, 6} ‘ , ‘ b6 = {1, 4} ‘ , ‘ b7 = {8, 9} ‘ , ‘ b8 = {7}

Action of R and B on the blocks of the partitions: = [2, 8, 7, 5, 1, 3, 4, 6] [7, 5, 8, 2, 6, 3, 1, 4]
with invariant measure [1, 1, 1, 1, 1, 1, 1, 1]

N by blocks, check: true . ‘ See partition graph.

‘ ‘ See level-8 partition graph.

‘

1820 . Coloring, {2, 3, 4, 5, 6, 7, 8, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^2 - 10s^3 - 40s^5 + 32s^6 - 32s^7 + 128s^8 \quad p' = 3s^2 + 2s^3 + 8s^4 - 8s^5 - 32s^7$$

R: [7, 8, 8, 7, 3, 3, A, B, B, C, 1, 9]

B: [6, 7, 7, 6, A, A, B, C, C, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 2, 0, 0, 0, 2, 2, 2, 2, 2, 2], [2, 0, 0, 0, 0, 0, 2, 2, 2, 2, 4, 2], [4, 0, 0, 0, 0, 0, 2, 0, 2, 2, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 2, 2, 2], [2, 0, 0, 0, 0, 0, 4, 0, 2, 4, 2, 2], [2, 0, 0, 0, 0, 0, 2, 0, 2, 4, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 2, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 2, 4, 2]] \$$$

$$[y_2, 0, y_1, 0, 0, 0, y_6, -y_2 + y_1 + y_6 - y_4 - y_5 + y_3 + y_7, y_4, y_5, y_3, y_7]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 2, 2, 0, 0, 2, 2, 2], [0, 2, 0, 2, 2, 2, 2, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 2, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 2, 4, 0, 0, 2, 2, 0], [0, 2, 0, 2, 0, 2, 4, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 2, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 4, 2, 0, 0, 2, 2, 0], [0, 2, 0, 2, 0, 4, 2, 0, 0, 4, 2, 0]] \$$$

$$[0, y_2, 0, y_1, -y_2 + y_1 - y_7 + y_6 + y_5 - y_4 + y_3, y_7, y_6, 0, 0, y_5, y_4, y_3]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1821 . Coloring, {2, 3, 4, 5, 6, 7, 9, 10}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7 \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, 3, A, C, C, 2, 1, 5]
B: [6, 7, 7, 6, A, A, B, B, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 8	6 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8
 See Matrix

\$ [[2, 2, 2, 0, 2, 0, 2, 2, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 2, 4, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 2, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$

$$[y_2 + y_5 - y_3, -y_1 + y_2 + y_5, y_1, 0, y_2 + y_5 - y_4, 0, y_2, y_3, 0, y_4, 0, y_5]$$

$$p' = s^5 - s^7 \quad p' = s^6 - s^7 \quad p = s^5 - s^8$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6
 See Matrix

\$ [[0, 0, 0, 2, 0, 2, 2, 0, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 2, 0, 0, 2, 2, 4, 2] , [0, 0, 0, 4, 0, 4, 0, 0, 2, 2, 2, 2] , [0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 2, 0, 0, 2, 4, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 2, 4] , [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 4, 2]] \$

$$[0, 0, 0, y_6, 0, y_4, y_5, 0, y_2, y_3, y_1, y_6 - y_4 + y_5 + y_2 + y_3 - y_1]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

1822 . Coloring, {2, 3, 4, 5, 6, 7, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 - 8s^5 - 32s^7$$

R: [7, 8, 8, 7, 3, 3, A, C, C, C, 4, 5]
B: [6, 7, 7, 6, A, A, B, B, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	6 vs 7

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}\}$ order: 4
See Matrix

$\$ [[0, 0, 2, 2, 2, 0, 2, 2, 0, 2, 0, 4], [0, 0, 2, 0, 4, 0, 2, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 0, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$$

$$[0, 0, -y_2 + y_4, y_4 - y_1, y_1, 0, y_2, y_4 - y_3, 0, y_3, 0, y_4]$$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: $\{\{1, 2, 6, 7, 10, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 4, 0], [4, 2, 0, 0, 0, 2, 2, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 4, 2, 0, 0, 2, 2, 0], [2, 2, 0, 0, 0, 4, 2, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 2, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 4, 0, 0, 2, 2, 0], [2, 2, 0, 0, 0, 2, 4, 0, 0, 2, 4, 0]] \$$

$$[y_1 + y_4 - y_5 - y_6 - y_3 + y_2, y_1, 0, 0, 0, y_4, y_5, 0, y_6, y_3, y_2, 0]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

1823 . Coloring, $\{2, 3, 4, 5, 6, 7, 9, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 + 32s^7$$

R: [7, 8, 8, 7, 3, 3, A, C, C, C, 1, 9]

B: [6, 7, 7, 6, A, A, B, B, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	7 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[2, 0, 2, 0, 0, 0, 2, 2, 2, 2, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 2, 4, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$[y_1, 0, y_1, 0, 0, 0, y_4, y_4, y_3, y_2, 0, y_3 + y_2]$

$$p = -s^4 + s^5 \quad p = -s^4 + s^6 \quad p = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 2, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 4, 2, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 4, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 2, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 4, 0, 0, 2, 2, 0] , [0, 2, 0, 2, 0, 4, 2, 0, 0, 2, 4, 0]] \$

$[0, y_7, 0, y_6, y_5, y_4, y_3, 0, 0, y_2, y_1, 0]$

1824 . Coloring, {2, 3, 4, 5, 6, 7, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, C, B, 2, 4, 5]

B: [6, 7, 7, 6, A, A, B, B, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	6 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 2, 2, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 0, 2, 4, 0, 2, 0, 2] , [0, 2, 1, 0, 2, 0, 1, 4, 0, 2, 0, 4] , [0, 2, 2, 0, 4, 0, 0, 3, 0, 1, 0, 4] , [0, 1, 4, 0, 4, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3]] \$

$$[0, y_2, y_1, y_2 + y_1 - y_8 + y_7 - y_6 - y_5 + y_4 + y_3, y_8, 0, y_7, y_6, 0, y_5, y_4, y_3]$$

$$p = s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 2, 2, 0, 2, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 2, 4], [2, 0, 0, 0, 0, 3, 0, 0, 4, 2, 0, 5], [0, 0, 0, 0, 0, 2, 0, 0, 5, 3, 0, 6], [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[y_1 - y_2 - y_4 - y_5 + y_6 + y_3, 0, 0, 0, 0, y_1, y_2, 0, y_4, y_5, y_6, y_3]$$

$$p = s^6 - s^7$$

1825 . Coloring, {2, 3, 4, 5, 6, 7, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, C, B, 2, 1, 9]

B: [6, 7, 7, 6, A, A, B, B, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 7

Omega Rank for R : cycles: {{1, 2, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[2, 2, 2, 0, 0, 0, 2, 2, 2, 2, 1, 1], [1, 2, 0, 0, 0, 0, 2, 4, 1, 2, 2, 2], [2, 2, 0, 0, 0, 0, 1, 2, 2, 2, 1, 4], [1, 2, 0, 0, 0, 0, 2, 2, 4, 1, 2, 2], [2, 1, 0, 0, 0, 0, 1, 2, 2, 2, 4, 2], [4, 2, 0, 0, 0, 0, 2, 1, 2, 1, 2, 2], [2, 1, 0, 0, 0, 0, 4, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 0, 2, 1, 1, 4, 2, 2], [2, 4, 0, 0, 0, 0, 2, 2, 2, 2, 1, 1]] \$$$

$$[y_8, y_7, y_6, 0, 0, 0, y_5, y_4, y_3, y_2, y_1, y_8 - y_7 - y_6 - y_5 + y_4 + y_3 + y_2 - y_1]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 2, 0, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 2, 0, 0, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 3, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[0, 0, 0, y_7, y_6, y_5, y_4, 0, 0, y_3, y_2, y_1]$$

1826 . Coloring, {2, 3, 4, 5, 6, 7, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, C, B, C, 4, 9]

B: [6, 7, 7, 6, A, A, B, B, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 2, 2, 2, 2, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 2, 3, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 1, 0, 4, 2, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 1, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 2, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 0, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 4, 2, 4]] \$

$$[0, 0, y_1 - y_2 + y_3 + y_4 + y_5 - y_6 - y_7, y_1, 0, 0, y_2, y_3, y_4, y_5, y_6, y_7]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 2, 0, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 2, 2, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 4, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 3, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 4, 2, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 2, 0, 0, 4, 2, 0]] \$

$$[y_1, y_2, 0, 0, y_3, y_4, y_5, 0, 0, y_6, y_7, y_8]$$

1827 . Coloring, {2, 3, 4, 5, 6, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p' = s^3 + 8s^5 + 8s^6 + 16s^7 \quad p = s^3 + 8s^5 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, 3, 3, B, B, C, 2, 1, 5]

B: [6, 7, 7, 6, A, A, A, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 7

Omega Rank for R : cycles: {{1, 7, 11}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 2, 0, 2, 2, 0, 0, 3, 1], [3, 0, 2, 0, 1, 0, 2, 4, 0, 0, 4, 0], [4, 0, 1, 0, 0, 0, 3, 2, 0, 0, 6, 0], [6, 0, 0, 0, 0, 4, 1, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 5, 0, 0, 0, 6, 0], [6, 0, 0, 0, 0, 0, 5, 0, 0, 0, 5, 0], [5, 0, 0, 0, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[y_1, 2y_7, y_2, 0, y_3, 0, y_4, y_5, 0, 0, y_6, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 2, 2, 0, 2, 4, 1, 3], [0, 0, 0, 1, 0, 2, 0, 0, 3, 4, 2, 4], [0, 0, 0, 2, 0, 1, 0, 0, 4, 2, 3, 4], [0, 0, 0, 3, 0, 2, 0, 0, 4, 1, 4, 2], [0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 4, 1], [0, 0, 0, 4, 0, 4, 0, 0, 1, 3, 2, 2], [0, 0, 0, 2, 0, 4, 0, 0, 2, 4, 1, 3]] \$$$

$$[0, 0, 0, y_2 + y_1 - y_6 - y_4 + y_5 + y_3, 0, y_2, y_1, 0, y_6, y_4, y_5, y_3]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

1828 . Coloring, {2, 3, 4, 5, 6, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, 3, B, B, C, C, 4, 5]
B: [6, 7, 7, 6, A, A, A, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
 See Matrix

\$ [[0, 0, 2, 2, 2, 0, 2, 2, 0, 0, 3, 3] , [0, 0, 2, 3, 3, 0, 2, 2, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 0, 3, 2, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 4, 3, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 0, 0, 0, 7, 0] , [0, 0, 0, 7, 0, 0, 5, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 7, 0, 0, 0, 5, 0]] \$

[0, 0, y₁, y₆, y₇, 0, y₅, y₄, 0, 0, y₃, y₂]

Omega Rank for B : cycles: {{2, 7, 10}} order: 6
 See Matrix

\$ [[2, 2, 0, 0, 0, 2, 2, 0, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 2, 2, 0, 1, 4, 2, 0] , [2, 4, 0, 0, 0, 1, 4, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 2, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 1, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

[y₁, y₂, 0, 0, 0, y₅, y₆, 0, y₃, y₄, y₇, y₈]

1829 . Coloring, {2, 3, 4, 5, 6, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, 3, B, B, C, C, 1, 9]
B: [6, 7, 7, 6, A, A, A, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	6 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 2, 0, 0, 0, 2, 2, 2, 0, 3, 3], [3, 0, 0, 0, 0, 0, 2, 2, 3, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 3], [4, 0, 0, 0, 0, 0, 4, 0, 3, 0, 3, 2], [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 3], [4, 0, 0, 0, 0, 0, 3, 0, 3, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 3]] \$$

$[5 y_2, 0, 5 y_1, 0, 0, 0, -5 y_2 - 5 y_1 - 5 y_6 + 11 y_5 - 5 y_4 + 11 y_3, 5 y_6, 5 y_5, 0, 5 y_4, 5 y_3]$

$$p = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 2, 2, 0, 0, 4, 1, 1], [0, 4, 0, 1, 1, 2, 2, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$

$[0, y_1, 0, y_2, y_2, y_6, y_5, 0, 0, y_3, y_4, y_4]$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1830 . Coloring, $\{2, 3, 4, 5, 6, 8, 10, 11\}$

$\Omega p(\Delta)=0: \quad p = s^2 + 56s^5 + 16s^6 - 64s^7 - 256s^8 \quad p' = s^2 - 16s^4 - 8s^5 + 16s^6 + 64s^7 \quad p'' = s^3 + 4s^4 - 8s^6 - 16s^7$

R: [7, 8, 8, 7, 3, 3, B, B, B, 2, 4, 5]

B: [6, 7, 7, 6, A, A, A, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	6 vs 7	4 vs 6

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 2, 2, 2, 2, 0, 2, 2, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 0, 2, 4, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 4, 2, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

[0, y₅, y₁, y₂, y₅, 0, y₃, y₄, 0, 0, y₆, 0]

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{9, 12}} order: 4
See Matrix

\$ [[2, 0, 0, 0, 0, 2, 2, 0, 2, 4, 0, 4] , [0, 0, 0, 0, 0, 2, 0, 0, 4, 4, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

[y₁, 0, 0, 0, 0, y₂ + y₃ - y₄, y₁, 0, y₂, y₃, 0, y₄]

$$p = -s^4 + s^6 \quad p = -s^4 + s^5$$

1831 . Coloring, {2, 3, 4, 5, 6, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 8s^5 + 48s^6 + 128s^8 \quad p' = s^2 - 8s^4 - 24s^5 - 16s^6 - 64s^7 \quad p'' = s^3 + 4s^4 + 8s^5 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, 3, 3, B, B, B, 2, 1, 9]

B: [6, 7, 7, 6, A, A, A, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
5 vs 8	8 vs 8	8 vs 8	5 vs 7	5 vs 6

Omega Rank for R : cycles: {{1, 7, 11}} order: 3
See Matrix

\$ [[2, 2, 2, 0, 0, 0, 2, 2, 2, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 2, 4, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0] , [4, 0, 0, 0, 0, 0, 6, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 4, 0, 0, 0, 6, 0] , [6, 0, 0, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$$[y_1, y_3, y_3, 0, 0, 0, y_4, y_5, y_3, 0, y_2, 0]$$

$$p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\$ [[0, 0, 0, 2, 2, 2, 2, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$$$

$$[0, 0, 0, y_3, y_1, y_2, y_3, 0, 0, y_4, 0, y_5]$$

$$p = -s^3 + s^6$$

1832 . Coloring, {2, 3, 4, 5, 6, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7 \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, 3, B, B, B, C, 4, 9]

B: [6, 7, 7, 6, A, A, A, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 7	5 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 0, 2, 2, 0, 0, 2, 2, 2, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 2, 2, 2, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$$$

$$[0, 0, y_5, y_2, 0, 0, y_4, y_3, y_3, 0, y_1, y_5]$$

$$p = s^3 - s^6 \quad p' = s^3 - s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 3

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 2, 0, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 2, 2, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$

$$[y_5, y_3, 0, 0, y_1, y_1, y_2, 0, 0, y_4, 0, y_5]$$

$$p' = -s^3 + s^6 \quad p = -s^3 + s^6$$

1833 . Coloring, {2, 3, 4, 5, 6, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 8s^5 - 80s^6 - 64s^7 - 128s^8 \quad p' = s^2 - 8s^4 - 8s^5 - 16s^6 \quad p' = s^3 - 8s^5 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, 3, 3, B, C, C, 2, 4, 5]

B: [6, 7, 7, 6, A, A, A, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	5 vs 8	6 vs 7

Omega Rank for R : cycles: {{4, 7, 11}, {3, 5, 8, 12}} order: 12

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 2, 2, 0, 0, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 4, 0, 0, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 2, 0, 0, 2, 4] , [0, 0, 2, 2, 4, 0, 2, 2, 0, 0, 2, 2] , [0, 0, 4, 2, 2, 0, 2, 2, 0, 0, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 4, 0, 0, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 2, 0, 0, 2, 2] , [0, 0, 2, 2, 4, 0, 2, 2, 0, 0, 2, 2]] \$

$$[0, -y_1 + 5y_4 - y_2 - y_3 - y_5, y_1, y_4, y_2, 0, y_4, y_3, 0, 0, y_4, y_5]$$

$$p = -s^2 + s^6 \quad p' = -s^2 + s^6 \quad p' = -s^3 + s^7$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 2, 2, 0, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 2, 0, 0, 2, 4, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 4, 2] , [4, 0, 0, 0, 0, 2, 0, 0, 2, 2, 4, 2] , [4, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 2] , [2, 0, 0, 0, 0, 4, 0, 0, 2, 4, 2, 2]] \$

$$[y_1 + y_2 - y_3 - y_6 + y_4 + y_5, 0, 0, 0, 0, y_1, y_2, 0, y_3, y_6, y_4, y_5]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1834 . Coloring, {2, 3, 4, 5, 6, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 8s^5 + 16s^6 \quad p' = s^2 + 8s^5 + 16s^6 \quad p'' = s^3 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, 3, 3, B, C, C, 2, 1, 9]

B: [6, 7, 7, 6, A, A, A, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	4 vs 8	6 vs 7

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 0, 2, 2, 2, 0, 2, 2], [2, 0, 0, 0, 0, 0, 2, 4, 2, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6], [2, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4], [2, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6], [2, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4], [2, 0, 0, 0, 0, 0, 2, 0, 4, 0, 2, 6], [2, 0, 0, 0, 0, 0, 2, 0, 6, 0, 2, 4]] \$$$

$$[y_3, y_1, y_1, 0, 0, 0, y_3, 5y_3 - 2y_1 - y_2 - y_4, y_2, 0, y_3, y_4]$$

$$p' = s^5 - s^7 \quad p'' = s^3 - s^7 \quad p''' = s^4 - s^6 \quad p^{(4)} = s^3 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 2, 2, 2, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$$$

$$[0, 0, 0, y_1, y_2, y_3, y_5, 0, 0, y_4, y_5, y_6]$$

$$p = s^4 - s^7$$

1835 . Coloring, {2, 3, 4, 5, 6, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^5 + 32s^7 \quad p = s^2 - 4s^4 - 8s^5 + 16s^6 + 32s^7 - 64s^8$$

R: [7, 8, 8, 7, 3, 3, B, C, C, C, 4, 9]

B: [6, 7, 7, 6, A, A, A, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	6 vs 7

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 0, 0, 2, 2, 2, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 2, 4, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6], [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6], [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6], [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4]] \$$$

$$[0, 0, 5y_4 - y_1 - y_2 - y_3, y_4, 0, 0, y_4, y_1, y_2, 0, y_4, y_3]$$

$$p = -s^3 + s^5 \quad p' = -s^3 + s^5 \quad p = -s^3 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 2, 2, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 2, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 2, 4, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$$$

$$[y_2, y_3, 0, 0, y_6, y_1, y_4, 0, 0, y_5, y_6, 0]$$

$$p = -s^4 + s^7$$

1836 . Coloring, {2, 3, 4, 5, 6, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 9s^3 + 8s^5 - 8s^6 + 16s^7 - 64s^8 \quad p = -3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, 3, B, C, B, 2, 4, 9]
B: [6, 7, 7, 6, A, A, A, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
 See Matrix

\$ [[0, 2, 2, 2, 0, 0, 2, 2, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 2, 4, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 4, 0, 4, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 3, 0, 0, 0, 8, 0] , [0, 0, 0, 8, 0, 0, 5, 0, 0, 0, 3, 0] , [0, 0, 0, 3, 0, 0, 8, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 3, 0, 0, 0, 8, 0]] \$

$$[0, y_7, y_7, y_6, 0, 0, y_5, y_4, y_3, 0, y_2, y_1]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
 See Matrix

\$ [[2, 0, 0, 0, 2, 2, 2, 0, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_2, 0, 0, 0, y_6, y_1, 2y_4, 0, 0, y_5, y_4, y_3]$$

$$p = -s^4 + s^7$$

1837 . Coloring, {2, 3, 4, 5, 7, 8, 9, 10}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 - 8s^5 - 32s^7 \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 - 32s^7 - 64s^8$$

R: [7, 8, 8, 7, 3, A, A, B, C, 2, 1, 5]
B: [6, 7, 7, 6, A, 3, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	9 vs 9	8 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 3, 1, 1], [1, 3, 2, 0, 1, 0, 2, 3, 0, 2, 2, 0], [2, 2, 1, 0, 0, 0, 1, 5, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 2, 3, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 3, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 5, 1, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 3, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 2, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 1, 5, 0, 2, 3, 0]] \$$

$[y_1, y_9, y_8, 0, y_7, 0, y_6, y_5, 0, y_4, y_3, y_2]$

Omega Rank for B : cycles: $\{\{3, 4, 6, 7, 11\}\}$ order: 5
See Matrix

$\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 1, 3, 3], [0, 0, 2, 3, 0, 2, 1, 0, 3, 0, 4, 1], [0, 0, 2, 4, 0, 3, 2, 0, 1, 0, 4, 0], [0, 0, 3, 4, 0, 4, 2, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 4, 3, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 3, 4, 0, 0, 0, 3, 0], [0, 0, 3, 3, 0, 2, 4, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 3, 3, 0, 0, 0, 4, 0]] \$$

$[0, 0, y_4, y_3, 0, y_2, y_1, 0, y_8, y_7, y_5, y_6]$

1838 . Coloring, $\{2, 3, 4, 5, 7, 8, 9, 11\}$

$\Omega p(\Delta)=0: p = s^2 - 4s^4 + 8s^5 - 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 + 8s^5 + 32s^7$

R: [7, 8, 8, 7, 3, A, A, B, C, C, 4, 5]

B: [6, 7, 7, 6, A, 3, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 9

Omega Rank for R : cycles: {{3, 4, 5, 7, 8, 10, 11, 12}} order: 8
See Matrix

\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 3, 1, 3] , [0, 0, 2, 1, 3, 0, 2, 1, 0, 2, 2, 3] , [0, 0, 3, 2, 3, 0, 1, 2, 0, 2, 1, 2] , [0, 0, 3, 1, 2, 0, 2, 3, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 0, 1, 3, 0, 2, 3, 1] , [0, 0, 2, 3, 1, 0, 2, 2, 0, 1, 3, 2] , [0, 0, 1, 3, 2, 0, 3, 2, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 0, 3, 1, 0, 3, 2, 2]] \$

[0, 0, y₃, y₄, y₂, 0, y₁, y₇, 0, y₆, y₅, y₈]

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5
See Matrix

\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 1, 3, 1] , [3, 1, 2, 0, 0, 2, 3, 0, 1, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 3, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 4, 2, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 3, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 3, 4, 0, 0, 0, 3, 0] , [3, 0, 3, 0, 0, 2, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 3, 3, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 4, 2, 0, 0, 0, 3, 0]] \$

[y₃, y₆, y₂, 0, 0, y₁, y₇, 0, y₆, y₄, y₅, y₄]

$$p = -s^3 + s^8 \quad p' = -s^3 + s^8$$

1839 . Coloring, {2, 3, 4, 5, 7, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 - 32s^7 \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 - 32s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, A, A, B, C, C, 1, 9]

B: [6, 7, 7, 6, A, 3, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8
See Matrix

\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 1, 3, 2, 2, 5] , [2, 0, 0, 0, 0, 0, 1, 0, 5, 2, 1, 5] , [1, 0, 0, 0, 0, 0, 2, 0, 5, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 1, 0, 7, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[y_4, 0, y_5, 0, 0, 0, y_1, y_2, y_3, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 2, 1, 2, 2, 2, 0, 0, 1, 3, 1], [0, 1, 2, 3, 1, 2, 3, 0, 0, 2, 2, 0], [0, 2, 2, 2, 0, 3, 3, 0, 0, 1, 3, 0], [0, 1, 3, 3, 0, 2, 4, 0, 0, 0, 3, 0], [0, 0, 2, 3, 0, 3, 4, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 3, 2, 0, 0, 0, 4, 0], [0, 0, 3, 4, 0, 4, 3, 0, 0, 0, 2, 0], [0, 0, 4, 2, 0, 4, 3, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 2, 4, 0, 0, 0, 3, 0]] \$$$

$$[0, y_1, y_2, y_3, y_4, y_5, y_6, 0, 0, y_7, y_8, y_9]$$

1840 . Coloring, {2, 3, 4, 5, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, A, B, B, 2, 4, 5]

B: [6, 7, 7, 6, A, 3, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 3, 2, 0], [0, 3, 2, 2, 0, 0, 2, 3, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 2, 5, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 2, 2, 0, 2, 5, 0], [0, 2, 0, 5, 0, 0, 3, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 5, 2, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 2, 2, 0, 5, 2, 0], [0, 5, 0, 2, 0, 0, 2, 3, 0, 2, 2, 0]] \$$$

$$[0, y_3, y_4, y_2, y_1, 0, y_7, y_6, 0, y_5, y_8, 0]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {9, 12}} order: 10

See Matrix

$$\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 1, 2, 4], [2, 0, 2, 0, 0, 2, 1, 0, 4, 0, 2, 3], [2, 0, 2, 0, 0, 2, 2, 0, 3, 0, 1, 4], [1, 0, 2, 0, 0, 2, 2, 0, 4, 0, 2, 3], [2, 0, 2, 0, 0, 1, 2, 0, 3, 0, 2, 4], [2, 0, 1, 0, 0, 2, 2, 0, 4, 0, 2, 3], [2, 0, 2, 0, 0, 2, 1, 0, 3, 0, 2, 4], [2, 0, 2, 0, 0, 2, 2, 0, 4, 0, 1, 3]] \$$$

$$[7y_7, 0, 7y_6, 0, 0, 7y_5, 7y_4, 0, 7y_3, 7y_2, -7y_7 - 7y_6 - 7y_5 - 7y_4 + 9y_3 + 9y_2 + 9y_1, 7y_1]$$

$$p = -s^2 - s^3 + s^7 + s^8$$

1841 . Coloring, {2, 3, 4, 5, 7, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, A, A, B, B, 2, 1, 9]

B: [6, 7, 7, 6, A, 3, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 4, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 3, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 3, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 3, 0, 2, 4, 0]] \$$$

$$[y_1, y_3, y_2, 0, 0, 0, y_5, y_4, 2y_2, y_7, y_6, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {3, 4, 6, 7, 11}}

See Matrix

$$\$ [[0, 0, 1, 2, 2, 2, 0, 0, 1, 2, 4], [0, 0, 2, 2, 4, 2, 1, 0, 0, 2, 2, 1], [0, 0, 2, 2, 1, 2, 2, 0, 0, 4, 1, 2], [0, 0, 2, 1, 2, 2, 2, 0, 0, 1, 2, 4], [0, 0, 2, 2, 4, 1, 2, 0, 0, 2, 2, 1], [0, 0, 1, 2, 1, 2, 2, 0, 0, 4, 2, 2], [0, 0, 2, 2, 2, 2, 1, 0, 0, 1, 2, 4], [0, 0, 2, 2, 4, 2, 2, 0, 0, 2, 1, 1]] \$$$

$$[0, 0, -7y_1 + 9y_4 - 7y_2 - 7y_3 + 9y_5 - 7y_7 + 9y_6, 7y_1, 7y_4, 7y_2, 7y_3, 0, 0, 7y_5, 7y_7, 7y_6]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

1842 . Coloring, {2, 3, 4, 5, 7, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, A, A, B, B, C, 4, 9]

B: [6, 7, 7, 6, A, 3, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 1, 2, 2, 4, 3] , [0, 0, 0, 4, 0, 0, 2, 0, 3, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 3, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 2, 4, 3]] \$

[0, 0, y_8 , y_7 , 0, 0, y_6 , y_5 , y_4 , y_3 , y_2 , y_1]

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 2, 3, 0, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 2, 3, 0, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 2, 4, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 3, 4, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 3, 2, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 4, 3, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 3, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 2, 4, 0, 0, 0, 3, 0]] \$

[y_4 , y_3 , y_2 , 0, y_1 , y_8 , y_7 , 0, 0, y_6 , y_5 , y_9]

1843 . Coloring, {2, 3, 4, 5, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, A, C, C, 2, 4, 5]

B: [6, 7, 7, 6, A, 3, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8

See Matrix

$\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 2, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 0, 5, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 0, 4, 0, 0, 0, 5], [0, 0, 3, 0, 5, 0, 0, 4, 0, 0, 0, 4], [0, 0, 5, 0, 4, 0, 0, 3, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 5, 0, 0, 0, 3], [0, 0, 4, 0, 3, 0, 0, 4, 0, 0, 0, 5]] \$$

$[0, y_6, y_5, y_4, y_3, 0, y_2, y_1, 0, y_8, 0, y_7]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 1, 4, 2], [4, 0, 2, 0, 0, 2, 1, 0, 2, 0, 4, 1], [4, 0, 2, 0, 0, 4, 2, 0, 1, 0, 3, 0], [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0]] \$$

$[y_8, 0, y_7, 0, 0, y_6, y_5, 0, y_4, y_3, y_2, y_1]$

1844 . Coloring, $\{2, 3, 4, 5, 7, 9, 10, 12\}$

$\Omega p(\Delta)=0: p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$

R: [7, 8, 8, 7, 3, A, A, C, C, 2, 1, 9]

B: [6, 7, 7, 6, A, 3, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 2, 3, 2, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 3, 4, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[2 y_2, y_1, y_2, 0, 0, 0, y_3, y_4, y_7, y_5, 0, y_6]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {3, 4, 6, 7, 11}}

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 0, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 2, 1, 0, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 4, 2, 0, 0, 2, 1, 2] , [0, 0, 4, 1, 2, 2, 2, 0, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 1, 4, 0, 0, 2, 2, 1] , [0, 0, 1, 2, 1, 2, 2, 0, 0, 2, 4, 2] , [0, 0, 2, 4, 2, 2, 1, 0, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 4, 2, 0, 0, 2, 1, 1]] \$

$$[0, 0, 5 y_7, 5 y_6, 5 y_5, 5 y_4, 5 y_3, 0, 0, 5 y_2, -5 y_7 - 5 y_6 + 11 y_5 - 5 y_4 - 5 y_3 + 11 y_2 + 11 y_1, 5 y_1]$$

$$p = s + s^2 + s^3 - s^6 - s^7 - s^8$$

1845 . Coloring, {2, 3, 4, 5, 7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, A, A, C, C, C, 4, 9]

B: [6, 7, 7, 6, A, 3, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 1, 4, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, y_5, 2y_5, 0, 0, -2y_5 + 2y_4, y_4, y_3, y_2, 0, y_1]$$

$$p = -s^4 + s^6 \quad p' = s^4 - s^6$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 1, 4, 0], [4, 1, 2, 0, 0, 2, 3, 0, 0, 2, 2, 0], [2, 2, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 2, 4, 0, 0, 0, 3, 0], [3, 0, 2, 0, 0, 3, 4, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 3, 2, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 4, 3, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 3, 0, 0, 0, 3, 0]] \$$$

$$[y_2, y_3, y_1, 0, y_4, y_5, y_6, 0, 0, y_7, y_8, 0]$$

1846 . Coloring, {2, 3, 4, 5, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^3 + 8s^5 - 8s^6 + 16s^7 \quad p' = s^2 + 8s^4 - 8s^5 + 16s^6 \quad p = s^2 - 8s^5 - 48s^6 + 64s^7 - 128s^8$$

R: [7, 8, 8, 7, 3, A, A, C, B, 2, 4, 9]

B: [6, 7, 7, 6, A, 3, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 2, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 3, 2, 2, 1, 3], [0, 2, 0, 1, 0, 0, 2, 2, 3, 1, 2, 3], [0, 1, 0, 2, 0, 0, 1, 2, 3, 2, 3, 2], [0, 2, 0, 3, 0, 0, 2, 1, 2, 1, 3, 2], [0, 1, 0, 3, 0, 0, 3, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 0, 3, 1, 1, 3, 2, 2], [0, 3, 0, 2, 0, 0, 2, 2, 2, 3, 1, 1]] \$$$

$$[0, y_1, y_2, y_3, 0, 0, y_4, y_5, y_6, y_9, y_7, y_8]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {5, 10, 12}}

See Matrix

$$\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 1, 0, 0, 2, 2, 1], [2, 0, 2, 0, 1, 3, 2, 0, 0, 3, 1, 2], [1, 0, 3, 0, 2, 2, 2, 0, 0, 1, 2, 3], [2, 0, 2, 0, 3, 1, 3, 0, 0, 2, 2, 1], [2, 0, 1, 0, 1, 2, 2, 0, 0, 3, 3, 2], [3, 0, 2, 0, 2, 2, 2, 0, 0, 1, 2, 3]] \$$$

1, 0, 0, 1, 2, 3] , [2, 0, 2, 0, 3, 3, 2, 0, 0, 2, 1, 1]] \$

$[-3 y_1 + 5 y_2 - 3 y_3 - 3 y_4 + 5 y_5 - 3 y_6 + 5 y_7, 0, 3 y_1, 0, 3 y_2, 3 y_3, 3 y_4, 0, 0, 3 y_5, 3 y_6, 3 y_7]$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

1847 . Coloring, {2, 3, 4, 5, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 + 8s^5 - 48s^6 - 64s^7 - 128s^8 \quad p' = s^2 + 8s^4 + 8s^5 + 16s^6 \quad p'' = s^3 + 8s^5 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, 3, A, B, B, C, 2, 4, 5]

B: [6, 7, 7, 6, A, 3, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	7 vs 9	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 0, 2, 3, 0, 0, 4, 0] , [0, 0, 1, 4, 0, 0, 3, 3, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 4, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$[0, y_2, y_3, y_1, y_2, 0, y_7, y_6, 0, y_5, y_4, y_5]$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 9, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 3, 1, 3] , [1, 0, 2, 0, 0, 2, 1, 0, 3, 2, 2, 3] , [2, 0, 2, 0, 0, 1, 2, 0, 3, 1, 3, 2] , [3, 0, 1, 0, 0, 2, 2, 0, 2, 2, 3, 1] , [3, 0, 2, 0, 0, 3, 1, 0, 1, 2, 2, 2] , [2, 0, 3, 0, 0, 3, 2, 0, 2, 1, 1, 2] , [1, 0, 3, 0, 0, 2, 3, 0, 2, 2, 2, 1] , [2, 0, 2, 0, 0, 1, 3, 0, 1, 3, 2, 2]] \$

$$[y_7, 0, y_6, 0, 0, y_5, y_4, 0, y_2, y_3, y_7 + y_6 - y_5 - y_4 + y_2 + y_3 - y_1, y_1]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1848 . Coloring, {2, 3, 4, 5, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 8s^5 - 16s^6 \quad p' = s^3 - 8s^6 - 16s^7 \quad p'' = s^2 - 8s^5 - 16s^6$$

R: [7, 8, 8, 7, 3, A, B, B, C, 2, 1, 9]

B: [6, 7, 7, 6, A, 3, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	7 vs 9	8 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 2, 3, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 1, 2, 0, 5, 1], [5, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1]] \$$$

$$[3 y_7, -3 y_7 - 3 y_4 - 3 y_5 + 13 y_3 - 6 y_6 - 3 y_2 + 13 y_1, 3 y_6, 0, 0, 0, 3 y_4, 3 y_5, 3 y_3, 3 y_6, 3 y_2, 3 y_1]$$

$$p = -s^4 - s^5 + s^7 + s^8 \quad p = s^4 - s^6 - s^7 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 2, 0, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 1, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 1, 2, 0, 0, 4, 0, 4], [0, 0, 1, 0, 4, 0, 2, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$$

$$[0, 0, y_8, y_7, y_6, y_4, y_5, 0, 0, y_3, y_2, y_1]$$

1849 . Coloring, {2, 3, 4, 5, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7 \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, A, B, B, C, C, 4, 9]

B: [6, 7, 7, 6, A, 3, A, C, B, 2, 1, 5]

' See graph

' ' See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	5 vs 8	7 vs 9

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 1, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3]] \$

$$[0, 0, 3y_2, -3y_2 - 3y_1 - 3y_5 + 10y_3 - 3y_4, 0, 0, 3y_1, 3y_5, -3y_2 + 3y_3, 3y_2, 3y_4, 3y_3]$$

$$p = s^3 - s^6 \quad p' = s^3 - s^6 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 2, 0, 0, 1, 5, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0]] \$

$$[y_2, y_4, y_1, 0, y_2, y_3, y_5, 0, 0, y_6, y_7, y_7]$$

$$p' = -s^5 + s^8 \quad p = -s^5 + s^8$$

1850 . Coloring, {2, 3, 4, 5, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 8s^5 - 24s^6 - 16s^7 - 64s^8 \quad p' = s^3 + 4s^4 + 8s^5 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, 3, A, B, B, B, 2, 4, 9]

B: [6, 7, 7, 6, A, 3, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 2, 3, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, y_1, y_3, y_6, 0, 0, y_5, y_4, 2y_3, y_3, y_2, 0]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 2, 1, 0, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 0, 2, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 2, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_1, 0, y_7, 0, y_6, y_5, y_4, 0, 0, y_3, 0, y_2]$$

1851 . Coloring, {2, 3, 4, 5, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 8s^6 + 16s^7 \quad p' = s^3 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, 3, A, B, C, C, 2, 4, 9]

B: [6, 7, 7, 6, A, 3, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 9	8 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}, \{4, 7, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 1, 2, 2], [0, 1, 0, 2, 0, 0, 2, 3, 2, 0, 2, 4], [0, 0, 0, 2, 0, 0, 2, 1, 4, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5], [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5]] \$$

$[0, -2y_1 + 2y_3 + 2y_2, 5y_4 - 2y_3 - 2y_2, 2y_4, 0, 0, 2y_4, 2y_3, 2y_2, 5y_4 - 2y_3 - 2y_2, 2y_4, 2y_1]$

$p = -s^4 + s^8 \quad p = -s^4 + s^5 \quad p = -s^4 + s^9 \quad p = -s^4 + s^7 \quad p = -s^4 + s^6$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 3, 2, 2], [2, 0, 2, 0, 2, 2, 1, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 2, 2, 0, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 2, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 0, 2, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 5, 0, 0, 0, 6, 0, 5]] \$$

$[y_1, 0, y_2, 0, y_8, y_7, y_6, 0, 0, y_4, y_5, y_3]$

1852 . Coloring, $\{2, 3, 4, 6, 7, 8, 9, 10\}$

$\Omega p(\Delta)=0: \quad p' = 3s^2 - 2s^3 + 8s^4 + 8s^5 + 32s^7 \quad p = 9s^2 + 20s^4 + 40s^5 + 16s^6 + 96s^7 + 64s^8$

R: [7, 8, 8, 7, A, 3, A, B, C, 2, 1, 5]

B: [6, 7, 7, 6, 3, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 9	8 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 2, 0, 2, 2, 0, 3, 1, 1], [1, 3, 0, 0, 1, 0, 2, 3, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 1, 3, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 2, 4, 0, 1, 3, 0], [3, 1, 0, 0, 0, 0, 3, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 3, 1, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 4, 2, 0, 3, 1, 0], [1, 3, 0, 0, 0, 0, 3, 3, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 1, 3, 0, 3, 3, 0]] \$$

$$[y_7, y_6, y_5, 0, y_4, 0, y_3, y_2, 0, y_1, y_7 - y_6 - y_4 - y_3 + y_2 + y_1, y_5]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p' = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 0, 2, 2, 0, 2, 1, 3, 3], [0, 0, 0, 3, 0, 2, 1, 0, 3, 2, 4, 1], [0, 0, 0, 4, 0, 3, 0, 0, 1, 2, 4, 2], [0, 0, 0, 4, 0, 4, 0, 0, 2, 3, 1, 2], [0, 0, 0, 1, 0, 4, 0, 0, 2, 4, 2, 3], [0, 0, 0, 2, 0, 1, 0, 0, 3, 4, 2, 4], [0, 0, 0, 2, 0, 2, 0, 0, 4, 1, 3, 4], [0, 0, 0, 3, 0, 2, 0, 0, 4, 2, 4, 1]] \$$$

$$[0, 0, y_3, y_2, 0, y_1, y_8, 0, y_7, y_6, y_5, y_4]$$

1853 . Coloring, {2, 3, 4, 6, 7, 8, 9, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^2 + 5s^3 + 10s^4 - 8s^6 - 32s^7 - 32s^8 \quad p' = 3s^2 + 2s^3 + 8s^4 - 8s^5 - 32s^7$$

R: [7, 8, 8, 7, A, 3, A, B, C, C, 4, 5]

B: [6, 7, 7, 6, 3, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	8 vs 9

Omega Rank for R : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 1, 2, 2, 0, 2, 2, 0, 3, 1, 3], [0, 0, 0, 1, 3, 0, 2, 1, 0, 4, 2, 3], [0, 0, 0, 2, 3, 0, 1, 0, 0, 5, 1, 4], [0, 0, 0, 1, 4, 0, 2, 0, 0, 4, 0, 5], [0, 0, 0, 0, 5, 0, 1, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$$$

$$[0, 0, y_1, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 2, 2, 0, 2, 1, 3, 1], [3, 1, 0, 0, 0, 2, 3, 0, 1, 2, 4, 0], [4, 2, 0, 0, 0, 3, 1, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 4, 2, 0, 0, 3, 1, 0], [1, 3, 0, 0, 0, 4, 2, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 1, 3, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 4, 0, 0, 1, 3, 0], [3, 1, 0, 0, 0, 2, 4, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 3, 1, 0, 0, 2, 4, 0]] \$$$

$[y_2, y_1, y_7, 0, 0, y_3, y_4, 0, y_8, y_5, y_6, y_7]$

$$p = -s^3 + s^9$$

1854 . Coloring, {2, 3, 4, 6, 7, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = -9s^2 + 4s^4 + 24s^5 - 16s^6 - 96s^7 + 64s^8 \quad p = 3s^2 + 2s^3 - 8s^5 + 32s^7$$

R: [7, 8, 8, 7, A, 3, A, B, C, C, 1, 9]

B: [6, 7, 7, 6, 3, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 0, 2, 2, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 1, 3, 2, 2, 5] , [2, 0, 0, 0, 0, 0, 1, 0, 5, 2, 1, 5] , [1, 0, 0, 0, 0, 2, 0, 5, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 1, 0, 7, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$[y_1, 0, y_2, 0, 0, 0, y_3, y_6, y_4, y_5, y_7, y_8]$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 2, 2, 0, 0, 1, 3, 1] , [0, 1, 2, 3, 1, 2, 3, 0, 0, 2, 2, 0] , [0, 2, 1, 2, 0, 3, 3, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 2, 3, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 3, 2, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 3, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 2, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 2, 3, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 3, 3, 0, 0, 2, 3, 0]] \$

$[0, y_1, y_2, y_6, y_3, y_4, y_5, 0, 0, y_7, y_8, y_9]$

1855 . Coloring, {2, 3, 4, 6, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, A, B, B, 2, 4, 5]

B: [6, 7, 7, 6, 3, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 3, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 2, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 2, 4, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 2, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 3, 2, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 4, 2, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 3, 0, 4, 2, 0]] \$

$$[0, y_3, y_1, y_2, 2y_1, 0, y_4, y_5, 0, y_6, y_7, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 1, 2, 4] , [2, 0, 0, 0, 0, 2, 1, 0, 4, 2, 2, 3] , [2, 0, 0, 0, 0, 2, 0, 0, 3, 2, 1, 6] , [1, 0, 0, 0, 2, 0, 0, 6, 2, 0, 5] , [0, 0, 0, 0, 0, 1, 0, 0, 5, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[y_1, 0, y_2, 0, 0, y_3, y_5, 0, y_4, y_6, y_7, y_8]$$

1856 . Coloring, {2, 3, 4, 6, 7, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, A, B, B, 2, 1, 9]

B: [6, 7, 7, 6, 3, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 3, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 4, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 3, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 3, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 3, 0, 2, 4, 0]] \$$

$$[y_3, y_2, y_1, 0, 0, 0, y_6, y_4, 2y_1, y_5, y_7, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{3, 4, 5, 6, 7, 10, 11, 12\}\}$ order: 8
See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 2, 0, 0, 1, 2, 4], [0, 0, 2, 2, 4, 2, 1, 0, 0, 2, 2, 1], [0, 0, 4, 2, 1, 2, 2, 0, 0, 2, 1, 2], [0, 0, 1, 1, 2, 2, 4, 0, 0, 2, 2, 2], [0, 0, 2, 2, 2, 1, 1, 0, 0, 2, 4, 2], [0, 0, 2, 4, 2, 2, 2, 0, 0, 1, 1, 2], [0, 0, 2, 1, 2, 4, 2, 0, 0, 2, 2, 1], [0, 0, 2, 2, 1, 1, 2, 0, 0, 4, 2, 2]] \$$

$$[0, 0, y_1, y_8, y_7, y_6, y_5, 0, 0, y_4, y_3, y_2]$$

1857 . Coloring, $\{2, 3, 4, 6, 7, 8, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, 3, A, B, B, C, 4, 9]

B: [6, 7, 7, 6, 3, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 3, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 1, 2, 2, 4, 3] , [0, 0, 0, 4, 0, 0, 2, 0, 3, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 3, 0, 2, 4, 2, 2] , [0, 0, 0, 2, 0, 0, 3, 0, 2, 3, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 3, 2, 3] , [0, 0, 0, 2, 0, 0, 2, 0, 3, 2, 4, 3]] \$

[0, 0, y₁, y₈, 0, 0, y₇, y₆, y₅, y₄, y₃, y₂]

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 1, 2, 2] , [2, 1, 2, 0, 2, 2, 3, 0, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 2, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 4, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 2, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 4, 2, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 3, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 3, 0, 0, 2, 3, 0]] \$

[y₈, y₉, y₇, 0, y₆, y₅, y₄, 0, 0, y₂, y₃, y₁]

1858 . Coloring, {2, 3, 4, 6, 7, 9, 10, 11}

$\Omega p(\Delta)=0: p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$

R: [7, 8, 8, 7, A, 3, A, C, C, 2, 4, 5]

B: [6, 7, 7, 6, 3, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 2, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 2, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3]] \$

$$[0, y_1, y_2, 2y_2, y_3, 0, y_4, y_7, 0, y_6, 0, y_5]$$

$$p = s^3 - s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 1, 4, 2], [4, 0, 0, 0, 0, 2, 1, 0, 2, 2, 4, 1], [4, 0, 0, 0, 0, 4, 0, 0, 1, 2, 3, 2], [3, 0, 0, 0, 4, 0, 0, 2, 4, 1, 2], [1, 0, 0, 0, 0, 3, 0, 0, 2, 4, 2, 4], [2, 0, 0, 0, 0, 1, 0, 0, 4, 3, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 1, 4, 3], [4, 0, 0, 0, 0, 2, 0, 0, 3, 2, 4, 1]] \$$$

$$[y_2, 0, y_1, 0, 0, y_8, y_7, 0, y_6, y_5, y_3, y_4]$$

1859 . Coloring, {2, 3, 4, 6, 7, 9, 10, 12}

$$\Omega p(\Delta)=0: p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, A, C, C, 2, 1, 9]

B: [6, 7, 7, 6, 3, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 2, 3, 2, 2, 0, 4], [0, 2, 0, 0, 0, 0, 0, 3, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7], [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[2y_2, y_1, y_2, 0, 0, 0, y_6, y_7, y_5, y_4, 0, y_3]$$

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{3, 4, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 2, 2, 2, 0, 0, 1, 4, 2] , [0, 0, 2, 4, 2, 2, 1, 0, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 4, 2, 0, 0, 2, 1, 2] , [0, 0, 1, 1, 2, 2, 2, 0, 0, 4, 2, 2] , [0, 0, 2, 2, 2, 1, 1, 0, 0, 2, 2, 4] , [0, 0, 2, 2, 4, 2, 2, 0, 0, 1, 1, 2] , [0, 0, 4, 1, 2, 2, 2, 0, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 1, 4, 0, 0, 2, 2, 2]] \$

$$[0, 0, y_1, y_4, y_2, y_3, y_8, 0, 0, y_5, y_6, y_7]$$

1860 . Coloring, {2, 3, 4, 6, 7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, 3, A, C, C, C, 4, 9]

B: [6, 7, 7, 6, 3, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 3, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 1, 4, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, y_1, 2y_1, 0, 0, -2y_1 + 2y_2, y_2, y_3, y_4, 0, y_5]$$

$$p' = s^4 - s^6 \quad p = s^4 - s^6$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 1, 4, 0] , [4, 1, 2, 0, 0, 2, 3, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 4, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 2, 0, 0, 4, 3, 0] , [3, 4, 0, 0, 0, 3, 2, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 4, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 2, 0, 0, 3, 4, 0] , [4, 3, 0, 0, 0, 2, 3, 0, 0, 2, 2, 0]] \$

$$[y_3, y_4, y_5, 0, y_6, y_7, y_8, 0, 0, y_1, y_2, 0]$$

1861 . Coloring, {2, 3, 4, 6, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 8s^5 + 48s^6 + 128s^8 \quad p' = s^3 - 4s^4 + 8s^5 - 8s^6 + 16s^7 \quad p'' = s^2 - 8s^4 + 24s^5 - 16s^6 + 64s^7$$

R: [7, 8, 8, 7, A, 3, A, C, B, 2, 4, 9]

B: [6, 7, 7, 6, 3, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	9 vs 9	8 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 9, 10, 11, 12}} order: 8

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 2, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 3, 2, 2, 1, 3], [0, 2, 0, 1, 0, 0, 2, 2, 3, 1, 2, 3], [0, 1, 0, 2, 0, 0, 1, 2, 3, 2, 3, 2], [0, 2, 0, 3, 0, 0, 2, 1, 2, 1, 3, 2], [0, 1, 0, 3, 0, 0, 3, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 0, 3, 1, 1, 3, 2, 2], [0, 3, 0, 2, 0, 0, 2, 2, 2, 3, 1, 1]] \$$$

$$[0, y_7, y_8, y_9, 0, 0, y_6, y_3, y_4, y_5, y_1, y_2]$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 1, 0, 0, 2, 2, 1], [2, 0, 3, 0, 1, 3, 2, 0, 0, 2, 1, 2], [1, 0, 1, 0, 2, 2, 3, 0, 0, 3, 2, 2], [2, 0, 2, 0, 2, 1, 1, 0, 0, 2, 3, 3], [3, 0, 2, 0, 3, 2, 2, 0, 0, 1, 1, 2], [1, 0, 3, 0, 2, 3, 2, 0, 0, 2, 2, 1], [2, 0, 2, 0, 1, 1, 3, 0, 0, 3, 2, 2]] \$$$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, 0, 0, y_7, y_8, y_6]$$

1862 . Coloring, {2, 3, 4, 6, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 - 8s^5 - 32s^7 \quad p'' = -s^2 + 8s^4 + 24s^5 + 16s^6 + 64s^7 \quad p = s^2 + s^3 + 24s^6 - 16s^7 + 64s^8$$

R: [7, 8, 8, 7, A, 3, B, B, C, 2, 4, 5]

B: [6, 7, 7, 6, 3, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 1, 3, 1] , [0, 1, 0, 3, 1, 0, 2, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 3, 1, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 4, 2, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 5, 1, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$

[0, y_1 , y_8 , y_2 , y_3 , 0, y_4 , y_5 , 0, y_6 , y_7 , y_8]

$$p = -s^6 + s^9$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 2, 1, 0, 3, 4, 2, 3] , [2, 0, 0, 0, 0, 1, 0, 0, 3, 3, 3, 4] , [3, 0, 0, 0, 0, 2, 0, 0, 4, 1, 3, 3] , [3, 0, 0, 0, 0, 3, 0, 0, 3, 2, 4, 1] , [4, 0, 0, 0, 0, 3, 0, 0, 1, 3, 3, 2] , [3, 0, 0, 0, 0, 4, 0, 0, 2, 3, 1, 3] , [1, 0, 0, 0, 0, 3, 0, 0, 3, 4, 2, 3]] \$

$[-y_2 + y_1 + y_7 - y_5 - y_6 + y_3 + y_4, 0, y_2, 0, 0, y_1, y_7, 0, y_5, y_6, y_3, y_4]$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1863 . Coloring, {2, 3, 4, 6, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p' = s^3 + 4s^4 - 8s^6 - 16s^7 \quad p = s^2 + 56s^5 + 16s^6 - 64s^7 - 256s^8 \quad p' = s^2 - 16s^4 - 8s^5 + 16s^6 + 64s^7$$

R: [7, 8, 8, 7, A, 3, B, B, C, 2, 1, 9]

B: [6, 7, 7, 6, 3, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 9	8 vs 9	7 vs 9	8 vs 8

Omega Rank for R : cycles: $\{\{1, 7, 11\}, \{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 2, 3, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 1, 2, 0, 5, 1], [5, 0, 0, 0, 0, 4, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 5, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 4, 0, 1, 0, 5, 2], [5, 0, 0, 0, 0, 4, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 5, 0, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 4, 0, 2, 0, 5, 1]] \$$

$[-3 y_7 - 6 y_5 - 3 y_6 - 3 y_1 + 13 y_2 - 3 y_3 + 13 y_4, 3 y_7, 3 y_5, 0, 0, 0, 3 y_6, 3 y_1, 3 y_2, 3 y_5, 3 y_3, 3 y_4]$

$$p = -s^4 - s^5 + s^7 + s^8 \quad p' = s^4 - s^6 - s^7 + s^9$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 0, 0, 3, 1, 3], [0, 0, 2, 1, 3, 2, 1, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 1, 2, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4]] \$$

$$[0, 0, y_5, y_1, y_2, y_3, y_4, 0, 0, y_8, y_6, y_7]$$

1864 . Coloring, $\{2, 3, 4, 6, 8, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7$$

R: [7, 8, 8, 7, A, 3, B, B, C, C, 4, 9]

B: [6, 7, 7, 6, 3, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 9	8 vs 9	5 vs 8	6 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6
See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 1, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 1, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 3, 0, 3, 0, 4, 3]] \$

$$[0, 0, 3 y_2, 7 y_2 - 3 y_5 - 3 y_4 + 10 y_3 - 3 y_1, 0, 0, 3 y_5, 3 y_4, 3 y_3, 3 y_2, 3 y_1, 3 y_2 + 3 y_3]$$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 3, 1, 1] , [1, 3, 2, 0, 1, 2, 3, 0, 0, 4, 0, 0] , [0, 4, 1, 0, 0, 1, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_4, y_6, y_5, 0, y_4, y_3, y_2, 0, 0, y_1, -y_5 + y_3, -y_5 + y_3]$$

$$p' = s^5 - s^8 \quad p' = s^4 - s^7 \quad p = s^4 - s^7$$

Â» SYNC'D !RANK'D

1865 . Coloring, {2, 3, 4, 6, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 8s^5 + 8s^6 + 16s^7 \quad p' = s^3 + 8s^5 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, A, 3, B, B, B, 2, 4, 9]

B: [6, 7, 7, 6, 3, A, A, C, C, C, 1, 5]

' See graph

' ' See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 2, 3, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, y_6, y_5, y_4, 0, 0, y_2, y_3, 2y_5, y_5, y_1, 0]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 2, 1, 0, 0, 4, 0, 3] , [0, 0, 4, 0, 3, 0, 2, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 4, 0, 0, 2, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 4, 0, 2] , [0, 0, 3, 0, 2, 0, 4, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 0, 3, 0, 0, 4, 0, 3]] \$

$$[y_2, 0, y_1, 0, y_4, y_5, y_3, 0, 0, y_6, 0, y_7]$$

1866 . Coloring, {2, 3, 4, 6, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 9s^3 - 16s^5 - 24s^6 - 16s^7 + 64s^8 \quad p' = 3s^3 + 4s^4 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, A, 3, B, C, C, 2, 4, 9]

B: [6, 7, 7, 6, 3, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	4 vs 9	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 1, 2, 2] , [0, 1, 0, 2, 0, 0, 2, 3, 2, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 1, 4, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 0, 2, 5]] \$

$$[0, 2y_4, 2y_3, 2y_2, 0, 0, 2y_2, 2y_1, -2y_3 + 5y_2 - 2y_1, 2y_3, 2y_2, -2y_4 - 2y_3 + 5y_2]$$

$$p' = s^6 - s^8 \quad p' = s^5 - s^8 \quad p' = s^4 - s^8 \quad p = s^4 - s^9 \quad p' = s^7 - s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 3, 2, 2], [2, 0, 2, 0, 2, 2, 1, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 2, 2, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 4, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2], [0, 0, 4, 0, 2, 0, 3, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4]] \$$$

$$[y_3, 0, y_4, 0, y_5, y_6, y_7, 0, 0, y_8, y_1, y_2]$$

1867 . Coloring, {2, 3, 4, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, A, A, B, C, 2, 4, 5]

B: [6, 7, 7, 6, 3, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	7 vs 7

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 0, 2, 2, 0, 4, 1, 1], [0, 4, 0, 1, 1, 0, 2, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 1, 4, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 2, 4, 0, 1, 4, 0], [0, 1, 0, 4, 0, 0, 2, 3, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 4, 1, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 4, 2, 0, 4, 1, 0], [0, 4, 0, 1, 0, 0, 3, 2, 0, 4, 2, 0]] \$$$

$$[0, y_3, 0, y_1, y_2, 0, y_8, y_7, 0, y_6, y_4, y_5]$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 0, 2, 2, 0, 2, 0, 3, 3], [3, 0, 2, 0, 0, 2, 2, 0, 3, 0, 4, 0], [4, 0, 2, 0, 0, 3, 2, 0, 0, 0, 5, 0], [5, 0, 3, 0, 0, 4, 2, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 5, 3, 0, 0, 0, 2, 0], [2, 0, 5, 0, 0, 2, 4, 0, 0, 0, 3, 0], [3, 0, 2, 0, 0, 2, 5, 0, 0, 0, 4, 0]] \$$$

$$[y_7, 0, y_6, 0, 0, y_5, y_4, 0, y_3, 0, y_1, y_2]$$

1868 . Coloring, {2, 3, 4, 7, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, A, A, B, C, 2, 1, 9]

B: [6, 7, 7, 6, 3, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 7

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 0, 0, 2, 2, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 2, 2, 1, 2, 2, 2], [2, 2, 0, 0, 0, 0, 1, 4, 2, 2, 2, 1], [2, 2, 0, 0, 0, 0, 2, 2, 1, 1, 4, 2], [4, 1, 0, 0, 0, 0, 2, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 0, 4, 1, 1, 2, 2, 2], [2, 2, 0, 0, 0, 0, 2, 2, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 2, 2, 1, 2, 2, 2]] \$$$

$$[2 y_1, 11 y_1 - 2 y_4 + 11 y_3 - 39 y_2 + 11 y_5 - 2 y_6, 0, 0, 0, 0, 2 y_4, 2 y_3, 2 y_2, 2 y_5, 2 y_6, 3 y_1 + 3 y_3 - 11 y_2 + 3 y_5]$$

$$p' = -s + s^7 \quad p = -s + s^7$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 2, 2, 2, 0, 0, 0, 3, 3], [0, 0, 4, 3, 3, 2, 2, 0, 0, 0, 2, 0], [0, 0, 5, 2, 0, 3, 4, 0, 0, 0, 2, 0], [0, 0, 3, 2, 0, 2, 5, 0, 0, 0, 4, 0], [0, 0, 2, 4, 0, 2, 3, 0, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 2, 0, 0, 0, 3, 0], [0, 0, 4, 3, 0, 5, 2, 0, 0, 0, 2, 0]] \$$$

$$[0, 0, y_1, y_2, y_3, y_4, y_5, 0, 0, 0, y_6, y_7]$$

1869 . Coloring, {2, 3, 4, 7, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, A, A, B, C, C, 4, 9]

B: [6, 7, 7, 6, 3, 3, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 0, 2, 2, 2, 4, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 0, 3, 2, 2, 6] , [0, 0, 0, 2, 0, 0, 1, 0, 6, 2, 0, 5] , [0, 0, 0, 0, 0, 2, 0, 5, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$

[0, 0, 0, y_3 , 0, 0, y_2 , y_1 , y_7 , y_6 , y_5 , y_4]

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 2, 0, 2, 2, 2, 0, 0, 0, 3, 1] , [3, 0, 4, 0, 1, 2, 4, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0]] \$

[y_2 , 2 y_3 , y_1 , 0, y_7 , y_6 , y_5 , 0, 0, 0, y_4 , y_3]

$$p = s^3 - s^8$$

1870 . Coloring, {2, 3, 4, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 - 8s^5 - 32s^7 \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 - 32s^7 - 64s^8$$

R: [7, 8, 8, 7, A, A, A, B, B, 2, 4, 9]

B: [6, 7, 7, 6, 3, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	7 vs 7

Omega Rank for R : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 0, 2, 2, 2, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 4, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 4, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 4, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 2, 4, 0, 4, 2, 0]] \$$

$$[0, y_1, 0, y_2, 0, 0, y_3, y_4, y_5, y_6, y_7, 0]$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[2, 0, 2, 0, 2, 2, 2, 0, 0, 0, 2, 4], [2, 0, 4, 0, 4, 2, 2, 0, 0, 0, 2, 0], [2, 0, 6, 0, 0, 2, 4, 0, 0, 0, 2, 0], [2, 0, 2, 0, 0, 2, 6, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 2, 0, 0, 0, 6, 0], [6, 0, 2, 0, 0, 4, 2, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 6, 2, 0, 0, 0, 2, 0]] \$$

$$[y_1, 0, y_2, 0, y_5, y_3, y_4, 0, 0, 0, y_6, y_7]$$

1871 . Coloring, $\{2, 3, 4, 7, 9, 10, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p' = s^2 + 2s^3 + 8s^5 - 32s^7 \quad p = s^2 - 4s^4 + 8s^5 - 16s^6 - 32s^7 + 64s^8$$

R: [7, 8, 8, 7, A, A, A, C, C, 2, 4, 9]

B: [6, 7, 7, 6, 3, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 7	7 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 0, 2, 2, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 2, 2, 2, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 4, 4, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 2, 4, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 2, 8, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 0, 0, 10] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 10, 0, 0, 6]] \$

[0, y₁, 0, y₇, 0, 0, y₆, y₅, y₄, y₃, 0, y₂]

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 2, 0, 0, 0, 4, 2] , [4, 0, 4, 0, 2, 2, 2, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 4, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 2, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 2, 4, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 2, 0, 0, 0, 4, 0] , [4, 0, 4, 0, 0, 4, 2, 0, 0, 0, 2, 0]] \$

[y₅, 0, y₄, 0, y₃, y₂, y₁, 0, 0, 0, y₇, y₆]

1872 . Coloring, {2, 3, 4, 8, 9, 10, 11, 12}

$\Omega p(\Delta)=0: p = s^3 - 16s^5 - 8s^6 + 16s^7 + 64s^8 \quad p' = s^3 + 4s^4 - 8s^6 - 16s^7$

R: [7, 8, 8, 7, A, A, B, B, C, 2, 4, 9]

B: [6, 7, 7, 6, 3, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 0, 0, 2, 2, 2, 2, 3, 1] , [0, 2, 0, 3, 0, 0, 2, 2, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 2, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2]] \$

$$[0, -3y_1 - 3y_7 - 3y_6 + 13y_4 - 3y_5 - 3y_2 + 13y_3, 0, 3y_1, 0, 0, 3y_7, 3y_6, 3y_4, 3y_5, 3y_2, 3y_3]$$

$$p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 2, 2, 0, 0, 2, 1, 3], [1, 0, 4, 0, 3, 2, 2, 0, 0, 2, 0, 2], [0, 0, 5, 0, 2, 1, 4, 0, 0, 2, 0, 2], [0, 0, 3, 0, 2, 0, 5, 0, 0, 4, 0, 2], [0, 0, 2, 0, 2, 0, 3, 0, 0, 5, 0, 4], [0, 0, 2, 0, 4, 0, 2, 0, 0, 3, 0, 5], [0, 0, 4, 0, 5, 0, 2, 0, 0, 2, 0, 3], [0, 0, 5, 0, 3, 0, 4, 0, 0, 2, 0, 2]] \$$$

$$[y_1, 0, y_2, 0, y_4, y_5, y_3, 0, 0, y_6, y_7, y_8]$$

1873 . Coloring, {2, 3, 5, 6, 7, 8, 9, 10}

R: [7, 8, 8, 6, 3, 3, A, B, C, 2, 1, 5]

B: [6, 7, 7, 7, A, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 7

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 2, 1, 1, 2, 0, 2, 1, 1], [1, 2, 3, 0, 1, 0, 2, 4, 0, 1, 2, 0], [2, 1, 1, 0, 0, 0, 1, 5, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 2, 0, 1, 5, 0], [5, 1, 0, 0, 0, 0, 4, 2, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 5, 1, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 2, 2, 0, 5, 1, 0], [1, 5, 0, 0, 0, 0, 2, 4, 0, 2, 2, 0], [2, 2, 0, 0, 0, 0, 1, 5, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 2, 0, 1, 5, 0]] \$$$

$$[y_6, y_5, y_4, 0, y_3, y_8, y_2, y_1, 0, y_9, y_7, y_8]$$

$$p = -s^4 + s^{10}$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 1, 3, 0, 2, 2, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 1, 5, 2], [0, 0, 0, 5, 0, 0, 3, 0, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 5, 0, 1, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 0, 0, 0, 0, 0, 0]] \$$$

6, 0, 0, 0, 5, 0]] \$

[0, 0, 0, y₄, 0, y₅, y₁, 0, y₂, y₃, y₆, y₇]

1874 . Coloring, {2, 3, 5, 6, 7, 8, 9, 11}

R: [7, 8, 8, 6, 3, 3, A, B, C, C, 4, 5]

B: [6, 7, 7, 7, A, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 0, 2, 2, 2, 1, 1, 2, 0, 2, 1, 3] , [0, 0, 3, 1, 3, 2, 0, 2, 0, 1, 2, 2] , [0, 0, 5, 2, 2, 1, 0, 3, 0, 0, 2, 1] , [0, 0, 3, 2, 1, 2, 0, 5, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 2, 0, 3, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 3, 0, 3, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 5, 0, 2, 0, 0, 3, 0] , [0, 0, 5, 3, 0, 3, 0, 3, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 0, 5, 0, 0, 3, 0]] \$

[0, 0, y₆, y₅, y₄, y₃, y₂, y₁, 0, y₉, y₈, y₇]

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 0, 1, 3, 0, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 2, 0, 1, 1, 5, 0] , [5, 1, 0, 0, 0, 3, 2, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 5, 1, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 2, 0, 0, 5, 1, 0] , [1, 5, 0, 0, 0, 2, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 1, 5, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 3, 0, 0, 1, 5, 0]] \$

[y₂, y₁, 0, 0, 0, y₄, y₃, 0, y₈, y₇, y₆, y₅]

1875 . Coloring, {2, 3, 5, 6, 7, 8, 9, 12}

R: [7, 8, 8, 6, 3, 3, A, B, C, C, 1, 9]

B: [6, 7, 7, 7, A, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 2, 0, 0, 1, 1, 2, 2, 2, 1, 3] , [1, 0, 1, 0, 0, 0, 2, 2, 3, 1, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 1, 4, 2, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 4, 1, 1, 6] , [1, 0, 0, 0, 0, 0, 2, 0, 6, 2, 0, 5] , [0, 0, 0, 0, 0, 0, 1, 0, 5, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[y_1, 0, y_5, 0, 0, y_2, y_3, y_4, y_6, y_7, y_8, y_9]$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 0, 2, 2, 1, 3, 0, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 0, 4, 0, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 5, 0, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0]] \$

$$[0, y_1, 0, y_2, y_3, y_7, y_4, 0, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

1876 . Coloring, {2, 3, 5, 6, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 6s^2 - 5s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, B, B, 2, 4, 5]

B: [6, 7, 7, 7, A, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 7

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 2, 2, 0] , [0, 2, 3, 2, 0, 2, 0, 4, 0, 1, 2, 0] , [0, 1, 2, 2, 0, 2, 0, 5, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 0, 3, 0, 0, 5, 0] , [0, 0, 2, 5, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 5, 0, 2, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 3, 0, 4, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 2, 0, 5, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 2, 0, 3, 0, 0, 5, 0]] \$

$[0, y_1, y_2, y_3, 2y_5, y_4, y_5, y_6, 0, y_7, y_8, 0]$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 2, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 1, 3, 4] , [3, 0, 0, 0, 0, 2, 0, 0, 4, 2, 0, 5] , [0, 0, 0, 0, 3, 0, 0, 5, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 3, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$[y_5, 0, 0, 0, 0, y_4, y_3, 0, y_2, y_1, y_6, y_7]$

1877 . Coloring, {2, 3, 5, 6, 7, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 9s^3 - 2s^4 + 16s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, B, B, 2, 1, 9]

B: [6, 7, 7, 7, A, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	4 vs 7

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 2, 2, 0] , [2, 2, 1, 0, 0, 0, 2, 4, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 2, 3, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 1, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 0, 4, 2, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 3, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 1, 4, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 2, 4, 0, 1, 4, 0] , [4, 1, 0, 0, 0, 0, 2, 3, 0, 2, 4, 0]] \$

$$[y_4, y_3, y_2, 0, 0, y_1, y_8, y_7, 2y_1, y_6, y_5, 0]$$

$$p = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 2, 0, 0, 4, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 2, 4], [0, 0, 0, 2, 4, 0, 2, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 2, 0, 0, 4, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 2, 4]] \$$$

$$[0, 0, 0, 4y_4 + 4y_3 + 3y_2 - 7y_1, 2y_4, 2y_3, 10y_4 + 10y_3 + 4y_2 - 16y_1, 0, 0, 2y_2, 2y_1, 16y_4 + 16y_3 - 27y_1 + 7y_2]$$

$$p' = s^3 - s^6 \quad p' = s^2 - s^5 \quad p = s^2 - s^5$$

1878 . Coloring, {2, 3, 5, 6, 7, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 9s^3 + 2s^4 + 16s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, B, B, C, 4, 9]

B: [6, 7, 7, 7, A, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	9 vs 9	8 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 2, 2, 2], [0, 0, 1, 2, 0, 2, 0, 2, 2, 1, 4, 2], [0, 0, 2, 4, 0, 2, 0, 1, 2, 0, 4, 1], [0, 0, 2, 4, 0, 4, 0, 2, 1, 0, 3, 0], [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0], [0, 0, 4, 3, 0, 3, 0, 4, 0, 0, 2, 0], [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0], [0, 0, 3, 4, 0, 2, 0, 3, 0, 0, 4, 0], [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0]] \$$$

$$[0, 0, y_7, y_6, 0, y_4, y_5, y_3, y_1, y_2, y_8, y_9]$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 2, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 2, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 3, 3, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 2, 4, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 2, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 3, 3, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 4, 2, 0, 0, 3, 3, 0]] \$

$$[y_1, y_2, 0, 0, y_6, y_7, y_8, 0, 0, y_5, y_3, y_4]$$

1879 . Coloring, {2, 3, 5, 6, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, C, C, 2, 4, 5]

B: [6, 7, 7, 7, A, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 9	7 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 4

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 2, 0, 2] , [0, 2, 3, 0, 2, 2, 0, 4, 0, 1, 0, 2] , [0, 1, 4, 0, 2, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 2, 0, 4, 0, 0, 5, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 2, 0, 0, 0, 5] , [0, 0, 5, 0, 5, 0, 0, 4, 0, 0, 0, 2] , [0, 0, 5, 0, 2, 0, 0, 5, 0, 0, 0, 4] , [0, 0, 2, 0, 4, 0, 0, 5, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 2, 0, 0, 0, 5]] \$

$$[0, y_3, y_2, 2y_5, y_1, -3y_5 + 2y_6, y_5, y_4, 0, y_6, 0, y_7]$$

$$p = -s^4 + s^8 \quad p' = -s^4 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 2, 4, 2] , [4, 0, 0, 0, 0, 2, 0, 0, 2, 1, 5, 2] , [5, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 1] , [2, 0, 0, 0, 0, 5, 0, 0, 1, 4, 2, 2] , [2, 0, 0, 0, 0, 2, 0, 0, 2, 5, 1, 4] , [1, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 4, 2]] \$

$$[y_1, 0, 0, 0, 0, y_7, y_6, 0, y_5, y_4, y_3, y_2]$$

1880 . Coloring, {2, 3, 5, 6, 7, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 16s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, C, C, 2, 1, 9]

B: [6, 7, 7, 7, A, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	7 vs 9	4 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 2, 0, 0, 1, 1, 2, 2, 2, 0, 2], [0, 2, 1, 0, 0, 0, 2, 4, 2, 1, 0, 4], [0, 1, 0, 0, 0, 0, 0, 3, 4, 2, 0, 6], [0, 2, \\ & 0, 0, 0, 0, 0, 1, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, \\ & 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$ \end{aligned}$$

$$[2y_1, y_6, y_7, 0, 0, y_1, 2y_7 - 3y_1, y_2, y_3, y_4, 0, y_5]$$

$$p = -s^6 + s^8 \quad p' = -s^6 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {4, 7, 11}} order: 3

See Matrix

$$\begin{aligned} \$ [& [0, 0, 0, 2, 2, 1, 3, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 2, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 2, 2, 3], [0, 0, \\ & 0, 2, 3, 0, 3, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 0, 2, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 4, 0, 0, 2, 2, 3], [0, 0, 0, 2, 3, 0, \\ & 3, 0, 0, 2, 4, 2]] \$ \end{aligned}$$

$$[0, 0, 0, 2y_4, 2y_3, 4y_4 - 2y_3 - 7y_2 + 3y_1, 16y_4 - 27y_2 + 7y_1, 0, 0, 2y_2, 2y_1, 10y_4 - 16y_2 + 4y_1]$$

$$p' = s^3 - s^6 \quad p = s^2 - s^5 \quad p' = s^2 - s^5$$

Â» SYNC'D !RANK'D

1881 . Coloring, {2, 3, 5, 6, 7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 16s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, C, C, C, 4, 9]

B: [6, 7, 7, 7, A, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 2, 0, 4] , [0, 0, 1, 0, 0, 2, 0, 2, 4, 1, 0, 6] , [0, 0, 2, 0, 0, 0, 0, 1, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, 0, y_1, 2y_2, 0, -3y_2 + 2y_5, y_2, y_3, y_4, y_5, 0, y_6]$$

$$p' = -s^5 + s^7 \quad p = -s^5 + s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 4, 2, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 3, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 4, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 3, 3, 0, 0, 2, 4, 0]] \$

$$[y_1, y_5, 0, 0, y_4, y_2, y_3, 0, 0, y_7, y_6, 0]$$

1882 . Coloring, {2, 3, 5, 6, 7, 10, 11, 12}

R: [7, 8, 8, 6, 3, 3, A, C, B, 2, 4, 9]

B: [6, 7, 7, 7, A, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	10 vs 10	7 vs 7

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 9, 11, 12\}\}$ order: 7
See Matrix

\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 2, 1, 1] , [0, 2, 1, 1, 0, 2, 0, 4, 1, 1, 2, 2] , [0, 1, 2, 2, 0, 1, 0, 3, 2, 0, 1, 4] , [0, 0, 1, 1, 0, 2, 0, 3, 4, 0, 2, 3] , [0, 0, 2, 2, 0, 1, 0, 1, 3, 0, 4, 3] , [0, 0, 1, 4, 0, 2, 0, 2, 3, 0, 3, 1] , [0, 0, 2, 3, 0, 4, 0, 1, 1, 0, 3, 2] , [0, 0, 4, 3, 0, 3, 0, 2, 2, 0, 1, 1] , [0, 0, 3, 1, 0, 3, 0, 4, 1, 0, 2, 2] , [0, 0, 3, 2, 0, 1, 0, 3, 2, 0, 1, 4]] \$

$[0, y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, y_8, y_9, y_{10}]$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6
See Matrix

\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 2, 0, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 3, 0, 0, 0, 5, 0, 3] , [0, 0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$[y_7, 0, 0, 0, y_6, y_5, y_4, 0, 0, y_3, y_2, y_1]$

1883 . Coloring, $\{2, 3, 5, 6, 8, 9, 10, 11\}$

R: [7, 8, 8, 6, 3, 3, B, B, C, 2, 4, 5]

B: [6, 7, 7, 7, A, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 7

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5
See Matrix

\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 0, 3, 1] , [0, 0, 3, 3, 1, 2, 0, 4, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 3, 0, 3, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 3, 0, 3, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 4, 0, 3, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 0, 3, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 3, 0, 3, 0, 0, 3, 0]] \$

0, 4, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 3, 0, 3, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 3, 0, 3, 0, 0, 3, 0]] \$

[0, 2 y₆, y₅, y₄, y₃, y₂, y₆, y₁, 0, 0, y₇, y₆]

$$p' = -s^3 + s^8 \quad p = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 4, 2, 4] , [2, 0, 0, 0, 0, 1, 0, 0, 4, 2, 3, 4] , [3, 0, 0, 0, 0, 2, 0, 0, 4, 1, 4, 2] , [4, 0, 0, 0, 0, 3, 0, 0, 2, 2, 4, 1] , [4, 0, 0, 0, 0, 4, 0, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 4, 0, 0, 2, 4, 1, 3]] \$

[y₆ + y₅ - y₄ - y₃ + y₂ + y₁, 0, 0, 0, 0, y₆, y₅, 0, y₄, y₃, y₂, y₁]

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

1884 . Coloring, {2, 3, 5, 6, 8, 9, 10, 12}

R: [7, 8, 8, 6, 3, 3, B, B, C, 2, 1, 9]

B: [6, 7, 7, 7, A, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 7

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 0, 3, 1] , [3, 0, 1, 0, 0, 0, 2, 4, 1, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 3, 1, 2, 0, 6, 1] , [6, 0, 0, 0, 0, 3, 0, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 6, 0, 2, 0, 3, 1] , [3, 0, 0, 0, 0, 0, 4, 0, 1, 0, 6, 2] , [6, 0, 0, 0, 0, 0, 3, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 6, 0, 1, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 4, 0, 2, 0, 6, 1]] \$

[-3 y₁ - 9 y₂ - 3 y₅ - 3 y₃ + 13 y₄ - 3 y₆ + 13 y₇, 6 y₂, 3 y₁, 0, 0, 3 y₂, 3 y₅, 3 y₃, 3 y₄, 0, 3 y₆, 3 y₇]

$$p = s^4 + s^5 - s^7 - s^8 \quad p = -s^4 + s^6 + s^7 - s^9$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 4, 1, 3], [0, 0, 0, 1, 3, 0, 2, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$

$[0, 0, 0, y_1, y_2, y_5, y_3, 0, 0, y_4, y_5, y_6]$

$$p = -s^4 + s^7$$

1885 . Coloring, $\{2, 3, 5, 6, 8, 9, 11, 12\}$

R: $[7, 8, 8, 6, 3, 3, B, B, C, C, 4, 9]$

B: $[6, 7, 7, 7, A, A, A, C, B, 2, 1, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	6 vs 8

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 0, 3, 3], [0, 0, 1, 3, 0, 2, 0, 2, 3, 0, 3, 2], [0, 0, 2, 3, 0, 3, 0, 1, 2, 0, 2, 3], [0, 0, 3, 2, 0, 3, 0, 2, 3, 0, 1, 2], [0, 0, 3, 1, 0, 2, 0, 3, 2, 0, 2, 3], [0, 0, 2, 2, 0, 1, 0, 3, 3, 0, 3, 2], [0, 0, 1, 3, 0, 2, 0, 2, 2, 0, 3, 3], [0, 0, 2, 3, 0, 3, 0, 1, 3, 0, 2, 2]] \$$

$[0, 0, -5y_1 - 5y_2 - 5y_3 - 5y_4 + 11y_5 - 5y_6 + 11y_7, 5y_1, 0, 5y_2, 5y_3, 5y_4, 5y_5, 0, 5y_6, 5y_7]$

$$p = s^2 + s^3 - s^7 - s^8$$

Omega Rank for B : cycles: $\{\{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 4, 1, 1], [1, 4, 0, 0, 1, 2, 2, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$

$$[y_6, y_5, 0, 0, y_6, y_4, y_3, 0, 0, y_1, y_2, y_2]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

1886 . Coloring, {2, 3, 5, 6, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, B, B, 2, 4, 9]

B: [6, 7, 7, 7, A, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 8	5 vs 6

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

$$\begin{aligned} \$ [& [0, 2, 2, 2, 0, 1, 1, 2, 2, 0, 4, 0], [0, 0, 1, 4, 0, 2, 0, 4, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 0, 1, 0, 0, 4, 0], [0, 0, \\ & 4, 4, 0, 5, 0, 2, 0, 0, 1, 0], [0, 0, 5, 1, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 1, 0, 5, 0, 0, 4, 0], [0, 0, 1, 4, 0, 2, \\ & 0, 4, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 0, 1, 0, 0, 4, 0]] \$ \end{aligned}$$

$$[0, 2 y_2, y_6, y_5, 0, y_4, y_2, y_3, 2 y_2, 0, y_1, 0]$$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\begin{aligned} \$ [& [2, 0, 0, 0, 2, 1, 3, 0, 0, 4, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, \\ & 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$ \end{aligned}$$

$$[2 y_3, 0, 0, 0, 2 y_1, 2 y_2, 3 y_3, 0, 0, 2 y_4, 0, 2 y_5]$$

$$p = s^3 - s^6$$

Â» SYNC'D !RANK'D

1887 . Coloring, {2, 3, 5, 6, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, B, C, C, 2, 4, 9]

B: [6, 7, 7, 7, A, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	6 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [0, 2, 2, 2, 0, 1, 1, 2, 2, 0, 2, 2], [0, 0, 1, 2, 0, 2, 0, 4, 2, 0, 1, 4], [0, 0, 2, 1, 0, 2, 0, 1, 4, 0, 0, 6], [0, 0, \\ & 2, 0, 0, 1, 0, 2, 6, 0, 0, 5], [0, 0, 1, 0, 0, 0, 0, 2, 5, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 1, 8, 0, 0, 7], [0, 0, 0, 0, 0, 0, \\ & 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$ \end{aligned}$$

$$[0, 2 y_4, y_1, y_2, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8]$$

$$p = s^7 - s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 0, 0, 0, 2, 1, 3, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 6], [0, 0, \\ & 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, \\ & 0, 0, 0, 6, 0, 4]] \$ \end{aligned}$$

$$[2 y_1, 0, 0, 0, 2 y_2, 2 y_3, 3 y_4, 0, 0, 2 y_6, 2 y_4, 2 y_5]$$

$$p = -s^4 + s^7$$

1888 . Coloring, {2, 3, 5, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, A, A, B, C, 2, 4, 5]

B: [6, 7, 7, 7, A, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	9 vs 10	8 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 1, 1], [0, 3, 2, 1, 1, 2, 0, 3, 0, 2, 2, 0], [0, 2, 1, 2, 0, 1, 0, 5, 0, 2, 3, 0], [0, 2, 0, 3, 0, 2, 0, 3, 0, 1, 5, 0], [0, 1, 0, 5, 0, 3, 0, 2, 0, 2, 3, 0], [0, 2, 0, 3, 0, 5, 0, 1, 0, 3, 2, 0], [0, 3, 0, 2, 0, 3, 0, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 2, 0, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 1, 0, 5, 0, 2, 3, 0], [0, 2, 0, 3, 0, 2, 0, 3, 0, 1, 5, 0]] \$$

$$[0, y_1, y_2, y_3, y_8, y_7, y_4, y_5, 0, y_6, y_9, y_4]$$

$$p = -s^4 + s^{10}$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 3, 3], [3, 0, 1, 0, 0, 2, 1, 0, 3, 0, 5, 1], [5, 0, 2, 0, 0, 3, 1, 0, 1, 0, 4, 0], [4, 0, 3, 0, 0, 5, 2, 0, 0, 0, 2, 0], [2, 0, 5, 0, 0, 4, 3, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 2, 5, 0, 0, 0, 3, 0], [3, 0, 2, 0, 0, 2, 4, 0, 0, 0, 5, 0], [5, 0, 2, 0, 0, 3, 2, 0, 0, 0, 4, 0]] \$$

$$[y_4, 0, y_3, 0, 0, y_2, y_1, 0, y_8, y_7, y_6, y_5]$$

1889 . Coloring, $\{2, 3, 5, 7, 8, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = -2s^2 + 5s^3 + 2s^4 - 16s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, A, B, C, 2, 1, 9]

B: [6, 7, 7, 7, A, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 10	5 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 2, 3, 1, 2, 2, 2], [2, 2, 0, 0, 0, 0, 1, 3, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 2, 2, 1, 1, 3, 2], [3, 1, 0, 0, 0, 0, 3, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 0, 3, 1, 1, 3, 2, 2], [2, 3, 0, 0, 0, 0, 2, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 2, 3, 1, 2, 2, 2], [2, 2, 0, 0, 0, 0, 1, 3, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 2, 2, 1, 1, 3, 2]] \$$

$[3 y_5, 3 y_6, 3 y_7, 0, 0, 3 y_7, -3 y_6 - 6 y_7 + 5 y_1 - 3 y_3 + 8 y_4, -3 y_5 + 8 y_1 - 3 y_2 + 5 y_4, 3 y_1, 3 y_2, 3 y_3, 3 y_4]$

$$p' = -s^2 + s^8 \quad p' = -s^3 + s^9 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{4, 7, 11\}, \{5, 10, 12\}\}$ order: 3

See Matrix

$\$ [[0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 3, 3], [0, 0, 1, 3, 3, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 4, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 4, 3], [0, 0, 0, 4, 3, 0, 3, 0, 0, 2, 3, 1], [0, 0, 0, 3, 1, 0, 4, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 1, 4, 3], [0, 0, 0, 4, 3, 0, 3, 0, 0, 2, 3, 1]] \$$

$[0, 0, y_2, y_1, -2 y_2 - 2 y_1 + 5 y_3 + 5 y_4 - 4 y_5, y_3, 4 y_2 + 4 y_1 - 6 y_3 - 6 y_4 + 5 y_5, 0, 0, 5 y_2 + 5 y_1 - 8 y_3 - 8 y_4 + 6 y_5, y_4, y_5]$

$$p = s^3 - s^6 \quad p' = s^3 - s^6 \quad p' = s^4 - s^7$$

1890 . Coloring, $\{2, 3, 5, 7, 8, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = -2s^2 - 5s^3 + 2s^4 + 16s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, A, B, C, C, 4, 9]

B: [6, 7, 7, 7, A, 3, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8
See Matrix

\$ [[0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 2, 0, 1, 3, 2, 2, 5] , [0, 0, 0, 2, 0, 1, 0, 0, 5, 2, 1, 5] , [0, 0, 0, 1, 0, 2, 0, 0, 5, 1, 0, 7] , [0, 0, 0, 0, 0, 1, 0, 0, 7, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[0, 0, y_8 , y_6 , 0, y_7 , y_8 , y_4 , y_5 , y_1 , y_2 , y_3]

$$p = s^7 - s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5
See Matrix

\$ [[2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 2, 3, 0, 0, 2, 3, 0] , [3, 2, 2, 0, 0, 3, 2, 0, 0, 1, 3, 0] , [3, 1, 3, 0, 0, 3, 4, 0, 0, 0, 2, 0] , [2, 0, 3, 0, 0, 3, 4, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 2, 3, 0, 0, 0, 4, 0] , [4, 0, 2, 0, 0, 4, 3, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 4, 2, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 3, 4, 0, 0, 0, 2, 0]] \$

[y_4 , y_5 , y_1 , 0, y_2 , y_3 , y_9 , 0, 0, y_6 , y_7 , y_8]

1891 . Coloring, {2, 3, 5, 7, 8, 10, 11, 12}

R: [7, 8, 8, 6, 3, A, A, B, B, 2, 4, 9]

B: [6, 7, 7, 7, A, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}} order: 6
See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 0, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 4, 0, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 3, 0, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 3, 0, 2, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 0, 4, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 2, 0, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 2, 0, 3, 0, 2, 3, 0]] \$

$$[0, y_6, y_7, y_5, 0, y_4, y_7, y_3, 2 y_7, y_2, y_1, 0]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 7, 11}}

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 2, 4] , [2, 0, 1, 0, 4, 2, 1, 0, 0, 2, 3, 1] , [3, 0, 2, 0, 1, 2, 1, 0, 0, 4, 1, 2] , [1, 0, 2, 0, 2, 3, 2, 0, 0, 1, 1, 4] , [1, 0, 3, 0, 4, 1, 2, 0, 0, 2, 2, 1] , [2, 0, 1, 0, 1, 1, 3, 0, 0, 4, 2, 2] , [2, 0, 1, 0, 2, 2, 1, 0, 0, 1, 3, 4] , [3, 0, 2, 0, 4, 2, 1, 0, 0, 2, 1, 1]] \$

$$[-7 y_1 + 9 y_5 - 7 y_6 - 7 y_7 + 9 y_2 - 7 y_3 + 9 y_4, 0, 7 y_1, 0, 7 y_5, 7 y_6, 7 y_7, 0, 0, 7 y_2, 7 y_3, 7 y_4]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

1892 . Coloring, {2, 3, 5, 7, 9, 10, 11, 12}

R: [7, 8, 8, 6, 3, A, A, C, C, 2, 4, 9]

B: [6, 7, 7, 7, A, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 2, 0, 3, 2, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 3, 4, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, y_3, y_2, 2 y_2, 0, y_1, y_2, y_5, y_6, y_7, 0, y_4]$$

$$p = -s^6 + s^8 \quad p' = s^6 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 7, 11}}

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 4, 2], [4, 0, 1, 0, 2, 2, 1, 0, 0, 2, 3, 1], [3, 0, 2, 0, 1, 4, 1, 0, 0, 2, 1, 2], [1, 0, 4, 0, 2, 3, 2, 0, 0, 1, 1, 2], [1, 0, 3, 0, 2, 1, 4, 0, 0, 2, 2, 1], [2, 0, 1, 0, 1, 1, 3, 0, 0, 2, 4, 2], [4, 0, 1, 0, 2, 2, 1, 0, 0, 1, 3, 2], [3, 0, 2, 0, 2, 4, 1, 0, 0, 2, 1, 1]] \$$$

$$[-5y_1 + 11y_2 - 5y_3 - 5y_4 + 11y_5 - 5y_6 + 11y_7, 0, 5y_1, 0, 5y_2, 5y_3, 5y_4, 0, 0, 5y_5, 5y_6, 5y_7]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

1893 . Coloring, {2, 3, 5, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, B, B, C, 2, 4, 9]

B: [6, 7, 7, 7, A, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	7 vs 10	8 vs 8

Omega Rank for R : cycles: {{2, 4, 6, 8, 10, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 0, 3, 1, 1, 3, 2], [0, 1, 0, 3, 0, 3, 0, 1, 2, 2, 3, 1], [0, 2, 0, 3, 0, 3, 0, 1, 1, 3, 1, 2], [0, 3, 0, 1, 0, 3, 0, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 1, 0, 3, 1, 3, 2, 2], [0, 3, 0, 2, 0, 1, 0, 3, 2, 1, 3, 1], [0, 1, 0, 3, 0, 2, 0, 3, 1, 1, 3, 2], [0, 1, 0, 3, 0, 3, 0, 1, 2, 2, 3, 1], [0, 2, 0, 3, 0, 3, 0, 1, 1, 3, 1, 2]] \$$$

$$[0, 3y_7, 3y_5, 3y_6, 0, 3y_4, 3y_5, -3y_5 - 3y_6 + 5y_2 - 3y_3 + 8y_1, 3y_2, 3y_3, -3y_7 - 3y_5 - 3y_4 + 8y_2 + 5y_1, 3y_1]$$

$$p' = -s^3 + s^9 \quad p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 1, 3] , [1, 0, 1, 0, 3, 2, 1, 0, 0, 5, 0, 3] , [0, 0, 2, 0, 3, 1, 1, 0, 0, 4, 0, 5] , [0, 0, 1, 0, 5, 0, 2, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 7, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 5, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 7, 0, 4]] \$

[y₄, 0, y₅, 0, y₃, y₁, y₂, 0, 0, y₆, y₇, y₈]

1894 . Coloring, {2, 3, 6, 7, 8, 9, 10, 11}

$\Omega p(\Delta)=0: p = 3s^3 + 2s^4 - 8s^6 - 32s^8$

R: [7, 8, 8, 6, A, 3, A, B, C, 2, 4, 5]

B: [6, 7, 7, 7, 3, A, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 2, 1, 1, 2, 0, 3, 1, 1] , [0, 3, 1, 1, 1, 2, 0, 3, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 1, 0, 4, 0, 1, 3, 0] , [0, 1, 1, 3, 0, 2, 0, 5, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 3, 0, 2, 0, 0, 5, 0] , [0, 0, 3, 5, 0, 4, 0, 2, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 5, 0, 3, 0, 0, 2, 0] , [0, 0, 5, 2, 0, 2, 0, 4, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 2, 0, 5, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 3, 0, 2, 0, 0, 5, 0]] \$

[0, y₉, y₈, y₇, y₆, y₄, y₅, y₂, 0, y₃, y₁, y₅]

$p = s^5 - s^{10}$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 1, 3, 0, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 2, 1, 0, 3, 1, 5, 1] , [5, 0, 0, 0, 0, 3, 0, 0, 1, 2, 4, 1] , [4, 0, 0, 0, 0, 5, 0, 0, 1, 3, 1, 2] , [1, 0, 0, 0, 0, 4, 0, 0, 2, 5, 1, 3] , [1, 0, 0, 0, 0, 1, 0, 0, 3, 4, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 0, 5, 1, 3, 4] , [3, 0, 0, 0, 0, 2, 0, 0, 4, 1, 5, 1]] \$

$$[y_1 + y_2 - y_3 - y_4 - y_5 + y_6 + y_7, 0, y_1, 0, 0, y_2, y_3, 0, y_4, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1895 . Coloring, {2, 3, 6, 7, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 6s^2 + s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, A, B, C, 2, 1, 9]

B: [6, 7, 7, 7, 3, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 10	8 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 0, 1, 1, 2, 2, 3, 1, 1], [1, 3, 1, 0, 0, 0, 2, 3, 1, 1, 2, 2], [2, 1, 0, 0, 0, 0, 1, 4, 2, 2, 3, 1], [3, 2, \\ & 0, 0, 0, 0, 2, 1, 1, 1, 4, 2], [4, 1, 0, 0, 0, 0, 3, 2, 2, 2, 1, 1], [1, 2, 0, 0, 0, 0, 4, 1, 1, 3, 2, 2], [2, 3, 0, 0, 0, 0, \\ & 1, 2, 2, 4, 1, 1], [1, 4, 0, 0, 0, 0, 2, 3, 1, 1, 2, 2], [2, 1, 0, 0, 0, 0, 1, 4, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 2, 1, 1, 1, \\ & 4, 2]] \$ \end{aligned}$$

$$[2y_1, 2y_8, 2y_7, 0, 0, 2y_6, 2y_4, 2y_5, 2y_2, 2y_3, 11y_1 - 2y_8 - 2y_7 + 11y_6 - 2y_4 + 11y_5 - 39y_2 + 11y_3, 3y_1 + 3y_6 + 3y_5 - 11y_2 + 3y_3]$$

$$p = -s^3 + s^9 \quad p' = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 2, 1, 3, 0, 0, 1, 3, 3], [0, 0, 2, 3, 3, 0, 3, 0, 0, 1, 3, 1], [0, 0, 3, 3, 1, 0, 5, 0, 0, 0, 3, 1], [0, 0, \\ & 1, 3, 1, 0, 6, 0, 0, 0, 5, 0], [0, 0, 1, 5, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, \\ & 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0]] \$ \end{aligned}$$

$$[0, 0, y_5, y_4, y_3, y_2, y_1, 0, 0, y_8, y_7, y_6]$$

1896 . Coloring, {2, 3, 6, 7, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -6s^2 + s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, A, 3, A, B, C, C, 4, 9]

B: [6, 7, 7, 7, 3, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}, {9, 12}} order: 10

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 0, 1, 1, 2, 2, 3, 1, 3], [0, 0, 1, 1, 0, 2, 0, 1, 3, 1, 2, 5], [0, 0, 2, 2, 0, 1, 0, 1, 5, 0, 1, 4], [0, 0, \\ & 1, 1, 0, 2, 0, 2, 4, 0, 1, 5], [0, 0, 2, 1, 0, 1, 0, 1, 5, 0, 2, 4], [0, 0, 1, 2, 0, 1, 0, 2, 4, 0, 1, 5], [0, 0, 1, 1, 0, 2, \\ & 0, 1, 5, 0, 2, 4], [0, 0, 2, 2, 0, 1, 0, 1, 4, 0, 1, 5], [0, 0, 1, 1, 0, 2, 0, 2, 5, 0, 1, 4]] \$ \end{aligned}$$

$$[0, 0, 7y_2, 7y_1, 0, 7y_6, 9y_2 + 9y_1 + 9y_6 + 9y_3 - 7y_4 - 7y_5 + 9y_8 - 7y_7, 7y_3, 7y_4, 7y_5, 7y_8, 7y_7]$$

$$p = s^3 + s^4 - s^8 - s^9$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 2, 1, 3, 0, 0, 1, 3, 1], [3, 1, 2, 0, 1, 2, 3, 0, 0, 1, 3, 0], [3, 1, 1, 0, 0, 3, 3, 0, 0, 2, 3, 0], [3, 2, \\ & 0, 0, 0, 3, 2, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 3, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, \\ & 3, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 3, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 3, 0, 0, 2, 3, 0]] \$ \end{aligned}$$

$$[y_1 + y_2 - y_3 + y_4 - y_5 - y_6 + y_7 + y_8, y_1, y_2, 0, y_3, y_4, y_5, 0, 0, y_6, y_7, y_8]$$

$$p = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

1897 . Coloring, {2, 3, 6, 7, 8, 10, 11, 12}

R: [7, 8, 8, 6, A, 3, A, B, B, 2, 4, 9]

B: [6, 7, 7, 7, 3, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 2, 0] , [0, 3, 1, 2, 0, 2, 0, 3, 0, 1, 4, 0] , [0, 1, 2, 4, 0, 2, 0, 4, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 4, 0, 3, 0, 0, 4, 0] , [0, 0, 4, 4, 0, 3, 0, 2, 0, 0, 3, 0] , [0, 0, 3, 3, 0, 4, 0, 4, 0, 0, 2, 0] , [0, 0, 4, 2, 0, 3, 0, 3, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 0, 4, 0, 0, 3, 0] , [0, 0, 2, 3, 0, 4, 0, 3, 0, 0, 4, 0]] \$

$$[0, y_1, y_2, y_5, 0, y_6, y_4, y_3, 2y_4, y_8, y_7, 0]$$

$$p = s^4 - s^9$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 2, 4] , [2, 0, 2, 0, 4, 2, 1, 0, 0, 1, 3, 1] , [3, 0, 4, 0, 1, 2, 2, 0, 0, 2, 1, 1] , [1, 0, 1, 0, 1, 3, 4, 0, 0, 2, 2, 2] , [2, 0, 1, 0, 2, 1, 1, 0, 0, 3, 4, 2] , [4, 0, 2, 0, 2, 2, 1, 0, 0, 1, 1, 3] , [1, 0, 2, 0, 3, 4, 2, 0, 0, 2, 1, 1] , [1, 0, 3, 0, 1, 1, 2, 0, 0, 4, 2, 2]] \$

$$[y_7 - y_6 + y_5 - y_4 - y_3 + y_2 + y_1, 0, y_7, 0, y_6, y_5, y_4, 0, 0, y_3, y_2, y_1]$$

$$p = s - s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1898 . Coloring, {2, 3, 6, 7, 9, 10, 11, 12}

R: [7, 8, 8, 6, A, 3, A, C, C, 2, 4, 9]

B: [6, 7, 7, 7, 3, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 9	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6
See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 0, 2], [0, 3, 1, 0, 0, 2, 0, 3, 2, 1, 0, 4], [0, 1, 2, 0, 0, 0, 0, 4, 4, 0, 0, 5], [0, 0, 0, 0, 0, 0, 3, 5, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$[0, y_4, y_5, 8y_4 - 4y_5 - 10y_3, 0, y_3, 4y_4 - 2y_5 - 5y_3, y_2, y_1, 10y_4 - 5y_5 - 12y_3, 0, -3y_4 + 4y_3 + y_2 + y_1]$

$$p' = -s^5 + s^8 \quad p' = -s^5 + s^6 \quad p' = -s^5 + s^7 \quad p = s^5 - s^6$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 7, 10, 11, 12}} order: 8
See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 4, 2], [4, 0, 2, 0, 2, 2, 1, 0, 0, 1, 3, 1], [3, 0, 2, 0, 1, 4, 2, 0, 0, 2, 1, 1], [1, 0, 1, 0, 1, 3, 2, 0, 0, 4, 2, 2], [2, 0, 1, 0, 2, 1, 1, 0, 0, 3, 2, 4], [2, 0, 2, 0, 4, 2, 1, 0, 0, 1, 1, 3], [1, 0, 4, 0, 3, 2, 2, 0, 0, 2, 1, 1], [1, 0, 3, 0, 1, 1, 4, 0, 0, 2, 2, 2]] \$$

$[y_6, 0, y_7, 0, y_3, y_4, y_5, 0, 0, -y_6 + y_7 - y_3 + y_4 - y_5 + y_1 + y_2, y_1, y_2]$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1899 . Coloring, {2, 3, 6, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 + s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, B, B, C, 2, 4, 9]

B: [6, 7, 7, 7, 3, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 10	8 vs 8

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 11\}, \{9, 12\}\}$ order: 10
 See Matrix

$\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 1, 3, 1], [0, 1, 1, 3, 0, 2, 0, 3, 1, 0, 3, 2], [0, 0, 2, 3, 0, 3, 0, 2, 2, 0, 3, 1], [0, 0, 3, 3, 0, 3, 0, 2, 1, 0, 2, 2], [0, 0, 3, 2, 0, 3, 0, 3, 2, 0, 2, 1], [0, 0, 3, 2, 0, 2, 0, 3, 1, 0, 3, 2], [0, 0, 2, 3, 0, 2, 0, 3, 2, 0, 3, 1], [0, 0, 2, 3, 0, 3, 0, 2, 1, 0, 3, 2], [0, 0, 3, 3, 0, 3, 0, 2, 2, 0, 2, 1], [0, 0, 3, 2, 0, 3, 0, 3, 1, 0, 2, 2]] \$$

$[0, 3 y_8, 3 y_7, 3 y_6, 0, 3 y_5, 3 y_4, 3 y_3, 3 y_2, 3 y_4, -3 y_8 - 3 y_7 - 3 y_6 - 3 y_5 - 6 y_4 - 3 y_3 + 13 y_2 + 13 y_1, 3 y_1]$

$$p = -s^3 + s^5 + s^8 - s^{10} \quad p = s^3 + s^4 - s^8 - s^9$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5
 See Matrix

$\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 3, 1, 3], [1, 0, 2, 0, 3, 2, 1, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 1, 2, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4]] \$$

$[y_1, 0, y_2, 0, y_3, y_4, y_8, 0, 0, y_5, y_6, y_7]$

1900 . Coloring, $\{2, 3, 7, 8, 9, 10, 11, 12\}$

R: [7, 8, 8, 6, A, A, A, B, C, 2, 4, 9]

B: [6, 7, 7, 7, 3, 3, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 7

Omega Rank for R : cycles: $\{\{2, 4, 6, 8, 10, 11\}, \{9, 12\}\}$ order: 6
 See Matrix

$\$ [[0, 2, 0, 2, 0, 1, 1, 2, 2, 4, 1, 1], [0, 4, 0, 1, 0, 2, 0, 2, 1, 2, 2, 2], [0, 2, 0, 2, 0, 1, 0, 4, 2, 2, 2, 1], [0, 2, 0, 2, 0, 2, 1, 1, 4, 2], [0, 1, 0, 4, 0, 2, 0, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 4, 0, 1, 1, 2, 2, 2], [0, 2, 0, 2, 0, 2, 0, 2, 2, 4, 1, 1], [0, 4, 0, 1, 0, 2, 0, 2, 1, 2, 2, 2], [0, 2, 0, 2, 0, 1, 0, 4, 2, 2, 2, 1]] \$$

$$[0, -2y_3 - 2y_2 - 39y_6 - 2y_7 + 11y_1 + 11y_5 + 11y_4, 0, 2y_1, 0, 2y_3, 2y_2, 2y_5, 2y_6, 2y_4, 2y_7, 3y_1 + 3y_5 - 11y_6 + 3y_4]$$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 1, 3, 0, 0, 0, 3, 3], [3, 0, 3, 0, 3, 2, 2, 0, 0, 0, 3, 0], [3, 0, 5, 0, 0, 3, 3, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 3, 5, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 2, 3, 0, 0, 0, 5, 0], [5, 0, 2, 0, 0, 3, 3, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 5, 2, 0, 0, 0, 3, 0]] \$$$

$$[y_1, 0, y_2, 0, y_5, y_3, y_4, 0, 0, 0, y_6, y_7]$$

1901 . Coloring, {2, 4, 5, 6, 7, 8, 9, 10}

R: [7, 8, 7, 7, 3, 3, A, B, C, 2, 1, 5]

B: [6, 7, 8, 6, A, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 2, 1, 1], [1, 2, 2, 0, 1, 0, 4, 2, 0, 3, 1, 0], [1, 3, 1, 0, 0, 0, 3, 2, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 2, 3, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 2, 4, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 2, 3, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 3, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 4, 2, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 3, 2, 0, 4, 2, 0]] \$$$

$$[y_1, y_1 + y_4 - y_3 - y_2 + y_6 + y_8 - y_5 + y_7, y_4, 0, y_3, 0, y_2, y_6, 0, y_8, y_5, y_7]$$

$$p = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3, 3], [0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 3, 2], [0, 0, 0, 3, 0, 0, 2, 3, 3, 2], [0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 2, 3], [0, 0, 0, 2, 0, 3, 0, 0, 3, 3, 2, 3], [0, 0, 0, 2, 0, 2,$$

$0, 0, 3, 3, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3, 3]] \$$

$[0, 0, 0, y_2, 0, y_2 + 2y_1 + y_6 + y_5 - y_4 - y_3, y_1, y_1, y_6, y_5, y_4, y_3]$

$$p = -s^2 + s^8 \quad p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1902 . Coloring, {2, 4, 5, 6, 7, 8, 9, 11}

R: [7, 8, 7, 7, 3, 3, A, B, C, C, 4, 5]

B: [6, 7, 8, 6, A, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 9

Omega Rank for R : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

$\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 2, 1, 3], [0, 0, 2, 1, 3, 0, 4, 0, 0, 3, 1, 2], [0, 0, 3, 1, 2, 0, 3, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 0, 4, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 2, 0, 0, 4, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 2, 0, 4], [0, 0, 3, 0, 4, 0, 4, 0, 0, 3, 0, 2], [0, 0, 4, 0, 2, 0, 3, 0, 0, 4, 0, 3]] \$$

$[0, 0, y_1, y_8, y_7, 0, y_6, y_5, 0, y_4, y_3, y_2]$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

$\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 2, 0, 1, 2, 3, 1], [3, 2, 0, 0, 0, 3, 2, 0, 1, 2, 3, 0], [3, 2, 0, 0, 0, 3, 2, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 3, 3, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 3, 0, 0, 3, 3, 0], [3, 3, 0, 0, 0, 2, 3, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 3, 3, 0, 0, 2, 3, 0]] \$$

$[y_8, y_7, 0, 0, 0, y_6, y_4, y_5, y_3, y_2, y_1, y_8 - y_7 - y_6 + y_4 + y_5 + y_3 + y_2 - y_1]$

$$p = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

1903 . Coloring, {2, 4, 5, 6, 7, 8, 9, 12}

R: [7, 8, 7, 7, 3, 3, A, B, C, C, 1, 9]
B: [6, 7, 8, 6, A, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6
 See Matrix

\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 2, 1, 3] , [1, 0, 0, 0, 0, 0, 4, 0, 3, 3, 1, 4] , [1, 0, 0, 0, 0, 0, 1, 0, 4, 4, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[y_3, 0, 2y_2, 0, 0, 0, y_1, y_2, y_7, y_5, y_6, y_4]$$

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6
 See Matrix

\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 2, 2, 0, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 3, 2, 0, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 1, 4, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 2, 3, 0, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 2, 4, 0, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 4, 1, 0, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 3, 2, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 4, 2, 0, 0, 3, 2, 0]] \$

$$[0, y_1, 0, y_2, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$$

1904 . Coloring, {2, 4, 5, 6, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, B, B, 2, 4, 5]
B: [6, 7, 8, 6, A, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	6 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 2, 2, 0], [0, 2, 2, 2, 0, 0, 4, 2, 0, 3, 1, 0], [0, 3, 0, 1, 0, 0, 4, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 1, 3, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 4, 0, 1, 3, 0], [0, 1, 0, 3, 0, 0, 2, 4, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 3, 1, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 4, 2, 0, 3, 1, 0]] \$$

$$[0, y_3, y_4, y_2, y_1, 0, y_7, y_6, 0, y_5, y_8, 0]$$

Omega Rank for B : cycles: $\{\{9, 12\}\}$ order: 6
See Matrix

$\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 2, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 1, 5], [1, 0, 0, 0, 0, 2, 0, 0, 5, 2, 0, 6], [0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[y_6, 0, 0, 0, 0, y_4, y_5, y_5, y_1, y_2, y_3, y_6 - y_4 + 2y_5 + y_1 + y_2 - y_3]$$

$$p = -s^6 + s^8 \quad p = -s^6 + s^7$$

1905 . Coloring, $\{2, 4, 5, 6, 7, 8, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, B, B, 2, 1, 9]

B: [6, 7, 8, 6, A, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 4, 2, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 2, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 3, 3, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 2, 4, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 0, 2, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 3, 3, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 4, 2, 0, 3, 3, 0]] \$

[y₁, y₂, y₅, 0, 0, 0, y₃, y₄, y₅, y₆, y₇, 0]

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 2, 2, 4] , [0, 0, 0, 2, 4, 2, 0, 0, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

[0, 0, 0, y₂, y₁, y₄, y₃, y₃, 0, y₅, y₇, y₆]

$$p = s^5 - s^8$$

1906 . Coloring, {2, 4, 5, 6, 7, 8, 11, 12}

$$\Omega p(\Delta)=0: p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, B, B, C, 4, 9]

B: [6, 7, 8, 6, A, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 2, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 2, 0, 2, 4, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 2, 0, 2, 2, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 2, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 0, 2, 3, 3, 2]] \$

$$[0, 0, 2y_4, y_6, 0, 0, y_5, y_4, y_1, y_2, y_3, y_7]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 0, 0, 2, 2, 1, 1, 0, 2, 2, 2], [2, 2, 0, 0, 2, 2, 2, 0, 0, 4, 1, 1], [1, 4, 0, 0, 1, 2, 2, 0, 0, 4, 2, 0], [2, 4, \\ & 0, 0, 0, 1, 4, 0, 0, 3, 2, 0], [2, 3, 0, 0, 0, 2, 4, 0, 0, 1, 4, 0], [4, 1, 0, 0, 0, 2, 3, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 4, \\ & 1, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 4, 2, 0, 0, 4, 1, 0], [1, 4, 0, 0, 0, 3, 2, 0, 0, 4, 2, 0]] \$ \end{aligned}$$

$$[y_1, y_2, 0, 0, y_6, y_3, y_4, y_7, 0, y_8, y_5, y_9]$$

1907 . Coloring, {2, 4, 5, 6, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, C, C, 2, 4, 5]

B: [6, 7, 8, 6, A, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	6 vs 8

Omega Rank for R : cycles: {{2, 3, 5, 7, 8, 10, 12}} order: 7

See Matrix

$$\begin{aligned} \$ [& [0, 2, 2, 2, 2, 0, 3, 1, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 4, 2, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 2, 2, 0, 4, 0, 2], [0, 4, \\ & 1, 0, 2, 0, 2, 3, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 1, 4, 0, 2, 0, 3], [0, 2, 2, 0, 3, 0, 2, 2, 0, 1, 0, 4], [0, 1, 3, 0, 4, 0, \\ & 2, 2, 0, 2, 0, 2], [0, 2, 4, 0, 2, 0, 3, 1, 0, 2, 0, 2]] \$ \end{aligned}$$

$$[0, y_2, y_3, y_4, y_5, 0, y_6, y_7, 0, y_8, 0, y_1]$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 0, 0, 0, 0, 2, 1, 1, 2, 2, 4, 2], [4, 0, 0, 0, 0, 2, 0, 0, 2, 2, 4, 2], [4, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 2], [2, 0, \\ & 0, 0, 0, 4, 0, 0, 2, 4, 2, 2], [2, 0, 0, 0, 0, 2, 0, 0, 2, 4, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 4], [2, 0, 0, 0, 0, 2, \\ & 0, 0, 4, 2, 4, 2], [4, 0, 0, 0, 0, 2, 0, 0, 2, 2, 4, 2]] \$ \end{aligned}$$

$$[y_4 - 2y_3 - y_2 - y_1 + y_6 + y_5, 0, 0, 0, 0, y_4, y_3, y_3, y_2, y_1, y_6, y_5]$$

$$p = -s^2 + s^8 \quad p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1908 . Coloring, {2, 4, 5, 6, 7, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, C, C, 2, 1, 9]

B: [6, 7, 8, 6, A, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 2, 0, 2], [0, 2, 0, 0, 0, 0, 4, 2, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 0, 2, 3, 4, 0, 4], [0, 4, 0, 0, 0, 0, 3, 4, 0, 0, 5], [0, 0, 0, 0, 0, 0, 4, 5, 0, 0, 7], [0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[y_2, y_3, y_2, 0, 0, 0, y_1, y_7, y_5, y_6, 0, y_4]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 2, 4, 2], [0, 0, 0, 4, 2, 2, 0, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 4, 0, 0, 0, 4, 0, 4], [0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 6, 0, 6], [0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 6, 0, 6]] \$$$

$$[0, 0, 0, y_1, y_2, y_3, y_4, y_4, 0, y_5, y_6, y_7]$$

$$p = s^5 - s^8$$

1909 . Coloring, {2, 4, 5, 6, 7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, C, C, C, 4, 9]

B: [6, 7, 8, 6, A, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$$\begin{aligned} \$ [& [0, 0, 2, 2, 0, 0, 3, 1, 2, 2, 0, 4], [0, 0, 0, 0, 0, 0, 4, 0, 4, 3, 0, 5], [0, 0, 0, 0, 0, 0, 0, 0, 5, 4, 0, 7], [0, 0, \\ & 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, \\ & 0, 0, 9, 0, 0, 7]] \$ \end{aligned}$$

$$[0, 0, 2y_2, 2y_2, 0, 0, y_1, y_2, y_3, y_5, 0, y_4]$$

$$p = -s^4 + s^6 \quad p' = -s^4 + s^6$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 0, 0, 2, 2, 1, 1, 0, 2, 4, 0], [4, 2, 0, 0, 0, 2, 2, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 4, 2, 0, 0, 2, 2, 0], [2, 2, \\ & 0, 0, 0, 2, 4, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 2, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 2, 4, 0, 0, 2, 2, 0], [2, 2, 0, 0, 0, 4, \\ & 2, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 2, 2, 0, 0, 4, 2, 0]] \$ \end{aligned}$$

$$[y_1, y_2, 0, 0, 2y_6, y_7, y_5, y_6, 0, y_3, y_4, 0]$$

$$p = -s^2 + s^8$$

1910 . Coloring, {2, 4, 5, 6, 7, 10, 11, 12}

R: [7, 8, 7, 7, 3, 3, A, C, B, 2, 4, 9]

B: [6, 7, 8, 6, A, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 7, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 2, 1, 1], [0, 2, 0, 1, 0, 0, 4, 2, 1, 3, 2, 1], [0, 3, 0, 2, 0, 0, 1, 2, 1, 4, 1, 2], [0, 4, 0, 1, 0, 0, 2, 3, 2, 1, 1, 2], [0, 1, 0, 1, 0, 0, 1, 4, 2, 2, 2, 3], [0, 2, 0, 2, 0, 0, 1, 1, 3, 1, 2, 4], [0, 1, 0, 2, 0, 0, 2, 2, 4, 1, 3, 1], [0, 1, 0, 3, 0, 0, 2, 1, 1, 2, 4, 2], [0, 2, 0, 4, 0, 0, 3, 1, 2, 2, 1, 1]] \$$

$[0, y_1, y_3, y_2, 0, 0, y_5, y_4, y_7, y_6, y_9, y_8]$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 2, 3, 3], [3, 0, 0, 0, 3, 2, 0, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 3, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$$

$[y_1, 0, 0, 0, y_5, y_4, y_3, y_3, 0, y_2, y_6, y_7]$

$$p = s^5 - s^8$$

1911 . Coloring, $\{2, 4, 5, 6, 8, 9, 10, 11\}$

R: [7, 8, 7, 7, 3, 3, B, B, C, 2, 4, 5]

B: [6, 7, 8, 6, A, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 0, 3, 1] , [0, 0, 2, 3, 1, 0, 4, 2, 0, 0, 4, 0] , [0, 0, 1, 4, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, 2y_6, y_5, y_4, y_3, 0, y_2, 2y_3 - 3y_6, 0, 0, y_1, y_6]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 5] , [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 3, 3] , [3, 0, 0, 0, 2, 0, 0, 3, 1, 5, 2] , [5, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 1] , [3, 0, 0, 0, 0, 5, 0, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 3, 0, 0, 2, 5, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 5]] \$

$$[y_1, 0, 0, 0, 0, y_2, y_3, y_3, y_4, y_5, y_6, y_7]$$

$$p = -s^2 + s^8$$

1912 . Coloring, {2, 4, 5, 6, 8, 9, 10, 12}

R: [7, 8, 7, 7, 3, 3, B, B, C, 2, 1, 9]

B: [6, 7, 8, 6, A, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 0, 3, 1] , [3, 0, 0, 0, 0, 0, 4, 2, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 1] , [6, 0, 0, 0, 0, 4, 0, 1, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 6, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 3, 0, 1, 0, 6, 2] , [6, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 1] , [3, 0, 0, 0, 0, 0, 6, 0, 1, 0, 4, 2]] \$

$$[-6y_4 - 3y_3 - 3y_2 + 13y_1 - 3y_6 + 13y_5, 3y_4, 3y_4, 0, 0, 0, 3y_3, 3y_2, 3y_1, 0, 3y_6, 3y_5]$$

$$p' = -s^3 - s^4 + s^6 + s^7 \quad p = -s^3 + s^5 + s^6 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 4, 1, 3], [0, 0, 0, 1, 3, 2, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$$

$$[0, 0, 0, y_3, y_2, y_1, y_5, y_5, 0, y_4, y_5, y_6]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

1913 . Coloring, {2, 4, 5, 6, 8, 9, 11, 12}

R: [7, 8, 7, 7, 3, 3, B, B, C, C, 4, 9]

B: [6, 7, 8, 6, A, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 7	6 vs 9

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 0, 3, 3], [0, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4, 3], [0, 0, 0, 4, 0, 0, 4, 0, 3, 0, 3, 2], [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 3, 3]] \$$$

$$[0, 0, 10y_2, -5y_1 - 15y_2 + 11y_5 - 5y_3 + 11y_4, 0, 0, 5y_1, 5y_2, 5y_5, 0, 5y_3, 5y_4]$$

$$p = s^2 - s^4 - s^5 + s^7 \quad p = -s^2 - s^3 + s^5 + s^6$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 1, 1, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 2, 2, 0, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 1, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$

$$[y_5 + y_6, y_1, 0, 0, y_5 - y_6 + y_3, y_3, y_4, y_5, 0, y_2, y_5, y_6]$$

$$p = s^4 - s^7 \quad p' = s^4 - s^7 \quad p'' = s^5 - s^8$$

1914 . Coloring, {2, 4, 5, 6, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, B, B, 2, 4, 9]

B: [6, 7, 8, 6, A, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	5 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 4, 2, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0] , [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 6, 0, 0, 0, 4, 0]] \$

$$[0, y_5, y_5, y_4, 0, 0, y_3, y_2, y_5, 0, y_1, 0]$$

$$p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[2y_3, 0, 0, 0, y_1, y_2, y_3, y_3, 0, y_4, 0, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

1915 . Coloring, {2, 4, 5, 6, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, B, C, C, 2, 4, 9]

B: [6, 7, 8, 6, A, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 0, 2, 2], [0, 0, 0, 2, 0, 0, 4, 2, 2, 0, 3, 3], [0, 0, 0, 3, 0, 0, 2, 0, 3, 0, 4, 4], [0, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2, 3], [0, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3, 4], [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 2, 4], [0, 0, 0, 2, 0, 0, 4, 0, 4, 0, 3, 3]] \$$$

$$[0, 7y_1 + 7y_2 - 9y_3 - 9y_4 + 7y_5 - 9y_6, 7y_1 + 7y_2 - 9y_3 - 9y_4 + 7y_5 - 9y_6, 2y_1, 0, 0, 2y_2, 2y_3, 2y_4, 0, 2y_5, 2y_6]$$

$$p = -s^3 + s^5 + s^6 - s^8 \quad p = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 4, 2, 2], [2, 0, 0, 0, 2, 2, 0, 0, 0, 5, 1, 4], [1, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 5], [0, 0, 0, 0, 5, 1, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$$$

$$[y_7, 0, 0, 0, y_6, y_4, y_5, y_5, 0, y_3, y_2, y_1]$$

$$p = s^5 - s^8$$

1916 . Coloring, {2, 4, 5, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, A, B, C, 2, 4, 5]

B: [6, 7, 8, 6, A, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 1, 1] , [0, 3, 2, 1, 1, 0, 3, 2, 0, 3, 1, 0] , [0, 3, 1, 1, 0, 0, 3, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 3, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 2, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 3, 2, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 3, 3, 0, 3, 2, 0]] \$

$$[0, y_1 + y_2 - y_3 - y_4 + y_5 + y_6 - y_7 + y_8, y_1, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 9, 11, 12}} order: 7

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 3, 3] , [3, 0, 2, 0, 0, 2, 0, 1, 3, 0, 3, 2] , [3, 0, 2, 0, 0, 3, 0, 2, 2, 0, 3, 1] , [3, 0, 3, 0, 0, 3, 0, 2, 1, 0, 2, 2] , [2, 0, 3, 0, 0, 3, 0, 3, 2, 0, 1, 2] , [1, 0, 3, 0, 0, 2, 0, 3, 2, 0, 2, 3] , [2, 0, 2, 0, 0, 1, 0, 3, 3, 0, 2, 3] , [2, 0, 1, 0, 0, 2, 0, 2, 3, 0, 3, 3] , [3, 0, 2, 0, 0, 2, 0, 1, 3, 0, 3, 2]] \$

$$[y_1, 0, y_2, 0, 0, y_3, y_6, y_4, y_5, y_6, y_7, y_8]$$

$$p = -s^2 + s^9$$

1917 . Coloring, {2, 4, 5, 7, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, A, B, C, 2, 1, 9]

B: [6, 7, 8, 6, A, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}, {9, 12}} order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 3, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 1, 3, 2, 3, 2, 1], [2, 3, 0, 0, 0, 0, 1, 3, 1, 1, 3, 2], [3, 1, 0, 0, 0, 0, 2, 3, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 3, 1, 1, 2, 3, 2], [3, 2, 0, 0, 0, 0, 3, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 3, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 1, 3, 2, 3, 2, 1]] \$$

$[3 y_7, 3 y_6, 3 y_5, 0, 0, 0, 3 y_4, 3 y_3, 3 y_2, -3 y_7 - 3 y_5 - 3 y_3 + 8 y_2 + 5 y_1, -3 y_6 - 3 y_4 + 5 y_2 + 8 y_1, 3 y_1]$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 0, 1, 0, 2, 1, 2], [0, 0, 2, 1, 2, 3, 0, 2, 0, 3, 0, 3], [0, 0, 3, 0, 3, 1, 0, 2, 0, 2, 0, 5], [0, 0, 1, 0, 5, 0, 0, 3, 0, 3, 0, 4], [0, 0, 0, 0, 4, 0, 0, 1, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 0], [0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$$

$[0, 0, y_5, y_4, y_3, y_2, y_1, y_9, 0, y_8, y_7, y_6]$

1918 . Coloring, {2, 4, 5, 7, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, A, B, C, C, 4, 9]

B: [6, 7, 8, 6, A, 3, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 1, 3], [0, 0, 0, 1, 0, 0, 3, 0, 3, 3, 1, 5], [0, 0, 0, 1, 0, 0, 1, 0, 5, 3, 0, 6], [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[0, 0, y_6 , y_1 , 0, 0, y_2 , y_6 , y_7 , y_5 , y_3 , y_4]

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{1, 2, 3, 5, 6, 7, 8, 10, 11, 12}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 3, 1], [3, 1, 2, 0, 1, 2, 2, 1, 0, 2, 1, 1], [1, 2, 2, 0, 1, 3, 1, 2, 0, 1, 2, 1], [2, 1, 3, 0, 1, 1, 2, 2, 0, 1, 1, 2], [1, 1, 1, 0, 2, 2, 1, 3, 0, 1, 2, 2], [2, 1, 2, 0, 2, 1, 1, 1, 0, 2, 1, 3], [1, 2, 1, 0, 3, 2, 1, 2, 0, 2, 1, 1], [1, 2, 2, 0, 1, 1, 2, 1, 0, 3, 1, 2], [1, 3, 1, 0, 2, 1, 2, 2, 0, 1, 2, 1], [2, 1, 1, 0, 1, 1, 3, 1, 0, 2, 2, 2]] \$

[y_2 , y_1 , y_{10} , 0, y_9 , y_7 , y_8 , y_6 , 0, y_5 , y_4 , y_3]

1919 . Coloring, {2, 4, 5, 7, 8, 10, 11, 12}

R: [7, 8, 7, 7, 3, A, A, B, B, 2, 4, 9]

B: [6, 7, 8, 6, A, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 3, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 2, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 3, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 2, 3, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 3, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 3, 2, 0, 3, 3, 0]] \$

$$[0, y_1, y_2, y_6, 0, 0, y_3, y_5, 2y_2, y_4, y_7, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 2, 4] , [2, 0, 2, 0, 4, 2, 0, 1, 0, 2, 1, 2] , [1, 0, 2, 0, 2, 2, 0, 2, 0, 4, 0, 3] , [0, 0, 2, 0, 3, 1, 0, 2, 0, 2, 0, 6] , [0, 0, 1, 0, 6, 0, 0, 2, 0, 3, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 1, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5]] \$

$$[y_2, 0, y_1, 0, y_6, y_5, y_4, y_3, 0, y_9, y_7, y_8]$$

1920 . Coloring, {2, 4, 5, 7, 9, 10, 11, 12}

R: [7, 8, 7, 7, 3, A, A, C, C, 2, 4, 9]

B: [6, 7, 8, 6, A, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 3, 2, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 0, 3, 3, 3, 0, 4] , [0, 3, 0, 0, 0, 0, 3, 4, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 3, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, y_6, y_4, 2y_4, 0, 0, y_5, y_3, y_1, y_2, 0, y_7]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 8, 11}, {5, 10, 12}}

See Matrix

$$\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 4, 2], [4, 0, 2, 0, 2, 2, 0, 1, 0, 2, 2, 1], [2, 0, 2, 0, 1, 4, 0, 2, 0, 2, 1, 2], [1, 0, 4, 0, 2, 2, 0, 2, 0, 1, 2, 2], [2, 0, 2, 0, 2, 1, 0, 4, 0, 2, 2, 1], [2, 0, 1, 0, 1, 2, 0, 2, 0, 2, 4, 2], [4, 0, 2, 0, 2, 2, 0, 1, 0, 1, 2, 2], [2, 0, 2, 0, 2, 4, 0, 2, 0, 2, 1, 1], [1, 0, 4, 0, 1, 2, 0, 2, 0, 2, 2, 2]] \$$$

$$[-5y_4 + 11y_1 - 5y_2 - 5y_3 - 5y_5 + 11y_6 - 5y_7 + 11y_8, 0, 5y_4, 0, 5y_1, 5y_2, 5y_3, 5y_5, 0, 5y_6, 5y_7, 5y_8]$$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

1921 . Coloring, {2, 4, 5, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, A, B, B, C, 2, 4, 9]

B: [6, 7, 8, 6, A, 3, A, C, B, C, 1, 5]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 3, 2, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 3, 1, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1]] \$$$

$$[0, 3y_6, 3y_7, 3y_5, 0, 0, 3y_4, 3y_2, 3y_3, 3y_7, -3y_6 - 3y_5 - 3y_4 - 3y_2 + 13y_3 - 6y_7 + 13y_1, 3y_1]$$

$$p' = s^4 + s^5 - s^7 - s^8 \quad p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 0, 1, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 1, 0, 2, 0, 3, 0, 4] , [0, 0, 1, 0, 4, 0, 0, 2, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 1, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_1, 0, y_2, 0, y_4, y_3, y_7, y_5, 0, y_8, y_7, y_6]$$

$$p = s^6 - s^9$$

1922 . Coloring, {2, 4, 6, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, A, B, C, 2, 4, 5]

B: [6, 7, 8, 6, 3, A, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 1, 1] , [0, 3, 0, 1, 1, 0, 3, 2, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 1, 3, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 1, 5, 0, 1, 3, 0] , [0, 1, 0, 3, 0, 0, 2, 4, 0, 1, 5, 0] , [0, 1, 0, 5, 0, 0, 3, 1, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 5, 1, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 0, 4, 2, 0, 5, 1, 0] , [0, 5, 0, 1, 0, 0, 1, 3, 0, 4, 2, 0]] \$

$$[0, 2y_2 + y_7 - y_6 - y_5 + y_4 + y_3 - y_1, y_2, y_7, y_6, 0, y_5, y_4, 0, y_3, y_1, y_2]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 1, 3, 2, 3, 2] , [3, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 3, 0, 0, 3, 3, 2, 2] , [2, 0, 0, 0, 0, 3, 0, 0, 2, 3, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 3] , [2, 0, 0, 0, 0, 3, 0, 0, 3, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 3, 3, 2] , [3, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 3]] \$

$$[y_1, 0, y_2, 0, 0, y_5, y_2, y_3, y_4, y_8, y_7, y_6]$$

$$p = s^3 - s^9$$

1923 . Coloring, {2, 4, 6, 7, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, 3, A, B, C, 2, 1, 9]

B: [6, 7, 8, 6, 3, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {1, 2, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 3, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 1, 3, 2, 3, 2, 1], [2, 3, 0, 0, 0, 0, 1, 3, 1, 1, 3, 2], [3, 1, 0, 0, 0, 0, 2, 3, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 3, 1, 1, 2, 3, 2], [3, 2, 0, 0, 0, 0, 3, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 3, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 1, 3, 2, 3, 2, 1]] \$$$

$$[-3y_1 - 3y_7 + 8y_3 - 3y_4 + 5y_6, -3y_2 + 5y_3 - 3y_5 + 8y_6, 3y_1, 0, 0, 0, 3y_2, 3y_7, 3y_3, 3y_4, 3y_5, 3y_6]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 0, 1, 0, 2, 1, 2], [0, 0, 3, 1, 2, 3, 0, 2, 0, 2, 0, 3], [0, 0, 2, 0, 3, 1, 0, 3, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 0, 2, 0, 1, 0, 6], [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3], [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3], [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6]] \$$$

$$[0, 0, y_5, y_1, y_2, y_3, y_4, y_6, 0, y_7, y_8, y_9]$$

1924 . Coloring, {2, 4, 6, 7, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 7, 7, A, 3, A, B, C, C, 4, 9]

B: [6, 7, 8, 6, 3, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 3, 0, 3, 3, 1, 5] , [0, 0, 0, 1, 0, 0, 1, 0, 5, 3, 0, 6] , [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, 0, y_3, y_2, 0, 0, y_1, y_3, y_6, y_7, y_4, y_5]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}, {1, 2, 6, 7, 10, 11}} order: 12

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 2, 1, 0, 2, 1, 1] , [1, 2, 1, 0, 1, 3, 1, 2, 0, 2, 2, 1] , [2, 2, 1, 0, 1, 1, 2, 1, 0, 3, 1, 2] , [1, 3, 1, 0, 2, 2, 2, 1, 0, 1, 2, 1] , [2, 1, 2, 0, 1, 1, 3, 1, 0, 2, 2, 1] , [2, 2, 1, 0, 1, 2, 1, 2, 0, 1, 3, 1] , [3, 1, 1, 0, 1, 2, 2, 1, 0, 2, 1, 2] , [1, 2, 1, 0, 2, 3, 1, 1, 0, 2, 2, 1] , [2, 2, 2, 0, 1, 1, 2, 1, 0, 3, 1, 1]] \$

$$[33 y_2 - 2 y_4 + 33 y_6 - 2 y_5 - 13 y_1 - 13 y_3 - 13 y_7, 2 y_1, -5 y_1 + 13 y_2 - 5 y_3 + 13 y_6 - 5 y_7 - 2 y_8, 0, 2 y_2, 2 y_3, 2 y_4, 2 y_6, 0, 2 y_5, 2 y_7, 2 y_8]$$

$$p = -s - s^3 + s^7 + s^9 \quad p' = -s - s^3 + s^7 + s^9$$

1925 . Coloring, {2, 4, 6, 7, 8, 10, 11, 12}

R: [7, 8, 7, 7, A, 3, A, B, B, 2, 4, 9]

B: [6, 7, 8, 6, 3, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 3, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 2, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 3, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 2, 3, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 3, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 3, 2, 0, 3, 3, 0]] \$

$$[0, y_6, y_7, y_1, 0, 0, y_2, y_3, 2y_7, y_4, y_5, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 2, 4] , [2, 0, 2, 0, 4, 2, 0, 1, 0, 2, 1, 2] , [1, 0, 4, 0, 2, 2, 0, 2, 0, 2, 0, 3] , [0, 0, 2, 0, 3, 1, 0, 4, 0, 2, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 2, 0, 1, 0, 6] , [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3] , [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6]] \$

$$[y_2, 0, y_3, 0, y_1, y_5, y_6, y_7, 0, y_4, y_8, y_9]$$

1926 . Coloring, {2, 4, 6, 7, 9, 10, 11, 12}

R: [7, 8, 7, 7, A, 3, A, C, C, 2, 4, 9]

B: [6, 7, 8, 6, 3, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 3, 2, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 0, 3, 3, 3, 0, 4] , [0, 3, 0, 0, 0, 0, 3, 4, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 3, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[0, y₂, y₁, 2 y₁, 0, 0, y₇, y₆, y₅, y₄, 0, y₃]

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 8, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 4, 2] , [4, 0, 2, 0, 2, 2, 0, 1, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 4, 0, 2, 0, 2, 1, 2] , [1, 0, 1, 0, 2, 2, 0, 2, 0, 4, 2, 2] , [2, 0, 2, 0, 2, 1, 0, 1, 0, 2, 2, 4] , [2, 0, 2, 0, 4, 2, 0, 2, 0, 1, 1, 2] , [1, 0, 4, 0, 2, 2, 0, 2, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 1, 0, 4, 0, 2, 2, 2] , [2, 0, 1, 0, 2, 2, 0, 2, 0, 1, 4, 2]] \$

[y₁, 0, y₆, 0, y₅, y₂, y₃, y₄, 0, y₇, y₈, y₉]

1927 . Coloring, {2, 4, 6, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, 3, B, B, C, 2, 4, 9]

B: [6, 7, 8, 6, 3, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	5 vs 9

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 3, 2, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 1, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1]] \$

$[0, -6y_5 - 3y_1 - 3y_2 - 3y_3 + 13y_4 - 3y_6 + 13y_7, 3y_5, 3y_1, 0, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7]$

$$p = s^4 + s^5 - s^7 - s^8 \quad p' = s^4 + s^5 - s^7 - s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 2, 0, 1, 0, 3, 0, 4], [0, 0, 3, 0, 4, 1, 0, 2, 0, 2, 0, 4], [0, 0, 4, 0, 4, 0, 0, 3, 0, 1, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4], [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 0, 4]] \$$

$$[-y_3 + y_4 + y_5, 0, y_2, 0, y_3, -y_2 + y_4, y_5, y_4 + y_5 - y_1, 0, y_1, y_5, y_4]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7 \quad p = -s^5 + s^8 \quad p = -s^5 + s^9$$

1928 . Coloring, $\{2, 4, 7, 8, 9, 10, 11, 12\}$

R: $[7, 8, 7, 7, A, A, A, B, C, 2, 4, 9]$

B: $[6, 7, 8, 6, 3, 3, B, C, B, C, 1, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 7, 8, 10, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 2, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 0, 1, 4, 2, 2, 2, 1], [0, 2, 0, 2, 0, 0, 1, 3, 1, 1, 4, 2], [0, 1, 0, 4, 0, 0, 2, 2, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 4, 1, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 3, 1, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 2, 2, 1, 3, 1, 2]] \$$

$$[0, 3y_2, 0, 3y_1, 0, 0, -3y_2 + 5y_6 - 3y_4 + 8y_3, -3y_1 + 8y_6 - 3y_5 + 5y_3, 3y_6, 3y_5, 3y_4, 3y_3]$$

$$p' = -s + s^7 \quad p = -s + s^7$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8

See Matrix

\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 0, 3, 3] , [3, 0, 4, 0, 3, 2, 0, 2, 0, 0, 1, 1] , [1, 0, 5, 0, 1, 3, 0, 4, 0, 0, 0, 2] , [0, 0, 4, 0, 2, 1, 0, 5, 0, 0, 0, 4] , [0, 0, 3, 0, 4, 0, 0, 4, 0, 0, 0, 5] , [0, 0, 4, 0, 5, 0, 0, 3, 0, 0, 0, 4] , [0, 0, 5, 0, 4, 0, 0, 4, 0, 0, 0, 3] , [0, 0, 4, 0, 3, 0, 0, 5, 0, 0, 0, 4]] \$

$$[-y_1 + y_2 + y_5 - y_3 + y_4 + y_6 - y_7, 0, y_1, 0, y_2, y_5, y_3, y_4, 0, 0, y_6, y_7]$$

$$p = -s^5 + s^6 - s^7 + s^8$$

1929 . Coloring, {2, 5, 6, 7, 8, 9, 10, 11}

R: [7, 8, 7, 6, 3, 3, A, B, C, 2, 4, 5]

B: [6, 7, 8, 7, A, A, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 8

Omega Rank for R : cycles: {{2, 3, 4, 6, 7, 8, 10, 11}} order: 8

See Matrix

\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 1, 1] , [0, 2, 3, 1, 1, 2, 2, 2, 0, 2, 1, 0] , [0, 2, 3, 1, 0, 1, 3, 2, 0, 2, 2, 0] , [0, 2, 1, 2, 0, 1, 3, 2, 0, 3, 2, 0] , [0, 3, 1, 2, 0, 2, 1, 2, 0, 3, 2, 0] , [0, 3, 2, 2, 0, 2, 1, 3, 0, 1, 2, 0] , [0, 1, 2, 2, 0, 2, 2, 3, 0, 1, 3, 0] , [0, 1, 2, 3, 0, 2, 2, 1, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 3, 2, 1, 0, 2, 1, 0] , [0, 2, 3, 1, 0, 3, 2, 2, 0, 2, 1, 0]] \$

$$[0, y_9, y_9 - y_7 + y_8 + y_6 + y_4 - y_5 - y_2 + y_3 - y_1, y_7, y_8, y_6, y_4, y_5, 0, y_2, y_3, y_1]$$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9 - s^{10}$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 4, 3] , [4, 0, 0, 0, 0, 3, 0, 0, 3, 2, 3, 1] , [3, 0, 0, 0, 0, 4, 0, 0, 1, 3, 3, 2] , [3, 0, 0, 0, 0, 3, 0, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 3, 0, 0, 3, 3, 2, 4] , [2, 0, 0, 0, 0, 1, 0, 0, 4, 3, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 4, 3]] \$

$$[y_7, 0, 0, 0, 0, y_6, 2y_5, y_5, y_4, y_3, y_2, y_1]$$

$$p = -s^2 + s^8$$

1930 . Coloring, {2, 5, 6, 7, 8, 9, 10, 12}

R: [7, 8, 7, 6, 3, 3, A, B, C, 2, 1, 9]

B: [6, 7, 8, 7, A, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	4 vs 8

Omega Rank for R : cycles: {{9, 12}, {1, 2, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 1, 1], [1, 2, 1, 0, 0, 0, 4, 2, 1, 2, 1, 2], [1, 2, 0, 0, 0, 0, 2, 2, 2, 4, 2, 1], [2, 4, 0, 0, 0, 0, 1, 2, 1, 2, 2, 2], [2, 2, 0, 0, 0, 0, 2, 4, 2, 1, 2, 1], [2, 1, 0, 0, 0, 0, 2, 2, 1, 2, 4, 2], [4, 2, 0, 0, 0, 0, 2, 1, 2, 2, 2, 1], [2, 2, 0, 0, 0, 0, 4, 2, 1, 2, 1, 2], [1, 2, 0, 0, 0, 0, 2, 2, 2, 4, 2, 1], [2, 4, 0, 0, 0, 0, 1, 2, 1, 2, 2, 2]] \$$$

$$[-3y_1 - 3y_4 + 8y_5 - 3y_6 + 5y_8, -3y_2 - 3y_3 + 5y_5 - 3y_7 + 8y_8, 3y_1, 0, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8]$$

$$p = -s^3 + s^9 \quad p' = -s^3 + s^9$$

Omega Rank for B : cycles: {{4, 7, 11}, {5, 10, 12}} order: 3

See Matrix

$$\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 2, 0, 0, 3, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 2, 0, 0, 3, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 2, 3]] \$$$

$$[0, 0, 0, 3y_4, 3y_3, 3y_2, 3y_1, 3y_2, 0, 3y_3, -3y_4 + 7y_3 + 7y_2 - 3y_1, 3y_3 + 3y_2]$$

$$p' = -s^4 + s^7 \quad p' = -s^3 + s^6 \quad p' = -s^2 + s^5 \quad p = s^2 - s^5$$

1931 . Coloring, {2, 5, 6, 7, 8, 9, 11, 12}

R: [7, 8, 7, 6, 3, 3, A, B, C, C, 4, 9]

B: [6, 7, 8, 7, A, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 1, 3] , [0, 0, 1, 1, 0, 2, 2, 0, 3, 2, 1, 4] , [0, 0, 2, 1, 0, 1, 1, 0, 4, 2, 0, 5] , [0, 0, 1, 0, 0, 1, 2, 0, 5, 1, 0, 6] , [0, 0, 1, 0, 0, 0, 1, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[0, 0, y_1 , y_2 , 0, y_3 , y_4 , y_5 , y_6 , y_7 , y_8 , y_9]

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 2, 2, 0, 0, 3, 2, 1] , [2, 3, 0, 0, 1, 3, 2, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 3, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 4, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 2, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 4, 2, 0, 0, 3, 2, 0]] \$

[y_1 , y_2 , 0, 0, y_5 , y_3 , y_4 , y_6 , 0, y_7 , y_8 , y_9]

1932 . Coloring, {2, 5, 6, 7, 8, 10, 11, 12}

R: [7, 8, 7, 6, 3, 3, A, B, B, 2, 4, 9]

B: [6, 7, 8, 7, A, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	9 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{2, 3, 4, 6, 7, 8, 10, 11\}\}$ order: 8
See Matrix

$\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 2, 0], [0, 2, 1, 2, 0, 2, 2, 2, 0, 2, 3, 0], [0, 2, 2, 3, 0, 2, 1, 2, 0, 2, 2, 0], [0, 2, 2, 2, 0, 3, 2, 2, 0, 1, 2, 0], [0, 1, 3, 2, 0, 2, 2, 2, 0, 2, 2, 0], [0, 2, 2, 2, 0, 2, 3, 1, 0, 2, 2, 0], [0, 2, 2, 2, 0, 2, 2, 2, 0, 3, 1, 0], [0, 3, 2, 1, 0, 2, 2, 2, 0, 2, 2, 0], [0, 2, 2, 2, 0, 1, 2, 3, 0, 2, 2, 0]] \$$

$[0, y_5, y_6, y_4, 0, y_7, y_9, y_8, y_3, y_1, y_2, 0]$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6
See Matrix

$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 2, 4], [2, 0, 0, 0, 4, 2, 0, 0, 0, 3, 2, 3], [2, 0, 0, 0, 3, 2, 0, 0, 0, 6, 0, 3], [0, 0, 0, 0, 3, 2, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$

$[y_1, 0, 0, 0, y_4, y_2, 2y_3, y_3, 0, y_5, y_6, y_7]$

$$p = -s^5 + s^8$$

1933 . Coloring, $\{2, 5, 6, 7, 9, 10, 11, 12\}$

R: [7, 8, 7, 6, 3, 3, A, C, C, 2, 4, 9]

B: [6, 7, 8, 7, A, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	9 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 8
See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 0, 2] , [0, 2, 1, 0, 0, 2, 2, 2, 2, 0, 3] , [0, 2, 2, 0, 0, 0, 1, 2, 3, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 2, 2, 4, 1, 0, 5] , [0, 1, 0, 0, 0, 0, 0, 2, 5, 2, 0, 6] , [0, 2, 0, 0, 0, 0, 0, 1, 6, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

$$[0, y_2, y_3, y_1, 0, y_4, y_5, y_6, y_8, y_7, 0, y_9]$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 2, 0, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 4, 0, 0, 0, 4, 0, 3] , [0, 0, 0, 0, 3, 3, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

$$[y_1, 0, 0, 0, y_5, y_3, 2y_4, y_4, 0, y_2, y_6, y_7]$$

$$p = -s^5 + s^8$$

1934 . Coloring, {2, 5, 6, 8, 9, 10, 11, 12}

R: [7, 8, 7, 6, 3, 3, B, B, C, 2, 4, 9]

B: [6, 7, 8, 7, A, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 8

Omega Rank for R : cycles: {{9, 12}, {3, 4, 6, 7, 11}} order: 10

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 3, 1] , [0, 0, 1, 3, 0, 2, 2, 2, 1, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 1, 0, 2, 0, 4, 1] , [0, 0, 3, 4, 0, 3, 2, 0, 1, 0, 1, 2] , [0, 0, 3, 1, 0, 4, 3, 0, 2, 0, 2, 1] , [0, 0, 4, 2, 0, 1, 3, 0, 1, 0, 3, 2] , [0, 0, 1, 3, 0, 2, 4, 0, 2, 0, 3, 1] , [0, 0, 2, 3, 0, 3, 1, 0, 1, 0, 4, 2] , [0, 0, 3, 4, 0, 3, 2, 0, 2, 0, 1, 1]] \$

$$[0, -3y_1 - 3y_2 - 3y_6 - 3y_3 - 3y_4 + 13y_5 - 3y_7 + 13y_8, 3y_1, 3y_2, 0, 3y_6, 3y_3, 3y_4, 3y_5, 0, 3y_7, 3y_8]$$

$$p = s^3 + s^4 - s^8 - s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$[y_1, 0, 0, 0, y_4, y_3, 2y_6, y_6, 0, y_2, y_6, y_5]$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

1935 . Coloring, {2, 5, 7, 8, 9, 10, 11, 12}

R: [7, 8, 7, 6, 3, A, A, B, C, 2, 4, 9]

B: [6, 7, 8, 7, A, 3, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 4, 6, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 2, 1, 2, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 1, 0, 3, 2, 3, 2, 1] , [0, 3, 0, 2, 0, 1, 0, 3, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 2, 0, 3, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 3, 0, 1, 1, 2, 3, 2] , [0, 2, 0, 3, 0, 3, 0, 1, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 3, 0, 2, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 1, 0, 3, 2, 3, 2, 1] , [0, 3, 0, 2, 0, 1, 0, 3, 1, 1, 3, 2]] \$

$[0, -3y_6 - 3y_4 + 5y_3 - 3y_2 + 8y_8, -3y_7 - 3y_5 + 8y_3 - 3y_1 + 5y_8, 3y_7, 0, 3y_6, 3y_4, 3y_5, 3y_3, 3y_1, 3y_2, 3y_8]$

$$p' = -s^3 + s^9 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3] , [3, 0, 1, 0, 3, 2, 0, 1, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 3, 0, 1, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 2, 0, 2, 0, 2, 0, 4] , [0, 0, 2, 0, 4, 0, 0, 3, 0, 3, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 2, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

$$[y_3, 0, y_2, 0, y_1, y_8, y_9, y_7, 0, y_6, y_5, y_4]$$

1936 . Coloring, {2, 6, 7, 8, 9, 10, 11, 12}

R: [7, 8, 7, 6, A, 3, A, B, C, 2, 4, 9]

B: [6, 7, 8, 7, 3, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	8 vs 9

Omega Rank for R : cycles: {{2, 3, 4, 6, 7, 8, 10, 11}, {9, 12}} order: 8

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1], [0, 3, 1, 1, 0, 2, 1, 2, 1, 2, 1, 2], [0, 2, 2, 1, 0, 1, 1, 3, 2, 1, 2, 1], [0, 1, 1, 2, 0, 1, 2, 2, 1, 1, 3, 2], [0, 1, 1, 3, 0, 2, 1, 1, 2, 2, 2, 1], [0, 2, 2, 2, 0, 3, 1, 1, 1, 1, 1, 2], [0, 1, 3, 1, 0, 2, 2, 2, 1, 1, 1], [0, 1, 2, 1, 0, 1, 3, 1, 1, 2, 2, 2], [0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1], [0, 3, 1, 1, 0, 2, 1, 2, 1, 2, 1, 2, 1, 2]] \$$$

$$[0, 3 y_7, 3 y_8, 3 y_6, 0, 3 y_5, 3 y_4, 3 y_2, 3 y_3, -3 y_8 - 3 y_6 - 3 y_2 + 8 y_3 + 5 y_1, -3 y_7 - 3 y_5 - 3 y_4 + 5 y_3 + 8 y_1, 3 y_1]$$

$$p' = -s + s^9 \quad p = -s + s^9$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 0, 1, 0, 1, 2, 2], [2, 0, 3, 0, 2, 3, 0, 2, 0, 2, 0, 2], [0, 0, 2, 0, 2, 0, 3, 0, 3, 0, 4], [0, 0, 2, 0, 4, 0, 0, 2, 0, 2, 0, 6], [0, 0, 4, 0, 6, 0, 0, 2, 0, 0, 0, 4], [0, 0, 6, 0, 4, 0, 0, 4, 0, 0, 0, 2], [0, 0, 4, 0, 2, 0, 0, 6, 0, 0, 0, 4], [0, 0, 2, 0, 4, 0, 0, 4, 0, 0, 0, 6]] \$$$

$$[y_5, 0, y_4, 0, y_3, y_2, y_1, -y_5 + y_4 - y_3 + y_2 - y_1 - y_8 + y_7 + y_6, 0, y_8, y_7, y_6]$$

$$p = -s^6 + s^7 - s^8 + s^9$$

1937 . Coloring, {3, 4, 5, 6, 7, 8, 9, 10}

R: [7, 7, 8, 7, 3, 3, A, B, C, 2, 1, 5]

B: [6, 8, 7, 6, A, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 9

See Matrix

\$ [[2, 2, 2, 0, 2, 0, 3, 1, 0, 2, 1, 1] , [1, 2, 2, 0, 1, 0, 4, 2, 0, 3, 1, 0] , [1, 3, 1, 0, 0, 0, 3, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 4, 1, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 0, 6, 0, 0, 4, 1, 0] , [1, 4, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[y_2, y_1, y_3, 0, y_4, 0, y_5, y_6, 0, y_8, y_7, y_9]$$

Omega Rank for B : cycles: {{4, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 0, 2, 1, 1, 2, 2, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3, 3] , [0, 0, 0, 3, 0, 3, 0, 0, 3, 2, 3, 2] , [0, 0, 0, 3, 0, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 3, 0, 0, 2, 3, 2, 3] , [0, 0, 0, 2, 0, 3, 0, 0, 3, 3, 2, 3] , [0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 3, 3] , [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 3, 3]] \$

$$[0, 0, 0, y_1 - 2y_3 - y_2 - y_4 + y_5 + y_6, 0, y_1, y_3, y_3, y_2, y_4, y_5, y_6]$$

$$p' = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 \quad p = s^2 - s^8$$

1938 . Coloring, {3, 4, 5, 6, 7, 8, 9, 11}

R: [7, 7, 8, 7, 3, 3, A, B, C, C, 4, 5]

B: [6, 8, 7, 6, A, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	8 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 5, 7, 8, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 2, 2, 2, 0, 3, 1, 0, 2, 1, 3], [0, 0, 2, 1, 3, 0, 2, 2, 0, 3, 1, 2], [0, 0, 3, 1, 2, 0, 1, 2, 0, 2, 2, 3], [0, 0, 2, 2, 3, 0, 1, 3, 0, 1, 2, 2], [0, 0, 3, 2, 2, 0, 2, 2, 0, 1, 3, 1], [0, 0, 2, 3, 1, 0, 2, 3, 0, 2, 2, 1], [0, 0, 1, 2, 1, 0, 3, 2, 0, 2, 3, 2], [0, 0, 1, 3, 2, 0, 2, 1, 0, 3, 2, 2]] \$$

$[0, 0, y_1, y_2, y_3, 0, y_5, y_4, 0, y_6, y_8, y_7]$

Omega Rank for B : cycles: $\{\{1, 2, 6, 8, 9, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 2, 0, 0, 0, 2, 1, 1, 2, 2, 3, 1], [3, 2, 0, 0, 0, 2, 0, 2, 1, 2, 3, 1], [3, 2, 0, 0, 0, 3, 0, 2, 1, 2, 1, 2], [1, 2, 0, 0, 0, 3, 0, 2, 2, 3, 1, 2], [1, 3, 0, 0, 0, 1, 0, 2, 2, 3, 2, 2], [2, 3, 0, 0, 0, 1, 0, 3, 2, 1, 2, 2], [2, 1, 0, 0, 0, 2, 0, 3, 2, 1, 2, 3], [2, 1, 0, 0, 0, 2, 0, 1, 3, 2, 2, 3], [2, 2, 0, 0, 0, 2, 0, 1, 3, 2, 3, 1]] \$$

$[y_1 + y_3 - y_2 - y_4 - y_5 - y_6 + y_7 + y_8, y_1, 0, 0, 0, y_3, y_2, y_4, y_5, y_6, y_7, y_8]$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

1939 . Coloring, $\{3, 4, 5, 6, 7, 8, 9, 12\}$

R: [7, 7, 8, 7, 3, 3, A, B, C, C, 1, 9]

B: [6, 8, 7, 6, A, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[2, 0, 2, 0, 0, 0, 3, 1, 2, 2, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 2, 3, 3, 1, 4] , [1, 0, 0, 0, 0, 0, 1, 0, 4, 2, 2, 6] , [2, 0, 0, 0, 0, 1, 0, 6, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 2, 0, 6, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[y₄, 0, y₃, 0, 0, 0, y₂, y₁, y₈, y₇, y₆, y₅]

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[0, 2, 0, 2, 2, 2, 1, 1, 0, 2, 3, 1] , [0, 2, 0, 3, 1, 2, 0, 2, 0, 4, 1, 1] , [0, 4, 0, 1, 1, 3, 0, 2, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 1, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 3, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 4, 0, 4, 0, 2]] \$

[0, y₉, 0, y₈, y₇, y₆, y₅, y₄, 0, y₃, y₂, y₁]

1940 . Coloring, {3, 4, 5, 6, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, B, B, 2, 4, 5]

B: [6, 8, 7, 6, A, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 0, 4, 2, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 0, 4, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 4, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$

$$[0, y_1, y_2, y_3, y_4, 0, y_5, y_6, 0, y_7, y_8, 0]$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 2, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 1, 5], [1, 0, 0, 0, 0, 2, 0, 0, 5, 2, 0, 6], [0, 0, 0, 0, 1, 0, 0, 6, 2, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$$

$$[y_1, 0, 0, 0, 0, y_1 + 2y_6 + y_5 + y_4 - y_3 - y_2, y_6, y_6, y_5, y_4, y_3, y_2]$$

$$p' = s^6 - s^7 \quad p = s^6 - s^8$$

1941 . Coloring, {3, 4, 5, 6, 7, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, B, B, 2, 1, 9]

B: [6, 8, 7, 6, A, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 2, 2, 0], [2, 2, 0, 0, 0, 0, 4, 2, 0, 3, 3, 0], [3, 3, 0, 0, 0, 0, 4, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$$$

$$[y_2, y_1, y_5, 0, 0, 0, y_7, y_6, y_5, y_4, y_3, 0]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 2, 2, 4] , [0, 0, 0, 2, 4, 2, 0, 0, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

[0, 0, 0, $y_4, y_3, y_2, y_1, y_1, 0, y_7, y_6, y_5$]

$$p = -s^5 + s^8$$

1942 . Coloring, {3, 4, 5, 6, 7, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, B, B, C, 4, 9]

B: [6, 8, 7, 6, A, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 2, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 2, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 2, 0, 2, 2, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 2, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 0, 2, 3, 3, 2] , [0, 0, 0, 3, 0, 0, 2, 0, 2, 4, 2, 3] , [0, 0, 0, 2, 0, 0, 3, 0, 3, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 3, 3, 2]] \$

[0, 0, $y_1, y_2, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8$]

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 1, 1, 0, 2, 2, 2] , [2, 2, 0, 0, 2, 2, 0, 2, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 1, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 4, 0, 3, 0, 2]] \$

[$y_2, y_1, 0, 0, y_3, y_4, y_5, y_8, 0, y_6, y_7, y_9$]

1943 . Coloring, {3, 4, 5, 6, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, C, C, 2, 4, 5]

B: [6, 8, 7, 6, A, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}, {3, 5, 8, 12}} order: 12

See Matrix

$$\begin{aligned} \$ [& [0, 2, 2, 2, 2, 0, 3, 1, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 4, 2, 0, 3, 0, 1], [0, 3, 2, 0, 1, 0, 2, 2, 0, 4, 0, 2], [0, 4, \\ & 1, 0, 2, 0, 3, 2, 0, 2, 0, 2], [0, 2, 2, 0, 2, 0, 4, 1, 0, 3, 0, 2], [0, 3, 2, 0, 2, 0, 2, 2, 0, 4, 0, 1], [0, 4, 2, 0, 1, 0, \\ & 3, 2, 0, 2, 0, 2], [0, 2, 1, 0, 2, 0, 4, 2, 0, 3, 0, 2]] \$ \end{aligned}$$

$$[0, 7 y_7, 7 y_5, 7 y_6, 7 y_4, 0, 7 y_3, 7 y_2, 0, -7 y_7 + 9 y_5 - 7 y_6 + 9 y_4 - 7 y_3 + 9 y_2 + 9 y_1, 0, 7 y_1]$$

$$p = -s^2 - s^3 - s^4 + s^6 + s^7 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 0, 0, 0, 0, 2, 1, 1, 2, 2, 4, 2], [4, 0, 0, 0, 0, 2, 0, 0, 2, 2, 4, 2], [4, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 2], [2, 0, \\ & 0, 0, 0, 4, 0, 0, 2, 4, 2, 2], [2, 0, 0, 0, 0, 2, 0, 0, 2, 4, 2, 4], [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 4], [2, 0, 0, 0, 0, 2, \\ & 0, 0, 4, 2, 4, 2], [4, 0, 0, 0, 0, 2, 0, 0, 2, 2, 4, 2]] \$ \end{aligned}$$

$$[y_6, 0, 0, 0, 0, y_5, y_4, y_4, y_3, y_2, y_1, y_6 - y_5 + 2 y_4 + y_3 + y_2 - y_1]$$

$$p = -s^2 + s^8 \quad p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1944 . Coloring, {3, 4, 5, 6, 7, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, C, C, 2, 1, 9]
B: [6, 8, 7, 6, A, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 2, 0, 2], [0, 2, 0, 0, 0, 0, 4, 2, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 2, 0, 3, 4, 0, 4], [0, 4, 0, 0, 0, 0, 3, 0, 4, 2, 0, 3], [0, 2, 0, 0, 0, 0, 4, 0, 3, 3, 0, 4], [0, 3, 0, 0, 0, 0, 2, 0, 4, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 2, 0, 4], [0, 2, 0, 0, 0, 0, 4, 0, 4, 3, 0, 3]] \$$

$$[7y_6 + 7y_5 - 9y_4 - 9y_3 + 7y_2 - 9y_1, 2y_6, 7y_6 + 7y_5 - 9y_4 - 9y_3 + 7y_2 - 9y_1, 0, 0, 0, 2y_5, 2y_4, 2y_3, 2y_2, 0, 2y_1]$$

$$p = s^3 - s^5 - s^6 + s^8 \quad p' = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 2, 4, 2], [0, 0, 0, 4, 2, 2, 0, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 4, 0, 0, 0, 4, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6]] \$$

$$[0, 0, 0, y_1, y_3, y_4, y_2, y_2, 0, y_7, y_5, y_6]$$

$$p = -s^5 + s^8$$

1945 . Coloring, {3, 4, 5, 6, 7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, C, C, C, 4, 9]

B: [6, 8, 7, 6, A, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	8 vs 9	5 vs 7	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 4

See Matrix

$\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 2, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 2, 4, 3, 0, 5] , [0, 0, 0, 0, 0, 0, 0, 0, 5, 2, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$$[0, 0, y_1 - y_2, y_1 - y_2, 0, 0, y_1, y_2, y_3, y_4, 0, y_5]$$

$$p' = -s^4 + s^6 \quad p = -s^4 + s^6$$

Omega Rank for B : cycles: {{1, 2, 6, 8, 10, 11}} order: 6

See Matrix

$\$ [[2, 2, 0, 0, 2, 2, 1, 1, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 4, 0, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 2, 0, 4, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 0, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 4, 0, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 0, 2, 0, 4, 2, 0]] \$$

$$[y_2, y_1, 0, 0, 2y_5, y_6, y_5, y_3, 0, y_4, y_7, 0]$$

$$p = -s^2 + s^8$$

1946 . Coloring, {3, 4, 5, 6, 7, 10, 11, 12}

R: [7, 7, 8, 7, 3, 3, A, C, B, 2, 4, 9]

B: [6, 8, 7, 6, A, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 9
See Matrix

\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 2, 1, 1] , [0, 2, 0, 1, 0, 0, 4, 2, 1, 3, 2, 1] , [0, 3, 0, 2, 0, 0, 3, 0, 1, 4, 1, 2] , [0, 4, 0, 1, 0, 0, 5, 0, 2, 3, 1, 0] , [0, 3, 0, 1, 0, 0, 5, 0, 0, 5, 2, 0] , [0, 5, 0, 2, 0, 0, 4, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 7, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 5, 0, 0, 7, 0, 0] , [0, 7, 0, 0, 0, 0, 4, 0, 0, 5, 0, 0]] \$

[0, y₂, y₁, y₉, 0, 0, y₈, y₆, y₅, y₇, y₄, y₃]

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 2, 0, 0, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 3, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 5, 0, 0, 0, 6, 0, 5]] \$

[y₇, 0, 0, 0, y₄, y₅, y₆, y₆, 0, y₃, y₁, y₂]

$$p = s^5 - s^8$$

1947 . Coloring, {3, 4, 5, 6, 8, 9, 10, 11}

R: [7, 7, 8, 7, 3, 3, B, B, C, 2, 4, 5]

B: [6, 8, 7, 6, A, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}} order: 6
See Matrix

\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 0, 3, 1] , [0, 0, 2, 3, 1, 0, 4, 2, 0, 0, 4, 0] , [0, 0, 1, 4, 0, 0, 3, 2, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 4, 1, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0] , [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0] , [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$

$$[0, 2 y_1, y_7, y_6, y_5, 0, y_4, y_3, 0, 0, y_2, y_1]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 4, 1, 3], [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 5], [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 5, 2], [5, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 1], [3, 0, 0, 0, 0, 5, 0, 0, 1, 3, 2, 2], [2, 0, 0, 0, 0, 3, 0, 0, 2, 5, 1, 3], [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 5]] \$$$

$$[y_7, 0, 0, 0, 0, y_2, y_3, y_3, y_4, y_5, y_6, y_1]$$

$$p = -s^2 + s^8$$

1948 . Coloring, {3, 4, 5, 6, 8, 9, 10, 12}

R: [7, 7, 8, 7, 3, 3, B, B, C, 2, 1, 9]

B: [6, 8, 7, 6, A, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 0, 3, 1], [3, 0, 0, 0, 0, 0, 4, 2, 1, 0, 4, 2], [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 1], [6, 0, 0, 0, 0, 0, 4, 0, 1, 0, 3, 2], [3, 0, 0, 0, 0, 0, 6, 0, 2, 0, 4, 1], [4, 0, 0, 0, 0, 0, 3, 0, 1, 0, 6, 2], [6, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 1], [3, 0, 0, 0, 0, 0, 6, 0, 1, 0, 4, 2]] \$$$

$$[3 y_5, 3 y_6, 3 y_6, 0, 0, 0, 3 y_2, 3 y_3, 3 y_4, 0, -3 y_5 - 6 y_6 - 3 y_2 - 3 y_3 + 13 y_4 + 13 y_1, 3 y_1]$$

$$p = -s^3 + s^5 + s^6 - s^8 \quad p' = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

[0, 0, 0, $y_2, y_3, y_1, y_5, y_5, 0, y_4, y_5, y_6$]

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

1949 . Coloring, {3, 4, 5, 6, 8, 9, 11, 12}

R: [7, 7, 8, 7, 3, 3, B, B, C, C, 4, 9]

B: [6, 8, 7, 6, A, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 7	8 vs 9

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 2, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 4, 0, 3, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 3, 3]] \$

[0, 0, 5 $y_1, -5 y_1 - 5 y_4 - 5 y_5 + 11 y_3 - 5 y_2 + 11 y_6, 0, 0, 5 y_4, 5 y_5, 5 y_3, 0, 5 y_2, 5 y_6$]

$$p = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 1, 1, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 2, 0, 2, 0, 5, 0, 1] , [0, 5, 0, 0, 1, 1, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 3, 0, 2, 0, 5] , [0, 2, 0, 0, 5, 0, 0, 2, 0, 4, 0, 3] , [0, 4, 0, 0, 3, 0, 0, 2, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 4, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 5, 0, 2, 0, 4]] \$

[$y_1, y_2, 0, 0, y_3, y_4, y_7, y_5, 0, y_6, y_7, y_8$]

$$p = -s^4 + s^9$$

1950 . Coloring, {3, 4, 5, 6, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, B, B, 2, 4, 9]

B: [6, 8, 7, 6, A, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	5 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\begin{aligned} \$ [& [0, 2, 2, 2, 0, 0, 3, 1, 2, 0, 4, 0], [0, 0, 0, 4, 0, 0, 4, 2, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, \\ & 0, 6, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, \\ & 6, 0, 0, 0, 4, 0]] \$ \end{aligned}$$

$$[0, y_5, y_5, y_4, 0, 0, y_3, y_2, y_5, 0, y_1, 0]$$

$$p' = s^3 - s^6 \quad p = -s^3 + s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\begin{aligned} \$ [& [2, 0, 0, 0, 2, 2, 1, 1, 0, 4, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, \\ & 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, \\ & 0, 0, 0, 5, 0, 6]] \$ \end{aligned}$$

$$[2 y_3, 0, 0, 0, y_4, y_2, y_3, y_3, 0, y_1, 0, y_5]$$

$$p = -s^3 + s^6 \quad p' = -s^3 + s^6$$

1951 . Coloring, {3, 4, 5, 6, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, B, C, C, 2, 4, 9]

B: [6, 8, 7, 6, A, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 0, 2, 2] , [0, 0, 0, 2, 0, 0, 4, 2, 2, 0, 3, 3] , [0, 0, 0, 3, 0, 0, 2, 0, 3, 0, 4, 4] , [0, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2, 3] , [0, 0, 0, 2, 0, 0, 4, 0, 3, 0, 3, 4] , [0, 0, 0, 3, 0, 0, 2, 0, 4, 0, 4, 3] , [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 4, 0, 4, 0, 3, 3]] \$

$$[0, 7y_6 + 7y_5 - 9y_1 - 9y_2 + 7y_3 - 9y_4, 7y_6 + 7y_5 - 9y_1 - 9y_2 + 7y_3 - 9y_4, 2y_6, 0, 0, 2y_5, 2y_1, 2y_2, 0, 2y_3, 2y_4]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = -s^3 + s^5 + s^6 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 2, 0, 0, 0, 5, 1, 4] , [1, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 5] , [0, 0, 0, 0, 5, 1, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6]] \$

$$[y_1, 0, 0, 0, y_2, y_3, y_4, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

1952 . Coloring, {3, 4, 5, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, A, B, C, 2, 4, 5]

B: [6, 8, 7, 6, A, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 9	8 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 9

See Matrix

$\$ [[0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 1, 1], [0, 3, 2, 1, 1, 0, 4, 1, 0, 3, 1, 0], [0, 3, 1, 1, 0, 0, 4, 2, 0, 4, 1, 0], [0, 4, 0, 1, 0, 0, 4, 1, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 5, 0, 0, 4, 1, 0], [0, 4, 0, 1, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$$

$[0, y_9, y_7, y_8, y_6, 0, y_5, y_4, 0, y_3, y_2, y_1]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 3, 3], [3, 0, 2, 0, 0, 2, 1, 0, 3, 0, 3, 2], [3, 0, 2, 0, 0, 3, 2, 0, 2, 0, 4, 0], [4, 0, 3, 0, 0, 3, 2, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 4, 3, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 4, 3, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 2, 4, 0, 0, 0, 3, 0], [3, 0, 2, 0, 0, 3, 4, 0, 0, 0, 4, 0], [4, 0, 3, 0, 0, 3, 2, 0, 0, 0, 4, 0]] \$$

$[y_8, 0, y_7, 0, 0, y_6, y_4, y_5, y_3, y_5, y_2, y_1]$

$$p = s^4 - s^9$$

1953 . Coloring, $\{3, 4, 5, 7, 8, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, A, B, C, 2, 1, 9]

B: [6, 8, 7, 6, A, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 0, 4, 1, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 0, 4, 0, 2, 4, 1, 1] , [1, 4, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1]] \$

[3 y₈, 3 y₆, 3 y₇, 0, 0, 0, 3 y₅, 3 y₃, 3 y₄, -3 y₈ - 3 y₆ - 3 y₇ - 3 y₅ - 3 y₃ + 13 y₄ - 3 y₂ + 13 y₁, 3 y₂, 3 y₁]

$$p = -s^5 - s^6 + s^8 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}, {3, 4, 6, 7, 11}}
See Matrix

\$ [[0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 2, 1, 0, 0, 2, 1, 2] , [0, 0, 2, 1, 2, 3, 2, 0, 0, 3, 1, 2] , [0, 0, 3, 1, 2, 1, 2, 0, 0, 2, 2, 3] , [0, 0, 1, 2, 3, 1, 3, 0, 0, 2, 2, 2] , [0, 0, 1, 2, 2, 2, 1, 0, 0, 3, 3, 2] , [0, 0, 2, 3, 2, 2, 1, 0, 0, 2, 1, 3] , [0, 0, 2, 1, 3, 3, 2, 0, 0, 2, 1, 2] , [0, 0, 3, 1, 2, 1, 2, 0, 0, 3, 2, 2]] \$

[0, 0, 7 y₅, 7 y₄, 7 y₂, 7 y₃, -7 y₅ - 7 y₄ + 9 y₂ - 7 y₃ + 9 y₁ + 9 y₈ - 7 y₆ + 9 y₇, 7 y₁, 0, 7 y₈, 7 y₆, 7 y₇]

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1954 . Coloring, {3, 4, 5, 7, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, A, B, C, C, 4, 9]

B: [6, 8, 7, 6, A, 3, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	5 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 8
See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 1, 3, 3, 1, 5] , [0, 0, 0, 1, 0, 0, 1, 0, 5, 2, 1, 6] , [0, 0, 0, 1, 0, 0, 1, 0, 6, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 1, 0, 7, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_7, y_6, 0, 0, y_4, y_5, y_3, y_1, y_2, -y_7 + y_6 - y_4 + y_5 + y_3 + y_1 - y_2]$$

$$p = -s^7 + s^8$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 1, 2, 0, 2, 1, 1] , [1, 2, 2, 0, 1, 3, 2, 1, 0, 1, 1, 2] , [1, 1, 3, 0, 2, 1, 2, 2, 0, 1, 2, 1] , [2, 1, 1, 0, 1, 1, 3, 1, 0, 2, 2, 2] , [2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 1, 2, 0, 2, 1, 1] , [1, 2, 2, 0, 1, 3, 2, 1, 0, 1, 1, 2] , [1, 1, 3, 0, 2, 1, 2, 2, 0, 1, 2, 1] , [2, 1, 1, 0, 1, 1, 3, 1, 0, 2, 2, 2]] \$

$$[y_1, 5y_1 + 3y_3 - 8y_2 - y_5, 24y_1 + 19y_3 - 37y_2 - 7y_5 - 8y_4, 0, 9y_1 + 7y_3 - 14y_2 - 2y_5 - 3y_4, 11y_1 + 7y_3 - 17y_2 - 3y_5 - y_4, y_3, 14y_1 + 11y_3 - 21y_2 - 4y_5 - 5y_4, 0, y_2, y_5, y_4]$$

$$p' = s^2 - s^7 \quad p' = s^4 - s^9 \quad p' = s^3 - s^8 \quad p = s - s^6 \quad p' = s - s^6$$

1955 . Coloring, {3, 4, 5, 7, 8, 10, 11, 12}

R: [7, 7, 8, 7, 3, A, A, B, B, 2, 4, 9]

B: [6, 8, 7, 6, A, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 4, 1, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 5, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[0, y_1, y_7, y_6, 0, 0, y_5, y_4, 2y_7, y_3, y_2, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 7, 11}}

See Matrix

$$\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 2, 4], [2, 0, 2, 0, 4, 2, 1, 0, 0, 2, 1, 2], [1, 0, 2, 0, 2, 2, 2, 0, 0, 4, 1, 2], [1, 0, 2, 0, 2, 1, 2, 0, 0, 2, 2, 4], [2, 0, 1, 0, 4, 1, 2, 0, 0, 2, 2, 2], [2, 0, 1, 0, 2, 2, 1, 0, 0, 4, 2, 2], [2, 0, 2, 0, 2, 2, 1, 0, 0, 2, 1, 4], [1, 0, 2, 0, 4, 2, 2, 0, 0, 2, 1, 2], [1, 0, 2, 0, 2, 1, 2, 0, 0, 4, 2, 2]] \$$$

$$[y_4, 0, y_3, 0, y_1, y_2, -y_4 - y_3 + y_1 - y_2 + y_8 + y_7 - y_5 + y_6, y_8, 0, y_7, y_5, y_6]$$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

1956 . Coloring, {3, 4, 5, 7, 9, 10, 11, 12}

R: [7, 7, 8, 7, 3, A, A, C, C, 2, 4, 9]

B: [6, 8, 7, 6, A, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 4, 1, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3], [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3]] \$$$

$$[0, 3y_1, 3y_5 + 3y_4 - 3y_2, 6y_5 + 6y_4 - 6y_2, 0, 0, -3y_1 + 4y_5 + 4y_4 + 6y_2 - 3y_3, 3y_5, 3y_4, 3y_3, 0, 3y_2]$$

$$p' = s^4 - s^7 \quad p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 7, 11}}

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 4, 2] , [4, 0, 2, 0, 2, 2, 1, 0, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 4, 2, 0, 0, 2, 1, 2] , [1, 0, 4, 0, 2, 2, 2, 0, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 1, 4, 0, 0, 2, 2, 1] , [2, 0, 1, 0, 1, 2, 2, 0, 0, 2, 4, 2] , [4, 0, 2, 0, 2, 2, 1, 0, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 4, 2, 0, 0, 2, 1, 1] , [1, 0, 4, 0, 1, 2, 2, 0, 0, 2, 2, 2]] \$

$$[-5 y_1 + 11 y_2 - 5 y_3 - 5 y_4 - 5 y_5 + 11 y_6 - 5 y_7 + 11 y_8, 0, 5 y_1, 0, 5 y_2, 5 y_3, 5 y_4, 5 y_5, 0, 5 y_6, 5 y_7, 5 y_8]$$

$$p = -s^2 - s^3 - s^4 + s^7 + s^8 + s^9$$

1957 . Coloring, {3, 4, 5, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, A, B, B, C, 2, 4, 9]

B: [6, 8, 7, 6, A, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 4, 1, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1]] \$

$$[0, 3 y_6, 3 y_5, 3 y_4, 0, 0, 3 y_3, 3 y_6 - 3 y_5, 3 y_2, 3 y_5, -6 y_6 - 3 y_5 - 3 y_4 - 3 y_3 + 13 y_2 + 13 y_1, 3 y_1]$$

$$p' = -s^4 - s^5 + s^7 + s^8 \quad p' = s^3 + s^4 - s^6 - s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 1, 0, 0, 3, 0, 4] , [0, 0, 2, 0, 4, 1, 2, 0, 0, 4, 0, 3] , [0, 0, 1, 0, 3, 0, 2, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 1, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 5, 0, 5]] \$

$$[y_2, 0, y_3, 0, y_1, y_5, y_6, y_7, 0, y_4, y_7, y_8]$$

$$p = s^6 - s^9$$

1958 . Coloring, {3, 4, 6, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, A, B, C, 2, 4, 5]

B: [6, 8, 7, 6, 3, A, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 2, 0, 3, 1, 0, 3, 1, 1], [0, 3, 0, 1, 1, 0, 4, 1, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 4, 0, 0, 5, 1, 0], [0, 5, \\ & 0, 1, 0, 0, 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, \\ & 6, 0, 0, 4, 0, 0], [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0]] \$ \end{aligned}$$

$$[0, y_1, y_5 - y_7, y_4, y_5, 0, y_6, y_7, 0, y_2, y_3, y_5 - y_7]$$

$$p = -s^5 + s^8 \quad p' = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 0, 1, 0, 0, 2, 1, 1, 2, 1, 3, 3], [3, 0, 0, 0, 0, 2, 1, 0, 3, 2, 3, 2], [3, 0, 0, 0, 0, 3, 0, 0, 2, 2, 4, 2], [4, 0, \\ & 0, 0, 0, 3, 0, 0, 2, 3, 2, 2], [2, 0, 0, 0, 0, 4, 0, 0, 2, 3, 2, 3], [2, 0, 0, 0, 0, 2, 0, 0, 3, 4, 2, 3], [2, 0, 0, 0, 0, 2, \\ & 0, 0, 3, 2, 3, 4], [3, 0, 0, 0, 0, 2, 0, 0, 4, 2, 3, 2], [3, 0, 0, 0, 0, 3, 0, 0, 2, 2, 4, 2]] \$ \end{aligned}$$

$$[y_1, 0, y_6, 0, 0, y_7, y_8, y_6, y_5, y_4, y_3, y_2]$$

$$p = -s^3 + s^9$$

1959 . Coloring, {3, 4, 6, 7, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, A, B, C, 2, 1, 9]

B: [6, 8, 7, 6, 3, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 1, 0, 0, 0, 3, 1, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 4, 1, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 4, 0, 2, 4, 1, 1], [1, 4, \\ & 0, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, \\ & 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1]] \$ \end{aligned}$$

$$[3 y_1, -3 y_1 - 3 y_2 - 3 y_6 - 3 y_7 + 13 y_8 - 3 y_3 - 3 y_4 + 13 y_5, 3 y_2, 0, 0, 0, 3 y_6, 3 y_7, 3 y_8, 3 y_3, 3 y_4, 3 y_5]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

Omega Rank for B : cycles: {{3, 4, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

$$\begin{aligned} \$ [& [0, 0, 1, 2, 2, 2, 1, 1, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 1, 0, 0, 2, 1, 2], [0, 0, 3, 1, 2, 3, 2, 0, 0, 2, 1, 2], [0, 0, \\ & 2, 1, 2, 1, 3, 0, 0, 3, 2, 2], [0, 0, 2, 2, 2, 1, 2, 0, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 2, 0, 0, 1, 2, 1], [0, 0, 3, 2, 1, 3, \\ & 2, 0, 0, 2, 2, 1], [0, 0, 1, 2, 1, 2, 3, 0, 0, 3, 2, 2], [0, 0, 1, 2, 2, 2, 1, 0, 0, 2, 3, 3]] \$ \end{aligned}$$

$$[0, 0, y_6, y_5, y_2, y_3, y_4, y_1, 0, y_7, y_8, y_9]$$

1960 . Coloring, {3, 4, 6, 7, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 8, 7, A, 3, A, B, C, C, 4, 9]

B: [6, 8, 7, 6, 3, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 8	10 vs 10

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 3, 1, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 1, 3, 3, 1, 5] , [0, 0, 0, 1, 0, 0, 1, 0, 5, 2, 1, 6] , [0, 0, 0, 1, 0, 0, 1, 0, 6, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 1, 0, 7, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_4, y_3, 0, 0, y_2, y_1, y_4 - y_3 + y_2 - y_1 - y_7 + y_6 + y_5, y_7, y_6, y_5]$$

$$p = s^7 - s^8$$

Omega Rank for B : cycles: {{1, 2, 3, 5, 6, 7, 8, 10, 11, 12}} order: 10

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 1, 1, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 1, 2, 0, 2, 1, 1] , [1, 2, 1, 0, 1, 3, 2, 1, 0, 2, 1, 2] , [1, 2, 1, 0, 2, 1, 1, 2, 0, 3, 2, 1] , [2, 3, 2, 0, 1, 1, 1, 2, 0, 1, 1, 2] , [1, 1, 1, 0, 2, 2, 2, 3, 0, 1, 1, 2] , [1, 1, 2, 0, 2, 1, 1, 1, 0, 2, 2, 3] , [2, 2, 2, 0, 3, 1, 2, 1, 0, 1, 1, 1] , [1, 1, 3, 0, 1, 2, 2, 2, 0, 1, 2, 1] , [2, 1, 1, 0, 1, 1, 3, 1, 0, 2, 2, 2]] \$

$$[y_1, y_2, y_3, 0, y_4, y_5, y_6, y_7, 0, y_8, y_9, y_{10}]$$

1961 . Coloring, {3, 4, 6, 7, 8, 10, 11, 12}

R: [7, 7, 8, 7, A, 3, A, B, B, 2, 4, 9]

B: [6, 8, 7, 6, 3, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{2, 7, 10\}\}$ order: 6
See Matrix

$\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 2, 0], [0, 3, 0, 2, 0, 0, 4, 1, 0, 3, 3, 0], [0, 3, 0, 3, 0, 0, 5, 0, 0, 4, 1, 0], [0, 4, 0, 1, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$

$$[0, y_5, y_6, y_4, 0, 0, y_3, y_2, 2y_6, y_1, y_7, 0]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 5, 6, 7, 10, 11, 12\}\}$ order: 8
See Matrix

$\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 2, 4], [2, 0, 2, 0, 4, 2, 1, 0, 0, 2, 1, 2], [1, 0, 4, 0, 2, 2, 2, 0, 0, 2, 1, 2], [1, 0, 2, 0, 2, 1, 4, 0, 0, 2, 2, 2], [2, 0, 2, 0, 2, 1, 2, 0, 0, 1, 4, 2], [4, 0, 2, 0, 2, 2, 2, 0, 0, 1, 2, 1], [2, 0, 2, 0, 1, 4, 2, 0, 0, 2, 2, 1], [2, 0, 1, 0, 1, 2, 2, 0, 0, 4, 2, 2], [2, 0, 1, 0, 2, 2, 1, 0, 0, 2, 2, 4]] \$$

$$[y_5, 0, y_4, 0, y_3, y_2, y_1, y_9, 0, y_8, y_7, y_6]$$

1962 . Coloring, $\{3, 4, 6, 7, 9, 10, 11, 12\}$

R: $[7, 7, 8, 7, A, 3, A, C, C, 2, 4, 9]$

B: $[6, 8, 7, 6, 3, A, B, B, B, C, 1, 5]$

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	5 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6
See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 1, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 3, 0, 3, 4, 0, 3] , [0, 4, 0, 0, 0, 0, 3, 0, 3, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 4, 0, 3, 3, 0, 3]] \$

$$[0, -3y_4 + 4y_1 + 4y_2 - 3y_3 + 6y_5, 3y_1 + 3y_2 - 3y_5, 6y_1 + 6y_2 - 6y_5, 0, 0, 3y_4, 3y_1, 3y_2, 3y_3, 0, 3y_5]$$

$$p' = s^3 - s^6 \quad p' = s^4 - s^7 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 4, 2] , [4, 0, 2, 0, 2, 2, 1, 0, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 4, 2, 0, 0, 2, 1, 2] , [1, 0, 1, 0, 2, 2, 0, 0, 4, 2, 2] , [2, 0, 2, 0, 2, 1, 1, 0, 0, 2, 2, 4] , [2, 0, 2, 0, 4, 2, 2, 0, 0, 1, 1, 2] , [1, 0, 4, 0, 2, 2, 0, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 1, 4, 0, 0, 2, 2, 2] , [2, 0, 1, 0, 2, 2, 2, 0, 0, 1, 4, 2]] \$

$$[y_1, 0, y_2, 0, y_3, y_4, y_8, y_5, 0, y_6, y_7, y_9]$$

1963 . Coloring, {3, 4, 6, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, B, B, C, 2, 4, 9]

B: [6, 8, 7, 6, 3, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	10 vs 10	10 vs 10	6 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 4, 1, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1]] \$

$[0, 3 y_2 + 3 y_6, 3 y_2, 3 y_1, 0, 0, -9 y_2 - 6 y_6 - 3 y_1 + 13 y_5 - 3 y_3 + 13 y_4, 3 y_6, 3 y_5, 3 y_2, 3 y_3, 3 y_4]$

$$p' = s^4 + s^5 - s^7 - s^8 \quad p = s^3 - s^9 \quad p' = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 7, 10, 12\}\}$ order: 5

See Matrix

$\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 3, 1, 3], [1, 0, 2, 0, 3, 2, 1, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 1, 2, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3], [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3], [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3]] \$$

$[y_1, 0, y_5, 0, y_2, y_3, y_4, y_7, 0, y_6, y_7, y_8]$

$$p = -s^4 + s^9$$

1964 . Coloring, $\{3, 4, 7, 8, 9, 10, 11, 12\}$

R: $[7, 7, 8, 7, A, A, A, B, C, 2, 4, 9]$

B: $[6, 8, 7, 6, 3, 3, B, C, B, C, 1, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	8 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 0, 2, 0, 0, 3, 1, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 4, 0, 1, 3, 1, 2], [0, 3, 0, 1, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2]] \$$

$[0, -3 y_1 - 3 y_7 - 3 y_6 + 13 y_5 - 3 y_4 - 3 y_3 + 13 y_2, 0, 3 y_1, 0, 0, 3 y_7, 3 y_6, 3 y_5, 3 y_4, 3 y_3, 3 y_2]$

$$p = -s^4 - s^5 + s^7 + s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[2, 0, 2, 0, 2, 2, 1, 1, 0, 0, 3, 3], [3, 0, 4, 0, 3, 2, 2, 0, 0, 0, 1, 1], [1, 0, 5, 0, 1, 3, 4, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 1, 5, 0, 0, 0, 4, 0], [4, 0, 1, 0, 0, 2, 4, 0, 0, 0, 5, 0], [5, 0, 2, 0, 0, 4, 1, 0, 0, 0, 4, 0], [4, 0, 4, 0, 0, 5, 2, 0, 0, 0, 1, 0], [1, 0, 5, 0, 0, 4, 4, 0, 0, 0, 2, 0]] \$$

$$[y_1, 0, y_5, 0, y_4, y_2, y_3, y_6, 0, 0, y_8, y_7]$$

1965 . Coloring, {3, 5, 6, 7, 8, 9, 10, 11}

R: [7, 7, 8, 6, 3, 3, A, B, C, 2, 4, 5]

B: [6, 8, 7, 7, A, A, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 10	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}, {2, 7, 10}}

See Matrix

$\$ [[0, 2, 2, 2, 2, 1, 2, 1, 0, 2, 1, 1], [0, 2, 3, 1, 1, 2, 2, 2, 0, 2, 1, 0], [0, 2, 3, 1, 0, 1, 2, 3, 0, 2, 2, 0], [0, 2, 1, 2, 0, 1, 2, 3, 0, 2, 3, 0], [0, 2, 1, 3, 0, 2, 2, 1, 0, 2, 3, 0], [0, 2, 2, 3, 0, 3, 2, 1, 0, 2, 1, 0], [0, 2, 3, 1, 0, 3, 2, 2, 0, 2, 1, 0], [0, 2, 3, 1, 0, 1, 2, 3, 0, 2, 2, 0], [0, 2, 1, 2, 0, 1, 2, 3, 0, 2, 3, 0], [0, 2, 1, 3, 0, 2, 2, 1, 0, 2, 3, 0]] \$$

$$[0, y_5, -y_1 - y_2 - y_3 + 5y_5 - y_4 - y_6 - y_7, y_1, y_2, y_3, y_5, y_4, 0, y_5, y_6, y_7]$$

$$p = s^3 - s^8 \quad p' = -s^4 + s^9 \quad p'' = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$\$ [[2, 0, 0, 0, 0, 1, 2, 1, 2, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 4, 3], [4, 0, 0, 0, 0, 3, 0, 0, 3, 2, 3, 1], [3, 0, 0, 0, 0, 4, 0, 0, 1, 3, 3, 2], [3, 0, 0, 0, 0, 3, 0, 0, 2, 4, 1, 3], [1, 0, 0, 0, 0, 3, 0, 0, 3, 3, 2, 4], [2, 0, 0, 0, 0, 1, 0, 0, 4, 3, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 4, 3]] \$$

$$[y_1, 0, 0, 0, 0, y_5, 2y_2, y_2, y_3, y_4, y_6, y_7]$$

$$p = -s^2 + s^8$$

1966 . Coloring, {3, 5, 6, 7, 8, 9, 10, 12}

R: [7, 7, 8, 6, 3, 3, A, B, C, 2, 1, 9]

B: [6, 8, 7, 7, A, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	4 vs 8

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 1, 2, 1, 2, 2, 1, 1] , [1, 2, 1, 0, 0, 0, 4, 2, 1, 2, 1, 2] , [1, 2, 0, 0, 0, 0, 3, 1, 2, 4, 2, 1] , [2, 4, 0, 0, 0, 0, 3, 0, 1, 3, 1, 2] , [1, 3, 0, 0, 0, 0, 6, 0, 2, 3, 0, 1] , [0, 3, 0, 0, 0, 0, 4, 0, 1, 6, 0, 2] , [0, 6, 0, 0, 0, 0, 3, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 6, 0, 1, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 4, 0, 2, 6, 0, 1] , [0, 6, 0, 0, 0, 0, 3, 0, 1, 4, 0, 2]] \$

[3 y₁, 3 y₂, -3 y₁ - 3 y₂ - 3 y₉ - 3 y₇ - 3 y₈ + 13 y₆ - 3 y₅ - 3 y₄ + 13 y₃, 0, 0, 3 y₉, 3 y₇, 3 y₈, 3 y₆, 3 y₅, 3 y₄, 3 y₃]

$$p = s^6 + s^7 - s^9 - s^{10}$$

Omega Rank for B : cycles: {{5, 10, 12}, {4, 7, 11}} order: 3

See Matrix

\$ [[0, 0, 0, 2, 2, 1, 2, 1, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 0, 0, 3, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 3, 0, 0, 3, 2, 3] , [0, 0, 0, 2, 3, 0, 2, 0, 0, 3, 3, 3] , [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 2, 3]] \$

[0, 0, 0, -3 y₁ - 3 y₄ + 7 y₃, 3 y₂, -3 y₂ + 3 y₃, 3 y₁, -3 y₂ + 3 y₃, 0, 3 y₂, 3 y₄, 3 y₃]

$$p = s^2 - s^8 \quad p' = s^3 - s^6 \quad p' = s^4 - s^7 \quad p' = s^2 - s^5$$

1967 . Coloring, {3, 5, 6, 7, 8, 9, 11, 12}

R: [7, 7, 8, 6, 3, 3, A, B, C, C, 4, 9]

B: [6, 8, 7, 7, A, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 11\}, \{9, 12\}\}$ order: 10

See Matrix

$\$ [[0, 0, 2, 2, 0, 1, 2, 1, 2, 2, 1, 3], [0, 0, 1, 1, 0, 2, 0, 2, 3, 2, 1, 4], [0, 0, 2, 1, 0, 1, 0, 1, 4, 0, 2, 5], [0, 0, 1, 2, 0, 1, 0, 2, 5, 0, 1, 4], [0, 0, 1, 1, 0, 2, 0, 1, 4, 0, 2, 5], [0, 0, 2, 2, 0, 1, 0, 1, 5, 0, 1, 4], [0, 0, 1, 1, 0, 2, 0, 2, 4, 0, 1, 5], [0, 0, 2, 1, 0, 1, 0, 1, 5, 0, 2, 4], [0, 0, 1, 2, 0, 1, 0, 2, 4, 0, 1, 5]] \$$

$[0, 0, 7y_2, 7y_1, 0, 7y_6, 7y_5, 7y_4, 9y_2 + 9y_1 + 9y_6 - 7y_5 + 9y_4 - 7y_3 + 9y_8 - 7y_7, 7y_3, 7y_8, 7y_7]$

$$p = -s^3 - s^4 + s^8 + s^9$$

Omega Rank for B : cycles: $\{\{2, 5, 8, 10, 12\}\}$ order: 5

See Matrix

$\$ [[2, 2, 0, 0, 2, 1, 2, 1, 0, 2, 3, 1], [3, 2, 0, 0, 1, 2, 0, 2, 0, 3, 2, 1], [2, 3, 0, 0, 1, 3, 0, 2, 0, 3, 0, 2], [0, 3, 0, 0, 2, 2, 0, 3, 0, 4, 0, 2], [0, 4, 0, 0, 2, 0, 0, 3, 0, 4, 0, 3], [0, 4, 0, 0, 3, 0, 0, 4, 0, 2, 0, 3], [0, 2, 0, 0, 3, 0, 0, 4, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 2, 0, 3, 0, 4], [0, 3, 0, 0, 4, 0, 0, 3, 0, 4, 0, 2]] \$$

$[y_1, y_2, 0, 0, y_3, y_4, y_5, y_6, 0, y_7, y_8, y_9]$

1968 . Coloring, $\{3, 5, 6, 7, 8, 10, 11, 12\}$

R: [7, 7, 8, 6, 3, 3, A, B, B, 2, 4, 9]

B: [6, 8, 7, 7, A, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{3, 4, 6, 8, 11\}\}$

See Matrix

$\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 2, 0] , [0, 2, 1, 2, 0, 2, 2, 2, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 2, 2, 1, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 3, 2, 2, 0, 2, 1, 0] , [0, 2, 3, 1, 0, 2, 2, 2, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 1, 2, 3, 0, 2, 2, 0] , [0, 2, 1, 2, 0, 2, 2, 2, 0, 2, 3, 0] , [0, 2, 2, 3, 0, 2, 2, 1, 0, 2, 2, 0] , [0, 2, 2, 2, 0, 3, 2, 2, 0, 2, 1, 0]] \$$

$$[0, y_5, 5y_5 - y_1 - y_2 - y_3 - y_4 - y_6, y_1, 0, y_2, y_5, y_3, y_4, y_5, y_6, 0]$$

$$p = -s^2 + s^7 \quad p' = -s^2 + s^7 \quad p'' = -s^3 + s^8$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 2, 4] , [2, 0, 0, 0, 4, 2, 0, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 2, 0, 0, 0, 6, 0, 3] , [0, 0, 0, 0, 3, 2, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$

$$[y_1, 0, 0, 0, y_3, y_2, 2y_4, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

1969 . Coloring, $\{3, 5, 6, 7, 9, 10, 11, 12\}$

R: $[7, 7, 8, 6, 3, 3, A, C, C, 2, 4, 9]$

B: $[6, 8, 7, 7, A, A, B, B, B, C, 1, 5]$

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	9 vs 9	9 vs 9	6 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 0, 2] , [0, 2, 1, 0, 0, 2, 2, 2, 2, 2, 0, 3] , [0, 2, 2, 0, 0, 0, 2, 1, 3, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 2, 2, 4, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 2, 0, 4, 2, 0, 6] , [0, 2, 0, 0, 0, 0, 2, 0, 6, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 2, 0, 4, 2, 0, 6] , [0, 2, 0, 0, 0, 0, 2, 0, 6, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 2, 0, 4, 2, 0, 6]] \$$

$$[0, y_6, y_5, y_4, 0, y_3, y_6, y_2, y_1, y_6, 0, -y_5 - y_4 - y_3 - y_2 - y_1 + 5 y_6]$$

$$p' = s^6 - s^8 \quad p' = s^5 - s^7 \quad p = s^5 - s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 4, 2], [4, 0, 0, 0, 2, 2, 0, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 4, 0, 0, 0, 4, 0, 3], [0, 0, 0, 0, 3, 3, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$$$

$$[y_2, 0, 0, 0, y_1, y_7, 2 y_6, y_6, 0, y_5, y_4, y_3]$$

$$p = s^5 - s^8$$

1970 . Coloring, {3, 5, 6, 8, 9, 10, 11, 12}

R: [7, 7, 8, 6, 3, 3, B, B, C, 2, 4, 9]

B: [6, 8, 7, 7, A, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}, {9, 12}} order: 10

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 0, 3, 1], [0, 0, 1, 3, 0, 2, 2, 2, 1, 0, 3, 2], [0, 0, 2, 3, 0, 3, 0, 1, 2, 0, 4, 1], [0, 0, 3, 4, 0, 3, 0, 2, 1, 0, 1, 2], [0, 0, 3, 1, 0, 4, 0, 3, 2, 0, 2, 1], [0, 0, 4, 2, 0, 1, 0, 3, 1, 0, 3, 2], [0, 0, 1, 3, 0, 2, 0, 4, 2, 0, 3, 1], [0, 0, 2, 3, 0, 3, 0, 1, 1, 0, 4, 2], [0, 0, 3, 4, 0, 3, 0, 2, 2, 0, 1, 1]] \$$$

$$[0, 3 y_8, 3 y_7, 3 y_6, 0, 3 y_5, 3 y_4, 3 y_3, 3 y_2, 0, -3 y_8 - 3 y_7 - 3 y_6 - 3 y_5 - 3 y_4 - 3 y_3 + 13 y_2 + 13 y_1, 3 y_1]$$

$$p = -s^3 - s^4 + s^8 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[y_1, 0, 0, 0, y_2, y_3, 2y_5, y_5, 0, y_4, y_5, y_6]$$

$$p = s^4 - s^7 \quad p' = -s^4 + s^7$$

1971 . Coloring, {3, 5, 7, 8, 9, 10, 11, 12}

R: [7, 7, 8, 6, 3, A, A, B, C, 2, 4, 9]

B: [6, 8, 7, 7, A, 3, B, C, B, C, 1, 5]

‘ See graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	8 vs 9

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 2, 2, 1, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 1, 3, 0, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 1, 3, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 1, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2]] \$

$$[0, 3y_2, 3y_3, 3y_4, 0, -3y_2 - 3y_3 - 3y_4 - 3y_1 - 3y_8 + 13y_9 - 3y_5 - 3y_6 + 13y_7, 3y_1, 3y_8, 3y_9, 3y_5, 3y_6, 3y_7]$$

$$p = -s^6 - s^7 + s^9 + s^{10}$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 7, 11}}

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3] , [3, 0, 1, 0, 3, 2, 1, 0, 0, 2, 2, 2] , [2, 0, 2, 0, 2, 3, 1, 0, 0, 3, 1, 2] , [1, 0, 3, 0, 2, 2, 0, 0, 2, 1, 3] , [1, 0, 2, 0, 3, 1, 3, 0, 0, 2, 2, 2] , [2, 0, 1, 0, 2, 1, 2, 0, 0, 3, 3, 2] , [3, 0, 1, 0, 2, 2, 1, 0, 0, 2, 2, 3] , [2, 0, 2, 0, 3, 3, 1, 0, 0, 2, 1, 2] , [1, 0, 3, 0, 2, 2, 2, 0, 0, 3, 1, 2]] \$

$$[-7y_1 + 9y_2 - 7y_3 - 7y_4 + 9y_5 + 9y_6 - 7y_7 + 9y_8, 0, 7y_1, 0, 7y_2, 7y_3, 7y_4, 7y_5, 0, 7y_6, 7y_7, 7y_8]$$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

1972 . Coloring, {3, 6, 7, 8, 9, 10, 11, 12}

R: [7, 7, 8, 6, A, 3, A, B, C, 2, 4, 9]

B: [6, 8, 7, 7, 3, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	4 vs 9

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}, {2, 7, 10}, {9, 12}}

See Matrix

$$\$ [[0, 2, 1, 2, 0, 1, 2, 1, 2, 3, 1, 1], [0, 3, 1, 1, 0, 2, 2, 1, 1, 2, 1, 2], [0, 2, 2, 1, 0, 1, 3, 1, 2, 2, 1, 1], [0, 2, 1, 1, 0, 1, 2, 2, 1, 3, 1, 2], [0, 3, 1, 1, 0, 1, 2, 1, 2, 2, 2, 1], [0, 2, 1, 2, 0, 1, 3, 1, 1, 2, 1, 2], [0, 2, 1, 1, 0, 2, 2, 1, 2, 3, 1, 1], [0, 3, 2, 1, 0, 1, 2, 1, 1, 2, 1, 2], [0, 2, 1, 1, 0, 1, 3, 2, 2, 2, 1, 1], [0, 2, 1, 1, 0, 1, 2, 1, 1, 3, 2, 2]] \$$$

$$[0, -3y_3 + 7y_5 - 3y_8 + 7y_7, -3y_1 - 3y_2 - 3y_4 + 6y_5 - 3y_6 + 6y_7, 3y_1, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_8, 3y_6, 3y_7]$$

$$p = -2s - 3s^2 - 2s^3 + s^5 + 2s^6 + 3s^7 + 2s^8 - s^{10} \quad p = s + 2s^2 + 2s^3 + s^4 - s^6 - 2s^7 - 2s^8 - s^9$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 1, 2, 1, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 1, 0, 0, 1, 2, 2], [2, 0, 3, 0, 2, 3, 2, 0, 0, 2, 1, 1], [1, 0, 2, 0, 1, 2, 3, 0, 0, 3, 2, 2], [2, 0, 1, 0, 2, 1, 2, 0, 0, 2, 3, 3], [3, 0, 2, 0, 3, 2, 1, 0, 0, 1, 2, 2], [2, 0, 3, 0, 2, 3, 2, 0, 0, 2, 1, 1], [1, 0, 2, 0, 1, 2, 3, 0, 0, 3, 2, 2], [2, 0, 1, 0, 2, 1, 2, 0, 0, 2, 3, 3]] \$$$

$$[y_1, 0, y_1 + y_4 + y_3 - y_2, 0, y_1, y_1 + y_4 + y_3 - y_2, y_4 + y_3, y_4, 0, y_3, y_2, y_2]$$

$$p = -s^2 + s^6 \quad p = -s^2 + s^5 + s^7 - s^8 \quad p' = s^3 - s^7 \quad p' = s^2 - s^6 \quad p = -s^2 + s^7 - s^8 + s^9$$

1973 . Coloring, {4, 5, 6, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, B, C, 2, 4, 5]

B: [6, 8, 8, 6, A, A, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 2, 2, 2, 2, 0, 4, 0, 0, 2, 1, 1], [0, 2, 2, 1, 1, 0, 6, 0, 0, 4, 0, 0], [0, 4, 1, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, \\ & 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, \\ & 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0]] \$ \end{aligned}$$

$$[0, y_1, y_2, y_4, y_4, 0, y_3, 0, 0, y_5, y_6, y_6]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 0, 0, 0, 0, 2, 0, 2, 2, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 2, 4], [2, 0, 0, 0, 0, 3, 0, 0, 4, 2, 3, 2], [3, 0, \\ & 0, 0, 0, 2, 0, 0, 2, 3, 4, 2], [4, 0, 0, 0, 0, 3, 0, 0, 2, 2, 2, 3], [2, 0, 0, 0, 0, 4, 0, 0, 3, 3, 2, 2], [2, 0, 0, 0, 0, 2, \\ & 0, 0, 2, 4, 3, 3]] \$ \end{aligned}$$

$$[y_1 - y_6 - y_5 - y_4 + y_3 + y_2, 0, 0, 0, 0, y_1, 0, y_6, y_5, y_4, y_3, y_2]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

1974 . Coloring, {4, 5, 6, 7, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, B, C, 2, 1, 9]
B: [6, 8, 8, 6, A, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6
 See Matrix

\$ [[2, 2, 2, 0, 0, 0, 4, 0, 2, 2, 1, 1] , [1, 2, 0, 0, 0, 0, 6, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 3, 0, 2, 6, 0, 1] , [0, 6, 0, 0, 0, 0, 4, 0, 1, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 6, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 3, 0, 1, 6, 0, 2] , [0, 6, 0, 0, 0, 0, 4, 0, 2, 3, 0, 1] , [0, 3, 0, 0, 0, 0, 6, 0, 1, 4, 0, 2]] \$

$$[3 y_4, 3 y_5, 6 y_1, 0, 0, 0, 3 y_3, 0, 3 y_2, -3 y_4 - 3 y_5 - 3 y_3 + 13 y_2 - 9 y_1 + 13 y_6, 3 y_1, 3 y_6]$$

$$p = s^3 + s^4 - s^6 - s^7 \quad p' = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
 See Matrix

\$ [[0, 0, 0, 2, 2, 2, 0, 2, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 2, 0, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 3, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5]] \$

$$[0, 0, 0, 2 y_5, 2 y_4, 2 y_3, 0, 2 y_2, 0, 2 y_1, 3 y_2, 2 y_6]$$

$$p = s^4 - s^7$$

1975 . Coloring, {4, 5, 6, 7, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, B, C, C, 4, 9]
B: [6, 8, 8, 6, A, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6
See Matrix

\$ [[0, 0, 2, 2, 0, 0, 4, 0, 2, 2, 1, 3] , [0, 0, 0, 1, 0, 0, 4, 0, 3, 4, 0, 4] , [0, 0, 0, 0, 0, 0, 1, 0, 4, 4, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 1, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, 2y_3, y_1, 0, 0, y_1 + y_5 + y_4 + y_3 - y_2, 0, y_5, y_4, y_3, y_2]$$

$$p' = s^5 - s^6 \quad p = s^5 - s^7$$

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5
See Matrix

\$ [[2, 2, 0, 0, 2, 2, 0, 2, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 2, 0, 2, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 3, 0, 2, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 0, 0, 4, 0, 5, 0, 2] , [0, 5, 0, 0, 2, 0, 0, 3, 0, 2, 0, 4] , [0, 2, 0, 0, 4, 0, 0, 5, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 2, 0, 4, 0, 5] , [0, 4, 0, 0, 5, 0, 0, 2, 0, 3, 0, 2]] \$

$$[y_2, y_1, 0, 0, y_4, y_3, 0, y_5, 0, y_8, y_7, y_6]$$

1976 . Coloring, {4, 5, 6, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -9s^2 + 4s^4 + 24s^5 + 16s^6 + 96s^7 + 64s^8 \quad p = -3s^2 + 2s^3 + 8s^5 + 32s^7$$

R: [7, 7, 7, 7, 3, 3, A, B, B, 2, 4, 9]

B: [6, 8, 8, 6, A, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 7	6 vs 7

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 0, 4, 0, 2, 2, 2, 0] , [0, 2, 0, 2, 0, 0, 6, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0]] \$

[0, y₁, y₆, y₂, 0, 0, y₅, 0, y₆, y₃, y₄, 0]

$$p = -s^4 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 2, 0, 2, 0, 2, 2, 4] , [2, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

[y₆, 0, 0, 0, y₅, y₄, 0, y₃, 0, y₂, y₃, y₁]

$$p = s^4 - s^7$$

1977 . Coloring, {4, 5, 6, 7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 - 8s^5 + 32s^7 \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 + 32s^7 + 64s^8$$

R: [7, 7, 7, 7, 3, 3, A, C, C, 2, 4, 9]

B: [6, 8, 8, 6, A, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	7 vs 7

Omega Rank for R : cycles: {{2, 7, 10}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 0, 4, 0, 2, 2, 0, 2] , [0, 2, 0, 0, 0, 0, 6, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 2, 0, 2, 6, 0, 2] , [0, 6, 0, 0, 0, 0, 4, 0, 2, 2, 0, 2] , [0, 2, 0, 0, 0, 0, 6, 0, 2, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 2, 0, 2, 6, 0, 2] , [0, 6, 0, 0, 0, 0, 4, 0, 2, 2, 0, 2]] \$

$$[0, -2y_1 - y_2 + 6y_4 - y_3, y_1, y_1, 0, 0, y_2, 0, y_4, y_3, 0, y_4]$$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p'' = -s^3 + s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 2, 0, 2, 0, 2, 4, 2], [4, 0, 0, 0, 2, 2, 0, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 4, 0, 0, 0, 4, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$$$

$$[y_7, 0, 0, 0, y_6, y_5, 0, y_4, 0, y_3, y_2, y_1]$$

1978 . Coloring, {4, 5, 6, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, 3, B, B, C, 2, 4, 9]

B: [6, 8, 8, 6, A, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 7	6 vs 7

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 0, 4, 0, 2, 0, 3, 1], [0, 0, 0, 3, 0, 0, 6, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 6, 1], [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 3, 2], [0, 0, 0, 3, 0, 0, 6, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 3, 0, 1, 0, 6, 2], [0, 0, 0, 6, 0, 0, 4, 0, 2, 0, 3, 1]] \$$$

$$[0, 3y_4, 3y_4, 3y_5, 0, 0, 3y_3, 0, 3y_1, 0, -6y_4 - 3y_5 - 3y_3 + 13y_1 + 13y_2, 3y_2]$$

$$p = -s^2 - s^3 + s^5 + s^6 \quad p = s^2 - s^4 - s^5 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 2, 0, 2, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 1, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5]] \$

$$[y_1, 0, 0, 0, y_2, y_3, 0, 2y_5, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7$$

1979 . Coloring, {4, 5, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^5 - 32s^7 \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 - 32s^7 - 64s^8$$

R: [7, 7, 7, 7, 3, A, A, B, C, 2, 4, 9]

B: [6, 8, 8, 6, A, 3, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1] , [0, 5, 0, 0, 0, 0, 4, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2]] \$

$$[0, -3y_2 - 3y_1 + 13y_6 - 3y_5 - 6y_4 + 13y_3, 3y_4, 3y_2, 0, 0, 3y_1, 0, 3y_6, 3y_5, 3y_4, 3y_3]$$

$$p' = s^3 + s^4 - s^6 - s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 2, 0, 1, 0, 2, 0, 3] , [0, 0, 2, 0, 3, 3, 0, 2, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 0, 2, 0, 3, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 3, 0, 3, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5]] \$

$$[y_1, 0, y_5, 0, y_4, y_3, 0, y_2, 0, y_8, y_7, y_6]$$

1980 . Coloring, {4, 6, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 9s^2 - 28s^4 - 40s^5 - 16s^6 + 96s^7 + 64s^8 \quad p' = 3s^2 - 2s^3 - 8s^4 - 8s^5 + 32s^7$$

R: [7, 7, 7, 7, A, 3, A, B, C, 2, 4, 9]

B: [6, 8, 8, 6, 3, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	8 vs 8

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 4, 0, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 5, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 4, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2]] \$$$

$$[0, 3 y_1, 3 y_6, -3 y_1 - 6 y_6 - 3 y_2 + 13 y_4 - 3 y_5 + 13 y_3, 0, 0, 3 y_2, 0, 3 y_4, 3 y_5, 3 y_6, 3 y_3]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 2, 0, 2, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 0, 1, 0, 2, 0, 3], [0, 0, 3, 0, 3, 3, 0, 2, 0, 2, 0, 3], [0, 0, 3, 0, 3, 0, 0, 3, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6], [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3], [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3], [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4]] \$$$

$$[y_1, 0, y_2, 0, y_3, y_4, 0, y_5, 0, y_6, y_7, y_8]$$

1981 . Coloring, {5, 6, 7, 8, 9, 10, 11, 12}

R: [7, 7, 7, 6, 3, 3, A, B, C, 2, 4, 9]

B: [6, 8, 8, 7, A, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$\$ [[0, 2, 2, 2, 0, 1, 3, 0, 2, 2, 1, 1], [0, 2, 1, 1, 0, 2, 4, 0, 1, 3, 0, 2], [0, 3, 2, 0, 0, 1, 3, 0, 2, 4, 0, 1], [0, 4, 1, 0, 0, 0, 5, 0, 1, 3, 0, 2], [0, 3, 0, 0, 0, 0, 5, 0, 2, 5, 0, 1], [0, 5, 0, 0, 0, 0, 3, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 5, 0, 2, 3, 0, 1], [0, 3, 0, 0, 0, 0, 5, 0, 1, 5, 0, 2], [0, 5, 0, 0, 0, 0, 3, 0, 2, 5, 0, 1]] \$$

$[0, 3 y_8, 3 y_7, 3 y_6, 0, 3 y_5, 3 y_4, 0, 3 y_3, 3 y_2, -3 y_8 - 3 y_7 - 3 y_6 - 3 y_5 - 3 y_4 + 13 y_3 - 3 y_2 + 13 y_1, 3 y_1]$

$$p = s^5 + s^6 - s^8 - s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$\$ [[2, 0, 0, 0, 2, 1, 1, 2, 0, 2, 3, 3], [3, 0, 0, 0, 3, 2, 0, 0, 0, 3, 1, 4], [1, 0, 0, 0, 4, 3, 0, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 1, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7], [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7]] \$$

$[y_1, 0, 0, 0, y_2, y_3, y_4, 2 y_4, 0, y_5, y_6, y_7]$

$$p = s^5 - s^8$$

1982 . Coloring, {2, 3, 4, 5, 6, 7, 8, 9, 10}

$$\Omega p(\Delta)=0: p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, B, C, 2, 1, 5]

B: [6, 7, 7, 6, A, A, B, C, B, C, 4, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	6 vs 7

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}\}$ order: 6
See Matrix

$\$ [[2, 2, 2, 0, 2, 0, 2, 2, 0, 2, 1, 1], [1, 2, 2, 0, 1, 0, 2, 4, 0, 2, 2, 0], [2, 2, 1, 0, 0, 0, 1, 4, 0, 2, 4, 0], [4, 2, 0, 0, 0, 0, 2, 3, 0, 1, 4, 0], [4, 1, 0, 0, 0, 0, 4, 2, 0, 2, 3, 0], [3, 2, 0, 0, 0, 0, 4, 1, 0, 4, 2, 0], [2, 4, 0, 0, 0, 0, 3, 2, 0, 4, 1, 0], [1, 4, 0, 0, 0, 0, 2, 4, 0, 3, 2, 0], [2, 3, 0, 0, 0, 0, 1, 4, 0, 2, 4, 0]] \$$

$$[y_5, y_4, y_3, 0, y_2, 0, y_1, -y_5 + y_4 + y_3 - y_2 + y_1 - y_8 + y_7 + y_6, 0, y_8, y_7, y_6]$$

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: $\{\{4, 6, 9, 10, 11, 12\}\}$ order: 6
See Matrix

$\$ [[0, 0, 0, 2, 0, 2, 2, 0, 2, 2, 3, 3], [0, 0, 0, 3, 0, 2, 0, 0, 3, 2, 4, 2], [0, 0, 0, 4, 0, 3, 0, 0, 2, 2, 3, 2], [0, 0, 0, 3, 0, 4, 0, 0, 2, 3, 2, 2], [0, 0, 0, 2, 0, 3, 0, 0, 2, 4, 2, 3], [0, 0, 0, 2, 0, 2, 0, 0, 3, 3, 2, 4], [0, 0, 0, 2, 0, 2, 0, 0, 4, 2, 3, 3]] \$$

$$[0, 0, 0, y_1 - y_2 - y_3 - y_4 + y_5 + y_6, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1983 . Coloring, $\{2, 3, 4, 5, 6, 7, 8, 9, 11\}$

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, B, C, C, 4, 5]

B: [6, 7, 7, 6, A, A, B, C, B, 2, 1, 9]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	5 vs 8	7 vs 8

Omega Rank for R : cycles: {{3, 4, 5, 7, 8, 10, 11, 12}} order: 8
See Matrix

\$ [[0, 0, 2, 2, 2, 0, 2, 2, 0, 2, 1, 3] , [0, 0, 2, 1, 3, 0, 2, 2, 0, 2, 2, 2] , [0, 0, 3, 2, 2, 0, 1, 2, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 3, 0, 1, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 2, 0, 2, 3, 1] , [0, 0, 2, 3, 1, 0, 2, 2, 0, 2, 2, 2] , [0, 0, 1, 2, 2, 0, 3, 2, 0, 2, 2, 2] , [0, 0, 2, 2, 2, 0, 2, 1, 0, 3, 2, 2]] \$

$[0, 0, y_4 + y_5 - y_2, -y_1 + y_4 + y_5, y_1, 0, y_2, -y_3 + y_4 + y_5, 0, y_3, y_4, y_5]$

$$p = -s + s^2 - s^5 + s^6 \quad p = -s + s^3 - s^5 + s^7 \quad p = -s + s^4 - s^5 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6
See Matrix

\$ [[2, 2, 0, 0, 0, 2, 2, 0, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 2, 2, 0, 1, 2, 4, 0] , [4, 2, 0, 0, 0, 3, 2, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 4, 2, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 2, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 4, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 3, 0, 0, 2, 4, 0]] \$

$[y_1, y_1 - y_2 + y_3 + y_4 + y_5 - y_7 - y_6, 0, 0, 0, y_2, y_3, 0, y_4, y_5, y_7, y_6]$

$$p = s^3 - s^4 + s^5 - s^6 + s^7 - s^8$$

1984 . Coloring, {2, 3, 4, 5, 6, 7, 8, 9, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, B, C, C, 1, 9]

B: [6, 7, 7, 6, A, A, B, C, B, 2, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 8
See Matrix

\$ [[2, 0, 2, 0, 0, 0, 2, 2, 2, 2, 1, 3] , [1, 0, 0, 0, 0, 0, 2, 2, 3, 2, 2, 4] , [2, 0, 0, 0, 0, 0, 1, 0, 4, 2, 2, 5] , [2, 0, 0, 0, 0, 2, 0, 5, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 2, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_1, 0, y_1 - y_7 + y_6 + y_5 + y_3 - y_4 - y_2, 0, 0, 0, y_7, y_6, y_5, y_3, y_4, y_2]$$

$$p = -s^7 + s^8$$

Omega Rank for B : cycles: {{2, 4, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 2, 2, 0, 0, 2, 3, 1], [0, 2, 0, 3, 1, 2, 2, 0, 0, 4, 2, 0], [0, 4, 0, 2, 0, 3, 2, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 4, 0, 0, 3, 2, 0], [0, 3, 0, 2, 0, 2, 3, 0, 0, 2, 4, 0], [0, 2, 0, 4, 0, 2, 3, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 4, 2, 0, 0, 2, 3, 0], [0, 2, 0, 3, 0, 3, 2, 0, 0, 4, 2, 0]] \$$$

$$[0, y_1, 0, y_2, y_5, y_3, y_4, 0, 0, y_6, y_7, y_8]$$

1985 . Coloring, {2, 3, 4, 5, 6, 7, 8, 10, 11}

$$\Omega p(\Delta)=0: \quad p = -3s^2 + 2s^3 - 8s^5 + 32s^7 \quad p = -9s^2 + 4s^4 - 24s^5 - 16s^6 + 96s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, 3, A, B, B, 2, 4, 5]

B: [6, 7, 7, 6, A, A, B, C, C, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 8	6 vs 7

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 2, 0, 2, 2, 0, 2, 2, 0], [0, 2, 2, 2, 0, 0, 2, 4, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 2, 4, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 4, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 4, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 4, 0, 2, 2, 0]] \$$$

$$[0, y_7, y_6, y_5, y_4, 0, y_3, y_2, 0, y_1, -y_7 - y_6 + y_5 + y_4 - y_3 + y_2 + y_1, 0]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{9, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 2, 2, 0, 2, 2, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 0, 6] , [0, 0, 0, 0, 0, 2, 0, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[y_1 - y_2 - y_3 - y_4 + y_5 + y_6, 0, 0, 0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = -s^6 + s^7$$

1986 . Coloring, {2, 3, 4, 5, 6, 7, 8, 10, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^2 + 10s^3 + 40s^5 + 32s^6 + 32s^7 + 128s^8 \quad p' = -3s^2 + 2s^3 - 8s^4 - 8s^5 - 32s^7$$

R: [7, 8, 8, 7, 3, 3, A, B, B, 2, 1, 9]

B: [6, 7, 7, 6, A, A, B, C, C, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 8	7 vs 7

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 0, 2, 2, 2, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 2, 4, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 2, 2, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 0, 4, 2, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 4, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 2, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 0, 2, 4, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 0, 2, 4, 0, 2, 4, 0]] \$

$$[y_1 + y_2 - y_3 - y_5 + y_4, y_1, y_6, 0, 0, 0, y_2, y_3, y_6, y_5, y_4, 0]$$

$$p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 2, 0, 0, 2, 2, 4] , [0, 0, 0, 2, 4, 2, 0, 0, 0, 4, 2, 2] , [0, 0, 0, 2, 2, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$

$$[0, 0, 0, y_3, y_1, y_2, y_7, 0, 0, y_6, y_4, y_5]$$

1987 . Coloring, {2, 3, 4, 5, 6, 7, 8, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = 3s^2 + 2s^3 + 8s^4 - 8s^5 - 32s^7 \quad p = 3s^2 - 10s^3 - 40s^5 + 32s^6 - 32s^7 + 128s^8$$

R: [7, 8, 8, 7, 3, 3, A, B, B, C, 4, 9]

B: [6, 7, 7, 6, A, A, B, C, C, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{4, 7, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 0, 0, 2, 2, 2, 2, 2, 2], [0, 0, 0, 2, 0, 0, 2, 2, 2, 2, 4, 2], [0, 0, 0, 4, 0, 0, 2, 0, 2, 2, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 2, 2, 2], [0, 0, 0, 2, 0, 0, 4, 0, 2, 4, 2, 2], [0, 0, 0, 2, 0, 0, 2, 0, 2, 4, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 2, 2, 4], [0, 0, 0, 2, 0, 0, 2, 0, 4, 2, 4, 2]] \$$$

$$[0, 0, y_1 - y_2 + y_3 + y_4 + y_7 - y_5 - y_6, y_1, 0, 0, y_2, y_3, y_4, y_7, y_5, y_6]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 2, 2, 0, 0, 2, 2, 2], [2, 2, 0, 0, 2, 2, 2, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 2, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 4, 0, 0, 2, 2, 0], [2, 2, 0, 0, 0, 2, 4, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 2, 2, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 4, 2, 0, 0, 2, 2, 0], [2, 2, 0, 0, 0, 4, 2, 0, 0, 4, 2, 0]] \$$$

$$[y_1 + y_4 + y_2 - y_3 - y_6 + y_7 - y_5, y_1, 0, 0, y_4, y_2, y_3, 0, 0, y_6, y_7, y_5]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

1988 . Coloring, {2, 3, 4, 5, 6, 7, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 + 8s^5 + 16s^6 + 32s^7 + 64s^8 \quad p' = s^2 - 2s^3 + 8s^5 + 32s^7$$

R: [7, 8, 8, 7, 3, 3, A, C, C, 2, 4, 5]

B: [6, 7, 7, 6, A, A, B, B, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	5 vs 8	6 vs 7

Omega Rank for R : cycles: {{3, 5, 8, 12}} order: 8

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 2, 2, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 2, 4, 0, 2, 0, 2] , [0, 2, 2, 0, 2, 0, 0, 4, 0, 2, 0, 4] , [0, 2, 2, 0, 4, 0, 0, 4, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 4] , [0, 0, 4, 0, 4, 0, 0, 4, 0, 0, 4]] \$

$$[0, y_4, -y_4 + y_3 + y_2, -y_1 + y_3 + y_2, y_3, 0, -y_5 + y_3 + y_2, y_1, 0, y_2, 0, y_5]$$

$$p = -s^5 + s^6 \quad p = -s^5 + s^7 \quad p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 2, 2, 0, 2, 2, 4, 2] , [4, 0, 0, 0, 0, 2, 0, 0, 2, 2, 4, 2] , [4, 0, 0, 0, 0, 4, 0, 0, 2, 2, 2, 2] , [2, 0, 0, 0, 0, 4, 0, 0, 2, 4, 2, 2] , [2, 0, 0, 0, 0, 2, 0, 0, 2, 4, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 4, 2]] \$

$$[y_6, 0, 0, 0, 0, y_3, y_4, 0, y_5, y_2, y_6 - y_3 + y_4 + y_5 + y_2 - y_1, y_1]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1989 . Coloring, {2, 3, 4, 5, 6, 7, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7$$

R: [7, 8, 8, 7, 3, 3, A, C, C, 2, 1, 9]

B: [6, 7, 7, 6, A, A, B, B, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 8	7 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$\$ [[2, 2, 2, 0, 0, 0, 2, 2, 2, 2, 0, 2], [0, 2, 0, 0, 0, 0, 2, 4, 2, 2, 0, 4], [0, 2, 0, 0, 0, 0, 0, 2, 4, 2, 0, 6], [0, 2, 0, 0, 0, 0, 0, 2, 6, 0, 0, 6], [0, 0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$$

$$[y_1, -y_2 + y_3 + y_4 + y_5 - y_6, y_1, 0, 0, 0, y_2, y_3, y_4, y_5, 0, y_6]$$

$$p' = s^6 - s^7 \quad p = s^6 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$\$ [[0, 0, 0, 2, 2, 2, 2, 0, 0, 2, 4, 2], [0, 0, 0, 4, 2, 2, 0, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 4, 0, 0, 0, 4, 0, 4], [0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 6, 0, 4]] \$$

$$[0, 0, 0, y_7, y_6, y_5, y_4, 0, 0, y_3, y_2, y_1]$$

1990 . Coloring, {2, 3, 4, 5, 6, 7, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 - 12s^4 + 8s^5 + 16s^6 + 32s^7 - 64s^8 \quad p' = s^2 + 2s^3 - 8s^4 - 8s^5 + 32s^7$$

R: [7, 8, 8, 7, 3, 3, A, C, C, C, 4, 9]

B: [6, 7, 7, 6, A, A, B, B, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	4 vs 7	7 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 4
See Matrix

\$ [[0, 0, 2, 2, 0, 0, 2, 2, 2, 2, 0, 4] , [0, 0, 0, 0, 0, 0, 2, 2, 4, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_4, y_4, 0, 0, y_3, y_3, y_2, y_1, 0, y_2 + y_1]$$

$$p' = s^4 - s^6 \quad p' = s^5 - s^6 \quad p = s^4 - s^7$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6
See Matrix

\$ [[2, 2, 0, 0, 2, 2, 2, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 2, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 4, 2, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 2, 4, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 2, 2, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 4, 0, 0, 2, 2, 0] , [2, 2, 0, 0, 0, 4, 2, 0, 0, 2, 4, 0]] \$

$$[y_1, y_2, 0, 0, y_7, y_6, y_5, 0, 0, y_4, y_3, 0]$$

1991 . Coloring, {2, 3, 4, 5, 6, 7, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, C, B, 2, 4, 9]

B: [6, 7, 7, 6, A, A, B, B, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 7

Omega Rank for R : cycles: {{2, 4, 7, 8, 9, 10, 11, 12}} order: 8
See Matrix

\$ [[0, 2, 2, 2, 0, 0, 2, 2, 2, 2, 1, 1] , [0, 2, 0, 1, 0, 0, 2, 4, 1, 2, 2, 2] , [0, 2, 0, 2, 0, 0, 1, 2, 2, 2, 1, 4] , [0, 2, 0, 1, 0, 0, 2, 2, 4, 1, 2, 2] , [0, 1, 0, 2, 0, 0, 1, 2, 2, 2, 4, 2] , [0, 2, 0, 4, 0, 0, 2, 1, 2, 1, 2, 2] , [0, 1, 0, 2, 0, 0, 4, 2, 2, 2, 2, 1] , [0, 2, 0, 2, 0, 0, 2, 1, 1, 4, 2, 2] , [0, 4, 0, 2, 0, 0, 2, 2, 2, 2, 1, 1]] \$

$$[0, -y_1 + y_2 - y_3 + y_7 + y_8 + y_6 - y_4 - y_5, y_1, y_2, 0, 0, y_3, y_7, y_8, y_6, y_4, y_5]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 2, 2, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 2, 0, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 3, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$$

$$[y_7, 0, 0, 0, y_5, y_6, y_4, 0, 0, y_3, y_1, y_2]$$

1992 . Coloring, {2, 3, 4, 5, 6, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 + 8s^5 + 8s^6 + 16s^7 \quad p' = s^3 + 8s^5 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, 3, 3, B, B, C, 2, 4, 5]

B: [6, 7, 7, 6, A, A, A, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 8	6 vs 7

Omega Rank for R : cycles: {{4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 2, 0, 2, 2, 0, 0, 3, 1], [0, 0, 2, 3, 1, 0, 2, 4, 0, 0, 4, 0], [0, 0, 1, 4, 0, 0, 3, 2, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 1, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 5, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 5, 0, 0, 0, 5, 0], [0, 0, 0, 5, 0, 0, 6, 0, 0, 0, 5, 0]] \$$$

$$[0, 2 y_7, y_1, y_5, y_6, 0, y_4, y_3, 0, 0, y_2, y_7]$$

$$p = -s^5 + s^8$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 2, 2, 0, 2, 4, 1, 3] , [1, 0, 0, 0, 0, 2, 0, 0, 3, 4, 2, 4] , [2, 0, 0, 0, 0, 1, 0, 0, 4, 2, 3, 4] , [3, 0, 0, 0, 0, 2, 0, 0, 4, 1, 4, 2] , [4, 0, 0, 0, 0, 3, 0, 0, 2, 2, 4, 1] , [4, 0, 0, 0, 0, 4, 0, 0, 1, 3, 2, 2] , [2, 0, 0, 0, 0, 4, 0, 0, 2, 4, 1, 3]] \$

$$[y_1, 0, 0, 0, 0, y_1 - y_2 + y_3 + y_4 - y_5 - y_6, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

1993 . Coloring, {2, 3, 4, 5, 6, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p' = s^3 - 8s^6 - 16s^7 \quad p = s^3 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, 3, 3, B, B, C, 2, 1, 9]

B: [6, 7, 7, 6, A, A, A, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 7

Omega Rank for R : cycles: {{1, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[2, 2, 2, 0, 0, 0, 2, 2, 2, 0, 3, 1] , [3, 0, 0, 0, 0, 0, 2, 4, 1, 0, 4, 2] , [4, 0, 0, 0, 0, 0, 3, 0, 2, 0, 6, 1] , [6, 0, 0, 0, 0, 0, 4, 0, 1, 0, 3, 2] , [3, 0, 0, 0, 0, 0, 6, 0, 2, 0, 4, 1] , [4, 0, 0, 0, 0, 0, 3, 0, 1, 0, 6, 2] , [6, 0, 0, 0, 0, 0, 4, 0, 2, 0, 3, 1] , [3, 0, 0, 0, 0, 0, 6, 0, 1, 0, 4, 2]] \$

$$[-6y_1 - 3y_3 - 3y_4 + 13y_2 - 3y_6 + 13y_5, 3y_1, 3y_1, 0, 0, 0, 3y_3, 3y_4, 3y_2, 0, 3y_6, 3y_5]$$

$$p' = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 2, 0, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[0, 0, 0, y_5, y_4, y_3, 2 y_1, 0, 0, y_2, y_1, y_6]$$

$$p = -s^4 + s^7$$

1994 . Coloring, {2, 3, 4, 5, 6, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, 3, B, B, C, C, 4, 9]

B: [6, 7, 7, 6, A, A, A, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 7	6 vs 8

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

$$\$ [[0, 0, 2, 2, 0, 0, 2, 2, 2, 0, 3, 3], [0, 0, 0, 3, 0, 0, 2, 2, 3, 0, 4, 2], [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 4, 3], [0, 0, 0, 4, 0, 0, 4, 0, 3, 0, 3, 2], [0, 0, 0, 3, 0, 0, 4, 0, 2, 0, 4, 3], [0, 0, 0, 4, 0, 0, 3, 0, 3, 0, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 3, 3]] \$$$

$$[0, 0, -5 y_1 - 5 y_6 - 5 y_2 + 11 y_3 - 5 y_4 + 11 y_5, 5 y_1, 0, 0, 5 y_6, 5 y_2, 5 y_3, 0, 5 y_4, 5 y_5]$$

$$p = s^3 + s^4 - s^6 - s^7$$

Omega Rank for B : cycles: {{2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 0, 0, 2, 2, 2, 0, 0, 4, 1, 1], [1, 4, 0, 0, 1, 2, 2, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 1, 4, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0], [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0], [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$$$

$$[y_6, y_5, 0, 0, y_6, y_4, y_3, 0, 0, y_2, y_1, y_1]$$

$$p' = -s^4 + s^7 \quad p = -s^4 + s^7$$

1995 . Coloring, {2, 3, 4, 5, 6, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 8s^5 + 48s^6 + 128s^8 \quad p' = s^2 - 8s^4 - 24s^5 - 16s^6 - 64s^7 \quad p'' = s^3 + 4s^4 + 8s^5 + 8s^6 + 16s^7$$

R: [7, 8, 8, 7, 3, 3, B, B, B, 2, 4, 9]

B: [6, 7, 7, 6, A, A, A, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	5 vs 7	5 vs 6

Omega Rank for R : cycles: {{4, 7, 11}} order: 3

See Matrix

$$\$ [[0, 2, 2, 2, 0, 0, 2, 2, 2, 0, 4, 0], [0, 0, 0, 4, 0, 0, 2, 4, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 0, 4, 0], [0, 0, 0, 4, 0, 0, 6, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 4, 0, 0, 0, 6, 0], [0, 0, 0, 6, 0, 0, 0, 4, 0]] \$$$

$$[0, y_1, y_1, y_4, 0, 0, y_3, y_2, y_1, 0, y_5, 0]$$

$$p' = s^3 - s^6 \quad p = s^3 - s^6$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 3

See Matrix

$$\$ [[2, 0, 0, 0, 2, 2, 2, 0, 0, 4, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$$$

$$[y_5, 0, 0, 0, y_4, y_3, y_5, 0, 0, y_2, 0, y_1]$$

$$p = -s^3 + s^6$$

1996 . Coloring, {2, 3, 4, 5, 6, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^3 + 8s^6 + 16s^7 \quad p'' = s^2 + 8s^5 + 16s^6 \quad p = s^2 + 8s^5 + 16s^6$$

R: [7, 8, 8, 7, 3, 3, B, C, C, 2, 4, 9]
B: [6, 7, 7, 6, A, A, A, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 8	8 vs 8	4 vs 8	6 vs 7

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6
 See Matrix

\$ [[0, 2, 2, 2, 0, 0, 2, 2, 2, 0, 2, 2] , [0, 0, 0, 2, 0, 0, 2, 4, 2, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4] , [0, 0, 0, 2, 0, 0, 2, 0, 4, 0, 2, 6] , [0, 0, 0, 2, 0, 0, 2, 0, 6, 0, 2, 4]] \$

$$[0, y_1, y_1, y_4, 0, 0, y_4, y_2, y_3, 0, y_4, -2y_1 + 5y_4 - y_2 - y_3]$$

$$p' = -s^3 + s^5 \quad p = s^3 - s^7 \quad p' = s^4 - s^6 \quad p' = -s^3 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
 See Matrix

\$ [[2, 0, 0, 0, 2, 2, 2, 0, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

$$[y_1, 0, 0, 0, y_2, y_3, y_5, 0, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7$$

1997 . Coloring, {2, 3, 4, 5, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 - 8s^5 - 16s^6 - 32s^7 - 64s^8 \quad p' = s^2 - 2s^3 - 8s^5 - 32s^7$$

R: [7, 8, 8, 7, 3, A, A, B, C, 2, 4, 5]
B: [6, 7, 7, 6, A, 3, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	9 vs 9	8 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 3, 1, 1], [0, 3, 2, 1, 1, 0, 2, 3, 0, 2, 2, 0], [0, 2, 1, 2, 0, 0, 1, 5, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 2, 3, 0, 1, 5, 0], [0, 1, 0, 5, 0, 0, 3, 2, 0, 2, 3, 0], [0, 2, 0, 3, 0, 0, 5, 1, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 3, 2, 0, 5, 1, 0], [0, 5, 0, 1, 0, 0, 2, 3, 0, 3, 2, 0], [0, 3, 0, 2, 0, 0, 1, 5, 0, 2, 3, 0]] \$$

$[0, y_1, y_2, y_4, y_3, 0, y_6, y_5, 0, y_9, y_7, y_8]$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}\}$ order: 5

See Matrix

$\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 1, 3, 3], [3, 0, 2, 0, 0, 2, 1, 0, 3, 0, 4, 1], [4, 0, 2, 0, 0, 3, 2, 0, 1, 0, 4, 0], [4, 0, 3, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 4, 3, 0, 0, 0, 2, 0], [2, 0, 4, 0, 0, 3, 4, 0, 0, 0, 3, 0], [3, 0, 3, 0, 0, 2, 4, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 3, 3, 0, 0, 0, 4, 0]] \$$

$[y_8, 0, y_7, 0, 0, y_5, y_6, 0, y_1, y_2, y_4, y_3]$

1998 . Coloring, $\{2, 3, 4, 5, 7, 8, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 + 32s^7 \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 + 32s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, A, A, B, C, 2, 1, 9]

B: [6, 7, 7, 6, A, 3, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 9	7 vs 8

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}, {9, 12}} order: 6
See Matrix

\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 0, 2, 3, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 1, 3, 2, 2, 3, 1] , [3, 2, 0, 0, 0, 0, 2, 2, 1, 1, 3, 2] , [3, 1, 0, 0, 0, 0, 3, 2, 2, 2, 2, 1] , [2, 2, 0, 0, 0, 0, 3, 1, 1, 3, 2, 2] , [2, 3, 0, 0, 0, 0, 2, 2, 2, 3, 1, 1] , [1, 3, 0, 0, 0, 0, 2, 3, 1, 2, 2, 2] , [2, 2, 0, 0, 0, 0, 1, 3, 2, 2, 3, 1]] \$

$[-3y_2 + 8y_6 - 3y_5 + 5y_7, -3y_1 - 3y_3 + 5y_6 - 3y_4 + 8y_7, 3y_1, 0, 0, 0, 3y_3, 3y_2, 3y_6, 3y_5, 3y_4, 3y_7]$

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{3, 4, 6, 7, 11}, {5, 10, 12}}
See Matrix

\$ [[0, 0, 1, 2, 2, 2, 2, 0, 0, 1, 3, 3] , [0, 0, 2, 3, 3, 2, 1, 0, 0, 2, 2, 1] , [0, 0, 2, 2, 1, 3, 2, 0, 0, 3, 1, 2] , [0, 0, 3, 1, 2, 2, 0, 0, 1, 2, 3] , [0, 0, 2, 2, 3, 1, 3, 0, 0, 2, 2, 1] , [0, 0, 1, 2, 1, 2, 2, 0, 0, 3, 3, 2] , [0, 0, 2, 3, 2, 2, 1, 0, 0, 1, 2, 3] , [0, 0, 2, 2, 3, 3, 2, 0, 0, 2, 1, 1]] \$

$[0, 0, 3y_2, 3y_3, 3y_4, -3y_2 - 3y_3 + 5y_4 - 3y_1 + 5y_6 - 3y_7 + 5y_5, 3y_1, 0, 0, 3y_6, 3y_7, 3y_5]$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

1999 . Coloring, {2, 3, 4, 5, 7, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 4s^4 - 8s^5 - 16s^6 - 32s^7 + 64s^8 \quad p' = s^2 + 2s^3 + 8s^4 + 8s^5 - 32s^7$$

R: [7, 8, 8, 7, 3, A, A, B, C, C, 4, 9]

B: [6, 7, 7, 6, A, 3, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8
See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 1, 3, 2, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 2, 1, 5] , [0, 0, 0, 1, 0, 0, 2, 0, 5, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 1, 0, 7, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]] \$

0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[0, 0, $y_1, y_2, 0, 0, y_3, y_4, y_5, y_6, y_7, y_8$]

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 3, 0, 0, 2, 2, 0] , [2, 2, 2, 0, 0, 3, 3, 0, 0, 1, 3, 0] , [3, 1, 3, 0, 0, 2, 4, 0, 0, 0, 3, 0] , [3, 0, 2, 0, 0, 3, 4, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 3, 2, 0, 0, 0, 4, 0] , [4, 0, 3, 0, 0, 4, 3, 0, 0, 0, 2, 0] , [2, 0, 4, 0, 0, 4, 3, 0, 0, 0, 3, 0] , [3, 0, 4, 0, 0, 2, 4, 0, 0, 0, 3, 0]] \$

[$y_1, y_2, y_3, 0, y_4, y_5, y_6, 0, 0, y_7, y_8, y_9$]

2000 . Coloring, {2, 3, 4, 5, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: p = -3s^3 + 2s^4 - 8s^5 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, A, A, B, B, 2, 4, 9]

B: [6, 7, 7, 6, A, 3, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 2, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 3, 2, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 4, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 3, 0, 2, 4, 0]] \$

[0, $y_1, y_2, y_3, 0, 0, y_4, y_5, 2y_2, y_6, y_7, 0$]

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 7, 11}}

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 1, 2, 4] , [2, 0, 2, 0, 4, 2, 1, 0, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 2, 2, 0, 0, 4, 1, 2] , [1, 0, 2, 0, 2, 2, 2, 0, 0, 1, 2, 4] , [2, 0, 2, 0, 4, 1, 2, 0, 0, 2, 2, 1] , [2, 0, 1, 0, 1, 2, 2, 0, 0, 4, 2, 2] , [2, 0, 2, 0, 2, 2, 1, 0, 0, 1, 2, 4] , [2, 0, 2, 0, 4, 2, 2, 0, 0, 2, 1, 1]] \$

$$[7y_6, 0, 7y_5, 0, 7y_4, 7y_3, 7y_2, 0, 0, 7y_1, -7y_6 - 7y_5 + 9y_4 - 7y_3 - 7y_2 + 9y_1 + 9y_7, 7y_7]$$

$$p = s + s^2 + s^3 - s^6 - s^7 - s^8$$

2001 . Coloring, {2, 3, 4, 5, 7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, A, A, C, C, 2, 4, 9]

B: [6, 7, 7, 6, A, 3, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 3, 0, 2] , [0, 3, 0, 0, 0, 0, 2, 3, 2, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 3, 4, 2, 0, 5] , [0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, y_5, y_6, 2y_6, 0, 0, y_4, y_2, y_3, y_1, 0, y_7]$$

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 7, 11}}

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 1, 4, 2] , [4, 0, 2, 0, 2, 2, 1, 0, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 4, 2, 0, 0, 2, 1, 2] , [1, 0, 4, 0, 2, 2, 2, 0, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 1, 4, 0, 0, 2, 2, 1] , [2, 0, 1, 0, 1, 2, 2, 0, 0, 2, 4, 2] , [4, 0, 2, 0, 2, 2, 1, 0, 0, 1, 2, 2] , [2, 0, 2, 0, 2, 4, 2, 0, 0, 2, 1, 1]] \$

$$[-5y_2 + 11y_3 - 5y_1 - 5y_7 + 11y_6 - 5y_4 + 11y_5, 0, 5y_2, 0, 5y_3, 5y_1, 5y_7, 0, 0, 5y_6, 5y_4, 5y_5]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

2002 . Coloring, {2, 3, 4, 5, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^3 - 8s^6 - 16s^7 \quad p = s^2 - 8s^5 - 16s^6 \quad p' = s^2 - 8s^5 - 16s^6$$

R: [7, 8, 8, 7, 3, A, B, B, C, 2, 4, 9]

B: [6, 7, 7, 6, A, 3, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	9 vs 9	9 vs 9	7 vs 9	8 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 2, 3, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 3, 1, 2, 0, 5, 1], [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2], [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1], [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2], [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1]] \$$$

$$[0, -6y_5 - 3y_2 - 3y_1 - 3y_3 + 13y_4 - 3y_6 + 13y_7, 3y_5, 3y_2, 0, 0, 3y_1, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7]$$

$$p = s^4 - s^6 - s^7 + s^9 \quad p' = s^4 + s^5 - s^7 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 3, 1, 3], [1, 0, 2, 0, 3, 2, 1, 0, 0, 4, 0, 3], [0, 0, 2, 0, 3, 1, 2, 0, 0, 4, 0, 4], [0, 0, 1, 0, 4, 0, 2, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 0, 1, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 5, 0, 0, 0, 6, 0, 5]] \$$$

$$[y_1, 0, y_2, 0, y_3, y_4, y_5, 0, 0, y_6, y_7, y_8]$$

2003 . Coloring, {2, 3, 4, 6, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = 9s^2 + 20s^4 + 40s^5 + 16s^6 + 96s^7 + 64s^8 \quad p' = 3s^2 - 2s^3 + 8s^4 + 8s^5 + 32s^7$$

R: [7, 8, 8, 7, A, 3, A, B, C, 2, 4, 5]

B: [6, 7, 7, 6, 3, A, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 9	8 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 2, 0, 2, 2, 0, 3, 1, 1] , [0, 3, 0, 1, 1, 0, 2, 3, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 1, 3, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 2, 4, 0, 1, 3, 0] , [0, 1, 0, 3, 0, 0, 3, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 3, 1, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 4, 2, 0, 3, 1, 0] , [0, 3, 0, 1, 0, 0, 3, 3, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 1, 3, 0, 3, 3, 0]] \$

$$[0, y_7, y_6, y_5, y_4, 0, y_3, y_2, 0, y_1, -y_7 + y_5 - y_4 - y_3 + y_2 + y_1, y_6]$$

$$p' = s^3 - s^4 + s^5 - s^6 + s^7 - s^8 \quad p = s^3 - s^9$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 1, 0, 0, 2, 2, 0, 2, 1, 3, 3] , [3, 0, 0, 0, 0, 2, 1, 0, 3, 2, 4, 1] , [4, 0, 0, 0, 0, 3, 0, 0, 1, 2, 4, 2] , [4, 0, 0, 0, 0, 4, 0, 0, 2, 3, 1, 2] , [1, 0, 0, 0, 0, 4, 0, 0, 2, 4, 2, 3] , [2, 0, 0, 0, 0, 1, 0, 0, 3, 4, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 1, 3, 4] , [3, 0, 0, 0, 0, 2, 0, 0, 4, 2, 4, 1]] \$

$$[y_5, 0, y_4, 0, 0, y_3, y_2, 0, y_1, y_8, y_7, y_6]$$

2004 . Coloring, {2, 3, 4, 6, 7, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^2 + 2s^3 - 8s^5 + 32s^7 \quad p = -9s^2 + 4s^4 - 24s^5 - 16s^6 + 96s^7 + 64s^8$$

R: [7, 8, 8, 7, A, 3, A, B, C, 2, 1, 9]

B: [6, 7, 7, 6, 3, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 9	8 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}, \{1, 2, 7, 8, 10, 11\}\}$ order: 6

See Matrix

$\$ [[2, 2, 1, 0, 0, 0, 2, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 2, 3, 1, 2, 2, 2], [2, 2, 0, 0, 0, 0, 1, 3, 2, 2, 3, 1], [3, 2, 0, 0, 0, 0, 2, 2, 1, 1, 3, 2], [3, 1, 0, 0, 0, 0, 3, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 0, 3, 1, 1, 3, 2, 2], [2, 3, 0, 0, 0, 0, 2, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 2, 3, 1, 2, 2, 2], [2, 2, 0, 0, 0, 0, 1, 3, 2, 2, 3, 1]] \$$

$[-3 y_3 + 8 y_4 - 3 y_5 + 5 y_7, -3 y_1 - 3 y_2 + 5 y_4 - 3 y_6 + 8 y_7, 3 y_1, 0, 0, 0, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7]$

$$p' = s^2 - s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{3, 4, 5, 6, 7, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[0, 0, 1, 2, 2, 2, 2, 0, 0, 1, 3, 3], [0, 0, 2, 3, 3, 2, 1, 0, 0, 2, 2, 1], [0, 0, 3, 2, 1, 3, 2, 0, 0, 2, 1, 2], [0, 0, 1, 1, 2, 2, 3, 0, 0, 3, 2, 2], [0, 0, 2, 2, 2, 1, 1, 0, 0, 2, 3, 3], [0, 0, 2, 3, 3, 2, 2, 0, 0, 1, 1, 2], [0, 0, 3, 1, 2, 3, 2, 0, 0, 2, 2, 1], [0, 0, 2, 2, 1, 1, 3, 0, 0, 3, 2, 2]] \$$

$[0, 0, y_4, y_1, y_2, y_3, y_5, 0, 0, y_6, y_7, y_8]$

2005 . Coloring, $\{2, 3, 4, 6, 7, 8, 9, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = -9s^2 + 4s^4 + 24s^5 - 16s^6 - 96s^7 + 64s^8 \quad p = 3s^2 + 2s^3 - 8s^5 + 32s^7$$

R: [7, 8, 8, 7, A, 3, A, B, C, C, 4, 9]

B: [6, 7, 7, 6, 3, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 1, 2, 0, 0, 2, 2, 2, 3, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 1, 3, 2, 2, 5] , [0, 0, 0, 2, 0, 0, 1, 0, 5, 2, 1, 5] , [0, 0, 0, 1, 0, 0, 2, 0, 5, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 1, 0, 7, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 1, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

[0, 0, y₄, y₃, 0, 0, y₂, y₁, y₆, y₇, y₈, y₅]

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 1, 0, 2, 2, 2, 0, 0, 1, 3, 1] , [3, 1, 2, 0, 1, 2, 3, 0, 0, 2, 2, 0] , [2, 2, 1, 0, 0, 3, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 2, 3, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 2, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 3, 3, 0, 0, 2, 3, 0]] \$

[y₁, y₆, y₅, 0, y₄, y₂, y₃, 0, 0, y₉, y₈, y₇]

2006 . Coloring, {2, 3, 4, 6, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, A, B, B, 2, 4, 9]

B: [6, 7, 7, 6, 3, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 2, 3, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 3, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 3, 2, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 4, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 3, 0, 2, 4, 0]] \$

$$[0, y_1, y_2, y_3, 0, 0, y_4, y_5, 2y_2, y_6, y_7, 0]$$

$$p = s^2 - s^8$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

$$\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 1, 2, 4], [2, 0, 2, 0, 4, 2, 1, 0, 0, 2, 2, 1], [2, 0, 4, 0, 1, 2, 2, 0, 0, 2, 1, 2], [1, 0, 1, 0, 2, 2, 4, 0, 0, 2, 2, 2], [2, 0, 2, 0, 2, 1, 1, 0, 0, 2, 4, 2], [4, 0, 2, 0, 2, 2, 2, 0, 0, 1, 1, 2], [1, 0, 2, 0, 2, 4, 2, 0, 0, 2, 2, 1], [2, 0, 2, 0, 1, 1, 2, 0, 0, 4, 2, 2]] \$$$

$$[y_1, 0, y_5, 0, y_4, y_3, y_2, 0, 0, y_7, y_8, y_6]$$

2007 . Coloring, {2, 3, 4, 6, 7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, A, 3, A, C, C, 2, 4, 9]

B: [6, 7, 7, 6, 3, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 3, 0, 2], [0, 3, 0, 0, 0, 0, 2, 3, 2, 2, 0, 4], [0, 2, 0, 0, 0, 0, 0, 3, 4, 2, 0, 5], [0, 2, 0, 0, 0, 0, 2, 5, 0, 0, 7], [0, 0, 0, 0, 0, 0, 2, 7, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[0, y_1, y_2, 2y_2, 0, 0, y_5, y_4, y_3, y_6, 0, y_7]$$

$$p = s^6 - s^8$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 1, 4, 2] , [4, 0, 2, 0, 2, 2, 1, 0, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 4, 2, 0, 0, 2, 1, 2] , [1, 0, 1, 0, 2, 2, 0, 0, 4, 2, 2] , [2, 0, 2, 0, 2, 1, 1, 0, 0, 2, 2, 4] , [2, 0, 2, 0, 4, 2, 2, 0, 0, 1, 1, 2] , [1, 0, 4, 0, 2, 2, 2, 0, 0, 2, 2, 1] , [2, 0, 2, 0, 1, 1, 4, 0, 0, 2, 2, 2]] \$

$$[y_1, 0, y_2, 0, y_6, y_3, y_4, 0, 0, y_5, y_8, y_7]$$

2008 . Coloring, {2, 3, 4, 6, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^2 + 56s^5 + 16s^6 - 64s^7 - 256s^8 \quad p' = s^3 + 4s^4 - 8s^6 - 16s^7 \quad p'' = s^2 - 16s^4 - 8s^5 + 16s^6 + 64s^7$$

R: [7, 8, 8, 7, A, 3, B, B, C, 2, 4, 9]

B: [6, 7, 7, 6, 3, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
5 vs 8	8 vs 9	8 vs 9	7 vs 9	8 vs 8

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 2, 3, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 1, 2, 0, 5, 1] , [0, 0, 0, 5, 0, 0, 4, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 5, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 4, 0, 1, 0, 5, 2] , [0, 0, 0, 5, 0, 0, 4, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 5, 0, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 4, 0, 2, 0, 5, 1]] \$

$$[0, -6y_5 - 3y_1 - 3y_2 - 3y_3 + 13y_4 - 3y_7 + 13y_6, 3y_5, 3y_1, 0, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_7, 3y_6]$$

$$p = s^4 + s^5 - s^7 - s^8 \quad p' = s^4 - s^6 - s^7 + s^9$$

Omega Rank for B : cycles: {{3, 5, 7, 10, 12}} order: 5

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 3, 1, 3] , [1, 0, 2, 0, 3, 2, 1, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 1, 2, 0, 0, 3, 0, 4] , [0, 0, 3, 0, 4, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 4, 0, 3, 0, 3, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 4, 0, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 4, 0, 3] , [0, 0, 3, 0, 3, 0, 3, 0, 0, 3, 0, 4]] \$

$$[y_6, 0, y_7, 0, y_5, y_3, y_4, 0, 0, y_1, y_2, y_8]$$

2009 . Coloring, {2, 3, 4, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, A, A, A, B, C, 2, 4, 9]

B: [6, 7, 7, 6, 3, 3, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 7

Omega Rank for R : cycles: {{9, 12}, {2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$$\$ [[0, 2, 0, 2, 0, 0, 2, 2, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 2, 2, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 4, 2, 2, 2, 1], [0, 2, 0, 2, 0, 0, 2, 2, 1, 1, 4, 2], [0, 1, 0, 4, 0, 0, 2, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 0, 4, 1, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 2, 2, 2, 4, 1, 1], [0, 4, 0, 1, 0, 0, 2, 2, 1, 2, 2, 2]] \$$$

$$[0, 2y_5, 0, 2y_4, 0, 0, -2y_5 + 11y_4 + 11y_3 - 39y_2 + 11y_1 - 2y_6, 2y_3, 2y_2, 2y_1, 2y_6, 3y_4 + 3y_3 - 11y_2 + 3y_1]$$

$$p = -s + s^7 \quad p' = -s + s^7$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}} order: 5

See Matrix

$$\$ [[2, 0, 2, 0, 2, 2, 2, 0, 0, 0, 3, 3], [3, 0, 4, 0, 3, 2, 2, 0, 0, 0, 2, 0], [2, 0, 5, 0, 0, 3, 4, 0, 0, 0, 2, 0], [2, 0, 3, 0, 0, 2, 5, 0, 0, 0, 4, 0], [4, 0, 2, 0, 0, 2, 3, 0, 0, 0, 5, 0], [5, 0, 2, 0, 0, 4, 2, 0, 0, 0, 3, 0], [3, 0, 4, 0, 0, 5, 2, 0, 0, 0, 2, 0]] \$$$

$$[y_1, 0, y_2, 0, y_5, y_6, y_7, 0, 0, 0, y_3, y_4]$$

2010 . Coloring, {2, 3, 5, 6, 7, 8, 9, 10, 11}

R: [7, 8, 8, 6, 3, 3, A, B, C, 2, 4, 5]
B: [6, 7, 7, 7, A, A, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	7 vs 7

Omega Rank for R : cycles: $\{\{3, 4, 6, 8, 11\}\}$ order: 5
 See Matrix

$\$ [[0, 2, 2, 2, 2, 1, 1, 2, 0, 2, 1, 1], [0, 2, 3, 1, 1, 2, 0, 4, 0, 1, 2, 0], [0, 1, 3, 2, 0, 1, 0, 5, 0, 0, 4, 0], [0, 0, 1, 4, 0, 2, 0, 4, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 0, 1, 0, 0, 4, 0], [0, 0, 4, 4, 0, 5, 0, 2, 0, 0, 1, 0], [0, 0, 5, 1, 0, 4, 0, 4, 0, 0, 2, 0], [0, 0, 4, 2, 0, 1, 0, 5, 0, 0, 4, 0], [0, 0, 1, 4, 0, 2, 0, 4, 0, 0, 5, 0], [0, 0, 2, 5, 0, 4, 0, 1, 0, 0, 4, 0]] \$$

$$[0, y_8, y_7, y_6, y_5, y_4, y_3, y_2, 0, y_5, y_1, y_3]$$

$$p' = s^4 - s^9 \quad p = s^4 - s^9$$

Omega Rank for B : cycles: $\{\{1, 6, 9, 10, 11, 12\}\}$ order: 6
 See Matrix

$\$ [[2, 0, 0, 0, 0, 1, 3, 0, 2, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 1, 5, 2], [5, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 1], [3, 0, 0, 0, 0, 5, 0, 0, 1, 3, 2, 2], [2, 0, 0, 0, 0, 3, 0, 0, 2, 5, 1, 3], [1, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 5], [2, 0, 0, 0, 0, 1, 0, 0, 5, 2, 3, 3]] \$$

$$[y_5, 0, 0, 0, 0, y_1, y_2, 0, y_3, y_4, y_6, y_7]$$

2011 . Coloring, $\{2, 3, 5, 6, 7, 8, 9, 10, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^2 + 3s^3 - 6s^4 + 8s^5 - 24s^6 + 32s^7 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, B, C, 2, 1, 9]
B: [6, 7, 7, 7, A, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 10	9 vs 10	8 vs 10	4 vs 7

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[2, 2, 2, 0, 0, 1, 1, 2, 2, 2, 1, 1], [1, 2, 1, 0, 0, 0, 2, 4, 1, 1, 2, 2], [2, 1, 0, 0, 0, 0, 1, 3, 2, 2, 4, 1], [4, 2, 0, 0, 0, 0, 2, 1, 1, 1, 3, 2], [3, 1, 0, 0, 0, 0, 4, 2, 2, 2, 1, 1], [1, 2, 0, 0, 0, 0, 3, 1, 1, 4, 2, 2], [2, 4, 0, 0, 0, 0, 1, 2, 2, 3, 1, 1], [1, 3, 0, 0, 0, 0, 2, 4, 1, 1, 2, 2], [2, 1, 0, 0, 0, 0, 1, 3, 2, 2, 4, 1], [4, 2, 0, 0, 0, 0, 2, 1, 1, 1, 3, 2]] \$$

$[-3 y_4 - 3 y_2 + 8 y_8 - 3 y_7 + 5 y_5, 3 y_1, -3 y_1 - 3 y_3 + 5 y_8 - 3 y_6 + 8 y_5, 0, 0, 3 y_4, 3 y_3, 3 y_2, 3 y_8, 3 y_7, 3 y_6, 3 y_5]$

$$p' = -s^3 + s^9 \quad p = -s^3 + s^9$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}, \{4, 7, 11\}\}$ order: 3

See Matrix

$\$ [[0, 0, 0, 2, 2, 1, 3, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 0, 2, 0, 0, 3, 3, 2], [0, 0, 0, 3, 2, 0, 3, 0, 0, 3, 2, 3], [0, 0, 0, 2, 3, 0, 3, 0, 0, 2, 3, 3]] \$$

$[0, 0, 0, y_2, -y_1 + y_3, y_1, y_4, 0, 0, y_2, y_3, y_4]$

$$p = -s^2 + s^5 \quad p' = -s^2 + s^5 \quad p' = s^3 - s^6$$

M \; N

$\$ [[0, 308, 332, 0, 0, 0, 60, 0, 384, 0, 120, 0], [308, 0, 0, 0, 0, 166, 0, 286, 0, 223, 0, 221], [332, 0, 0, 0, 0, 222, 0, 194, 0, 349, 0, 107], [0, 0, 0, 0, 384, 60, 0, 0, 0, 332, 0, 428], [0, 0, 0, 384, 0, 0, 378, 0, 0, 0, 442, 0], [0, 166, 222, 60, 0, 0, 320, 0, 214, 0, 222, 0], [60, 0, 0, 0, 378, 320, 0, 320, 0, 446, 0, 884], [0, 286, 194, 0, 0, 0, 320, 0, 164, 0, 240, 0], [384, 0, 0, 0, 0, 214, 0, 164, 0, 442, 0, 0], [0, 223, 349, 332, 0, 0, 446, 0, 442, 0, 616, 0], [120, 0, 0, 0, 442, 222, 0, 240, 0, 616, 0, 768], [0, 221, 107, 428, 0, 0, 884, 0, 0, 0, 768, 0]] \$$
 $\$ [[0, 1, 1, 1, 0, 0, 1, 0, 1, 0, 1, 0], [1, 0, 0, 0, 1, 1, 0, 1, 0, 1, 0, 1], [1, 0, 0, 0, 1, 1, 0, 1, 0, 1, 0, 1], [1, 0, 0, 0, 1, 1, 0, 1, 0, 1, 0, 1], [0, 1, 1, 1, 0, 0, 1, 0, 1, 0, 1, 0], [0, 1, 1, 1, 0, 0, 1, 0, 1, 0, 1, 0], [1, 0, 0, 0, 1, 1, 0, 1, 0, 1, 0, 1], [0, 1, 1, 1, 0, 0, 1, 0, 1, 0, 1, 0], [0, 1, 1, 1, 0, 0, 1, 0, 1, 0, 1, 0], [1, 0, 0, 0, 1, 1, 0, 1, 0, 1, 0, 1], [0, 1, 1, 1, 0, 0, 1, 0, 1, 0, 1, 0]] \$$

$$\tau = 72, r' = 1/2$$

R: [7, 8, 8, 6, 3, 3, A, B, C, 2, 1, 9]

B: [6, 7, 7, 7, A, A, B, C, B, C, 4, 5]

Ranges

Action of R on ranges, [[23], [23], [24], [25], [3], [11], [27], [7], [26], [11], [27], [7], [26], [10], [10], [6], [21], [12], [2], [12], [13], [2], [29], [8], [28], [30], [5], [9], [1], [4]]

Action of B on ranges, [[20], [20], [22], [22], [15], [24], [25], [25], [18], [24], [25], [25], [18], [24], [24], [25], [18], [29], [16], [29], [29], [16], [30], [30], [19], [30], [17], [30], [17], [14]]

Cycles: R , {{1, 2, 7, 8, 10, 11}, {9, 12}}, B , {{5, 10, 12}, {4, 7, 11}}

$$\beta(\{1, 2\}) = 11/344$$

$$\beta(\{1, 3\}) = 83/2408$$

$$\beta(\{1, 7\}) = 15/2408$$

$$\beta(\{1, 9\}) = 12/301$$

$$\beta(\{1, 11\}) = 15/1204$$

$$\beta(\{2, 6\}) = 83/4816$$

$$\beta(\{2, 8\}) = 143/4816$$

$$\beta(\{2, 10\}) = 223/9632$$

$$\beta(\{2, 12\}) = 221/9632$$

$$\beta(\{3, 6\}) = 111/4816$$

$$\beta(\{3, 8\}) = 97/4816$$

$$\beta(\{3, 10\}) = 349/9632$$

$$\beta(\{3, 12\}) = 107/9632$$

$$\beta(\{4, 5\}) = 12/301$$

$$\beta(\{4, 6\}) = 15/2408$$

$$\beta(\{4, 10\}) = 83/2408$$

$$\beta(\{4, 12\}) = 107/2408$$

$$\beta(\{5, 7\}) = 27/688$$

$$\beta(\{5, 11\}) = 221/4816$$

$$\beta(\{6, 7\}) = 10/301$$

$$\beta(\{6, 9\}) = 107/4816$$

$$\beta(\{6, 11\}) = 111/4816$$

$$\beta(\{7, 8\}) = 10/301$$

$$\beta(\{7, 10\}) = 223/4816$$

$$\beta(\{7, 12\}) = 221/2408$$

$$\beta(\{8, 9\}) = 41/2408$$

$$\beta(\{8, 11\}) = 15/602$$

$$\beta(\{9, 10\}) = 221/4816$$

$$\beta(\{10, 11\}) = 11/172$$

$$\beta(\{11, 12\}) = 24/301$$

Omega Rank for R : cycles: {{9, 12}, {3, 4, 6, 8, 11}} order: 10

See Matrix

\$ [[0, 0, 2, 2, 0, 1, 1, 2, 2, 2, 1, 3] , [0, 0, 1, 1, 0, 2, 0, 2, 3, 1, 2, 4] , [0, 0, 2, 2, 0, 1, 0, 1, 4, 0, 2, 4] , [0, 0, 1, 2, 0, 2, 0, 2, 4, 0, 1, 4] , [0, 0, 2, 1, 0, 2, 0, 1, 4, 0, 2, 4] , [0, 0, 2, 2, 0, 1, 0, 2, 4, 0, 1, 4] , [0, 0, 1, 1, 0, 2, 0, 2, 4, 0, 2, 4] , [0, 0, 2, 2, 0, 1, 0, 1, 4, 0, 2, 4] , [0, 0, 1, 2, 0, 2, 0, 2, 4, 0, 1, 4]] \$

$$[0, 0, -y_1 - y_2 + 2y_4 + 2y_5 - y_3 - y_6, y_1, 0, y_2, y_4 + y_5 - y_7, y_3, y_4, y_5, y_6, y_7]$$

$$p' = -s^3 + s^8 \quad p = -s^3 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 1, 3, 0, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 2, 2, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 3, 3, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 3, 0, 0, 3, 3, 0] , [3, 3, 0, 0, 0, 2, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 3, 0]] \$

$$[y_1 + y_2 + y_3 - y_4 - y_5 + y_6 - y_7, y_1, 0, 0, y_2, y_3, y_4, 0, 0, y_5, y_6, y_7]$$

$$p = -s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

M \; N

\$ [[0, 956, 0, 0, 1260, 1164, 0, 0, 0, 0, 2328, 0] , [956, 0, 0, 0, 0, 0, 2328, 0, 0, 1539, 0, 885] , [0, 0, 0, 0, 0, 0, 1212, 0, 1284, 1305, 0, 1907] , [0, 0, 0, 0, 0, 0, 1164, 0, 1260, 1812, 0, 1472] , [1260, 0, 0, 0, 0, 0, 2132, 0, 0, 1284, 0, 1032] , [1164, 0, 0, 0, 0, 0, 478, 0, 736, 1794, 0, 1536] , [0, 2328, 1212, 1164, 2132, 478, 0, 478, 0, 0, 3624, 0] , [0, 0, 0, 0, 0, 0, 478, 0, 1396, 1770, 0, 2064] , [0, 0, 1284, 1260, 0, 736, 0, 1396, 0, 0, 1032, 0] , [0, 1539, 1305, 1812, 1284, 1794, 0, 1770, 0, 0, 1912, 0] , [2328, 0, 0, 0, 0, 0, 3624, 0, 1032, 1912, 0, 2520] , [0, 885, 1907, 1472, 1032, 1536, 0, 2064, 0, 0, 2520, 0]] \$ \$ [[0, 1, 1, 1, 1, 1, 0, 1, 0, 0, 1, 0] , [1, 0, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1] , [1, 0, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1] , [1, 0, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1] , [1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1] , [1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1] , [0, 1, 1, 1, 1, 1, 0, 1, 0, 0, 1, 0] , [1, 0, 0, 0, 0, 0, 1, 0, 1, 0, 1, 0] , [0, 1, 1, 1, 1, 1, 0, 1, 0, 0, 1, 0] , [1, 0, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1] , [0, 1, 1, 1, 1, 1, 0, 1, 0, 0, 1, 0]] \$

$$\tau = 74, r' = 1/2$$

R: [7, 8, 8, 6, 3, 3, A, B, C, C, 4, 9]

B: [6, 7, 7, 7, A, A, B, C, B, 2, 1, 5]

Ranges

Action of R on ranges, [[23], [8], [8], [12], [26], [27], [25], [26], [27], [27], [25], [21], [22], [22], [20], [10], [11], [9], [10], [11], [11], [9], [29], [14], [30], [30], [28], [15], [15], [13]]

Action of B on ranges, [[19], [21], [21], [3], [24], [5], [16], [24], [24], [5], [16], [24], [24], [5], [16], [29], [6], [17], [29], [29], [6], [17], [30], [4], [30], [7], [18], [4], [1], [2]]

Cycles: $R, \{\{9, 12\}, \{3, 4, 6, 8, 11\}\}, B, \{\{1, 2, 6, 7, 10, 11\}\}$

$$\beta(\{1, 2\}) = 239/11416$$

$$\beta(\{1, 5\}) = 315/11416$$

$$\beta(\{1, 6\}) = 291/11416$$

$$\beta(\{1, 11\}) = 291/5708$$

$$\beta(\{2, 7\}) = 291/5708$$

$$\beta(\{2, 10\}) = 1539/45664$$

$$\beta(\{2, 12\}) = 885/45664$$

$$\beta(\{3, 7\}) = 303/11416$$

$$\beta(\{3, 9\}) = 321/11416$$

$$\beta(\{3, 10\}) = 1305/45664$$

$$\beta(\{3, 12\}) = 1907/45664$$

$$\beta(\{4, 7\}) = 291/11416$$

$$\beta(\{4, 9\}) = 315/11416$$

$$\beta(\{4, 10\}) = 453/11416$$

$$\beta(\{4, 12\}) = 46/1427$$

$$\beta(\{5, 7\}) = 533/11416$$

$$\beta(\{5, 10\}) = 321/11416$$

$$\beta(\{5, 12\}) = 129/5708$$

$$\beta(\{6, 7\}) = 239/22832$$

$$\beta(\{6, 9\}) = 23/1427$$

$$\beta(\{6, 10\}) = 897/22832$$

$$\beta(\{6, 12\}) = 48/1427$$

$$\beta(\{7, 8\}) = 239/22832$$

$$\beta(\{7, 11\}) = 453/5708$$

$$\beta(\{8, 9\}) = 349/11416$$

$$\beta(\{8, 10\}) = 885/22832$$

$$\beta(\{8, 12\}) = 129/2854$$

$$\beta(\{9, 11\}) = 129/5708$$

$$\beta(\{10, 11\}) = 239/5708$$

$$\beta(\{11, 12\}) = 315/5708$$

Partitions

$$\alpha(\{\{1, 7, 9, 10, 12\}, \{2, 3, 4, 5, 6, 8, 11\}\}) = 1/1$$

$$b1 = \{1, 7, 9, 10, 12\} \text{ , ' , ' } b2 = \{2, 3, 4, 5, 6, 8, 11\}$$

Action of R and B on the blocks of the partitions: = [1, 2] [2, 1]
with invariant measure [1, 1]

N by blocks, check: true . ' See partition graph.

' ' See level-2 partition graph.

Right Group	
Coloring	{2, 3, 5, 6, 7, 8, 9, 11, 12}
Rank	2
R,B	[7, 8, 8, 6, 3, 3, A, B, C, C, 4, 9], [6, 7, 7, 7, A, A, B, C, B, 2, 1, 5]
π_2	[956, 0, 0, 1260, 1164, 0, 0, 0, 0, 2328, 0, 0, 0, 0, 2328, 0, 0, 1539, 0, 885, 0, 0, 0, 1212, 0, 1284, 1305, 0, 1907, 0, 0, 1164, 0, 1260, 1812, 0, 1472, 0, 2132, 0, 0, 1284, 0, 1032, 478, 0, 736, 1794, 0, 1536, 478, 0, 0, 3624, 0, 1396, 1770, 0, 2064, 0, 1032, 0, 1912, 0, 2520]
u_2	[1, 1, 1, 1, 1, 0, 1, 0, 0, 1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 1, 0, 1, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1] (dim 1)
wpp	[5, 7, 7, 7, 7, 7, 5, 7, 5, 5, 7, 5]

2013 . Coloring, {2, 3, 5, 6, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, B, B, 2, 4, 9]

B: [6, 7, 7, 7, A, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	7 vs 7

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}} order: 5

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 2, 2, 0] , [0, 2, 1, 2, 0, 2, 0, 4, 0, 1, 4, 0] , [0, 1, 2, 4, 0, 2, 0, 3, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 4, 0, 2, 0, 0, 3, 0] , [0, 0, 4, 3, 0, 3, 0, 4, 0, 0, 2, 0] , [0, 0, 3, 2, 0, 3, 0, 4, 0, 0, 4, 0] , [0, 0, 3, 4, 0, 2, 0, 3, 0, 0, 4, 0] , [0, 0, 2, 4, 0, 4, 0, 3, 0, 0, 3, 0]] \$

$$[0, y_1, y_2, y_3, 0, y_4, y_5, y_6, 2 y_5, y_7, y_8, 0]$$

$$p = -s^4 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 2, 2, 4], [2, 0, 0, 0, 4, 2, 0, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 2, 0, 0, 0, 6, 0, 3], [0, 0, 0, 0, 3, 3, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$$$

$$[y_7, 0, 0, 0, y_6, y_5, y_4, 0, 0, y_3, y_2, y_1]$$

2014 . Coloring, {2, 3, 5, 6, 7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 8, 8, 6, 3, 3, A, C, C, 2, 4, 9]

B: [6, 7, 7, 7, A, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	8 vs 9	8 vs 9	6 vs 9	7 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 2, 0, 2], [0, 2, 1, 0, 0, 2, 0, 4, 2, 1, 0, 4], [0, 1, 2, 0, 0, 0, 0, 3, 4, 0, 0, 6], [0, 0, 0, 0, 0, 0, 3, 6, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$$

$$[0, y_2, y_1, 8 y_2 - 4 y_1 - 6 y_3, 0, y_3, 4 y_2 - 2 y_1 - 3 y_3, y_4, y_5, 6 y_2 - 3 y_1 - 4 y_3, 0, y_6]$$

$$p = s^5 - s^9 \quad p' = -s^5 + s^7 \quad p'' = s^6 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 2, 0, 0, 0, 3, 3, 2] , [3, 0, 0, 0, 2, 4, 0, 0, 0, 4, 0, 3] , [0, 0, 0, 0, 3, 3, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

$$[y_1, 0, 0, 0, y_7, y_5, y_6, 0, 0, y_2, y_3, y_4]$$

2015 . Coloring, {2, 3, 5, 6, 8, 9, 10, 11, 12}

R: [7, 8, 8, 6, 3, 3, B, B, C, 2, 4, 9]

B: [6, 7, 7, 7, A, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	6 vs 7

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}, {9, 12}} order: 10
See Matrix

\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 0, 3, 1] , [0, 0, 1, 3, 0, 2, 0, 4, 1, 0, 3, 2] , [0, 0, 2, 3, 0, 3, 0, 1, 2, 0, 4, 1] , [0, 0, 3, 4, 0, 3, 0, 2, 1, 0, 1, 2] , [0, 0, 3, 1, 0, 4, 0, 3, 2, 0, 2, 1] , [0, 0, 4, 2, 0, 1, 0, 3, 1, 0, 3, 2] , [0, 0, 1, 3, 0, 2, 0, 4, 2, 0, 3, 1] , [0, 0, 2, 3, 0, 3, 0, 1, 1, 0, 4, 2] , [0, 0, 3, 4, 0, 3, 0, 2, 2, 0, 1, 1]] \$

$$[0, 6 y_6, -3 y_1 - 3 y_7 - 9 y_6 - 3 y_4 + 13 y_5 - 3 y_3 + 13 y_2, 3 y_1, 0, 3 y_7, 3 y_6, 3 y_4, 3 y_5, 0, 3 y_3, 3 y_2]$$

$$p = -s^2 - s^3 + s^7 + s^8 \quad p = s^2 - s^4 - s^7 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_1, 0, 0, 0, y_3, y_2, 3 y_4, 0, 0, y_5, y_4, y_6]$$

$$p = -s^4 + s^7$$

2016 . Coloring, {2, 3, 5, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 2s^2 - 7s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, 3, A, A, B, C, 2, 4, 9]

B: [6, 7, 7, 7, A, 3, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 10	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {2, 4, 6, 8, 10, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 0, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 1, 0, 3, 2, 2, 3, 1], [0, 2, \\ & 0, 3, 0, 2, 0, 2, 1, 1, 3, 2], [0, 1, 0, 3, 0, 3, 0, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 3, 0, 1, 1, 3, 2, 2], [0, 3, 0, 2, 0, 2, \\ & 0, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 2, 0, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 1, 0, 3, 2, 2, 3, 1], [0, 2, 0, 3, 0, 2, 0, 2, 1, 1, \\ & 3, 2]] \$ \end{aligned}$$

$$[0, 3 y_2, 3 y_1, 3 y_3, 0, -3 y_2 - 6 y_1 + 5 y_5 - 3 y_7 + 8 y_6, 3 y_1, -3 y_3 + 8 y_5 - 3 y_4 + 5 y_6, 3 y_5, 3 y_4, 3 y_7, 3 y_6]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8 \quad p'' = -s^3 + s^9$$

Omega Rank for B : cycles: {{1, 3, 6, 7, 11}, {5, 10, 12}}

See Matrix

$$\begin{aligned} \$ [& [2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 3, 3], [3, 0, 1, 0, 3, 2, 1, 0, 0, 2, 3, 1], [3, 0, 2, 0, 1, 3, 1, 0, 0, 3, 1, 2], [1, 0, \\ & 3, 0, 2, 3, 2, 0, 0, 1, 1, 3], [1, 0, 3, 0, 3, 1, 3, 0, 0, 2, 2, 1], [2, 0, 1, 0, 1, 1, 3, 0, 0, 3, 3, 2], [3, 0, 1, 0, 2, 2, \\ & 1, 0, 0, 1, 3, 3], [3, 0, 2, 0, 3, 3, 1, 0, 0, 2, 1, 1]] \$ \end{aligned}$$

$$[-3 y_1 + 5 y_2 - 3 y_4 - 3 y_3 + 5 y_5 - 3 y_7 + 5 y_6, 0, 3 y_1, 0, 3 y_2, 3 y_4, 3 y_3, 0, 0, 3 y_5, 3 y_7, 3 y_6]$$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

2017 . Coloring, {2, 3, 6, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = -6s^2 + 5s^3 - 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 6, A, 3, A, B, C, 2, 4, 9]

B: [6, 7, 7, 7, 3, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 8

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}, {9, 12}} order: 10

See Matrix

\$ [[0, 2, 1, 2, 0, 1, 1, 2, 2, 3, 1, 1], [0, 3, 1, 1, 0, 2, 0, 3, 1, 1, 2, 2], [0, 1, 2, 2, 0, 1, 0, 4, 2, 0, 3, 1], [0, 0, 1, 3, 0, 2, 0, 3, 1, 0, 4, 2], [0, 0, 2, 4, 0, 3, 0, 1, 2, 0, 3, 1], [0, 0, 3, 3, 0, 4, 0, 2, 1, 0, 1, 2], [0, 0, 4, 1, 0, 3, 0, 3, 2, 0, 2, 1], [0, 0, 3, 2, 0, 1, 0, 4, 1, 0, 3, 2], [0, 0, 1, 3, 0, 2, 0, 3, 2, 0, 4, 1], [0, 0, 2, 4, 0, 3, 0, 1, 1, 0, 3, 2]] \$

$$[0, -3y_1 - 3y_2 - 3y_3 - 3y_8 - 3y_4 + 13y_5 - 3y_6 - 3y_9 + 13y_7, 3y_1, 3y_2, 0, 3y_3, 3y_8, 3y_4, 3y_5, 3y_6, 3y_9, 3y_7]$$

$$p = -s^4 - s^5 + s^9 + s^{10}$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 1, 3, 0, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 1, 0, 0, 1, 3, 1], [3, 0, 3, 0, 1, 3, 2, 0, 0, 2, 1, 1], [1, 0, 1, 0, 1, 3, 3, 0, 0, 3, 2, 2], [2, 0, 1, 0, 2, 1, 1, 0, 0, 3, 3, 3], [3, 0, 2, 0, 3, 2, 1, 0, 0, 1, 1, 3], [1, 0, 3, 0, 3, 3, 2, 0, 0, 2, 1, 1], [1, 0, 3, 0, 1, 1, 3, 0, 0, 3, 2, 2]] \$

$$[y_1 - y_4 + y_2 - y_3 - y_5 + y_6 + y_7, 0, y_1, 0, y_4, y_2, y_3, 0, 0, y_5, y_6, y_7]$$

$$p = -s + s^2 - s^3 + s^4 - s^5 + s^6 - s^7 + s^8$$

2018 . Coloring, {2, 4, 5, 6, 7, 8, 9, 10, 11}

R: [7, 8, 7, 7, 3, 3, A, B, C, 2, 4, 5]

B: [6, 7, 8, 6, A, A, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	6 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 0, 4, 2, 0, 3, 1, 0] , [0, 3, 1, 1, 0, 0, 3, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 2, 3, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 2, 4, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 2, 3, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 3, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 2, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 3, 2, 0, 4, 2, 0]] \$

$$[0, y_1 + y_2 - y_3 - y_4 + y_5 + y_6 - y_7 + y_8, y_1, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = -s^4 + s^5 - s^6 + s^7 - s^8 + s^9$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 3, 3] , [3, 0, 0, 0, 0, 3, 0, 0, 3, 2, 3, 2] , [3, 0, 0, 0, 0, 3, 0, 0, 2, 3, 3, 2] , [3, 0, 0, 0, 0, 3, 0, 0, 2, 3, 2, 3] , [2, 0, 0, 0, 0, 3, 0, 0, 3, 3, 2, 3] , [2, 0, 0, 0, 0, 2, 0, 0, 3, 3, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 3, 3]] \$

$$[y_4, 0, 0, 0, 0, y_3, y_2, y_2, -y_4 + y_3 - 2y_2 - y_1 + y_6 + y_5, y_1, y_6, y_5]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7 \quad p = -s^2 + s^8$$

2019 . Coloring, {2, 4, 5, 6, 7, 8, 9, 10, 12}

R: [7, 8, 7, 7, 3, 3, A, B, C, 2, 1, 9]

B: [6, 7, 8, 6, A, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{1, 2, 7, 8, 10, 11\}, \{9, 12\}\}$ order: 6
 See Matrix

$\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 2, 1, 1], [1, 2, 0, 0, 0, 0, 4, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 1, 2, 2, 4, 2, 1], [2, 4, 0, 0, 0, 0, 1, 3, 1, 1, 2, 2], [2, 1, 0, 0, 0, 0, 2, 4, 2, 1, 3, 1], [3, 1, 0, 0, 0, 0, 2, 1, 1, 2, 4, 2], [4, 2, 0, 0, 0, 0, 3, 1, 2, 2, 1, 1], [1, 2, 0, 0, 0, 0, 4, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 1, 2, 2, 4, 2, 1]] \$$

$[-3 y_4 - 3 y_3 + 8 y_1 - 3 y_2 + 5 y_7, -3 y_5 + 5 y_1 - 3 y_6 + 8 y_7, 3 y_4, 0, 0, 0, 3 y_5, 3 y_3, 3 y_1, 3 y_2, 3 y_6, 3 y_7]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6
 See Matrix

$\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 2, 3, 3], [0, 0, 0, 3, 3, 2, 0, 0, 0, 4, 1, 3], [0, 0, 0, 1, 3, 3, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 1, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$

$[0, 0, 0, y_2, y_1, y_7, y_6, y_6, 0, y_5, y_4, y_3]$

$$p = -s^5 + s^8$$

2020 . Coloring, $\{2, 4, 5, 6, 7, 8, 9, 11, 12\}$

R: $[7, 8, 7, 7, 3, 3, A, B, C, C, 4, 9]$

B: $[6, 7, 8, 6, A, A, B, C, B, 2, 1, 5]$

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 8	9 vs 9

Omega Rank for R : cycles: $\{\{9, 12\}\}$ order: 6
 See Matrix

$\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 2, 1, 3], [0, 0, 0, 1, 0, 0, 4, 0, 3, 3, 1, 4], [0, 0, 0, 1, 0, 0, 1, 0, 4, 4, 0, 6], [0, 0, 0, 0, 0, 1, 0, 6, 1, 0, 8], [0, 0, 0, 0, 0, 0, 0, 8, 1, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9], [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7], [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$$

$$[0, 0, 2 y_3, y_1, 0, 0, y_2, y_3, y_4, y_7, y_5, y_6]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [2, 2, 0, 0, 2, 2, 1, 1, 0, 2, 3, 1], [3, 2, 0, 0, 1, 2, 2, 0, 0, 4, 1, 1], [1, 4, 0, 0, 1, 3, 2, 0, 0, 3, 2, 0], [2, 3, \\ & 0, 0, 0, 1, 4, 0, 0, 4, 2, 0], [2, 4, 0, 0, 0, 2, 3, 0, 0, 1, 4, 0], [4, 1, 0, 0, 0, 2, 4, 0, 0, 2, 3, 0], [3, 2, 0, 0, 0, 4, \\ & 1, 0, 0, 2, 4, 0], [4, 2, 0, 0, 0, 3, 2, 0, 0, 4, 1, 0], [1, 4, 0, 0, 0, 4, 2, 0, 0, 3, 2, 0]] \$ \end{aligned}$$

$$[y_4, y_5, 0, 0, y_3, y_2, y_1, y_9, 0, y_7, y_8, y_6]$$

2021 . Coloring, {2, 4, 5, 6, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 + 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, B, B, 2, 4, 9]

B: [6, 7, 8, 6, A, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$$\begin{aligned} \$ [& [0, 2, 2, 2, 0, 0, 3, 1, 2, 2, 2, 0], [0, 2, 0, 2, 0, 0, 4, 2, 0, 3, 3, 0], [0, 3, 0, 3, 0, 0, 2, 2, 0, 4, 2, 0], [0, 4, \\ & 0, 2, 0, 0, 3, 3, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 2, 4, 0, 3, 3, 0], [0, 3, 0, 3, 0, 0, 2, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, \\ & 3, 3, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 4, 2, 0, 3, 3, 0]] \$ \end{aligned}$$

$$[0, y_1, y_5, y_2, 0, 0, y_7, y_6, y_5, y_4, y_3, 0]$$

$$p = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 2, 2, 4] , [2, 0, 0, 0, 4, 2, 0, 0, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_1, 0, 0, 0, y_2, y_3, y_4, y_4, 0, y_5, y_6, y_7]$$

$$p = -s^5 + s^8$$

2022 . Coloring, {2, 4, 5, 6, 7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, 3, A, C, C, 2, 4, 9]

B: [6, 7, 8, 6, A, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 2, 0, 2] , [0, 2, 0, 0, 0, 0, 4, 2, 2, 3, 0, 3] , [0, 3, 0, 0, 0, 0, 0, 2, 3, 4, 0, 4] , [0, 4, 0, 0, 0, 0, 0, 3, 4, 0, 0, 5] , [0, 0, 0, 0, 0, 0, 0, 4, 5, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9]] \$

$$[0, y_1, y_2, y_2, 0, 0, y_3, y_4, y_5, y_6, 0, y_7]$$

$$p = -s^6 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 2, 0, 0, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 4, 0, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

$$[y_5, 0, 0, 0, y_1, y_2, y_3, y_3, 0, y_4, y_6, y_7]$$

$$p = -s^5 + s^8$$

2023 . Coloring, {2, 4, 5, 6, 8, 9, 10, 11, 12}

R: [7, 8, 7, 7, 3, 3, B, B, C, 2, 4, 9]

B: [6, 7, 8, 6, A, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 4, 2, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 6, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 3, 0, 1, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 4, 0, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 6, 0, 1, 0, 4, 2]] \$

$$[0, 3y_1, 3y_1, -6y_1 - 3y_2 - 3y_4 + 13y_3 - 3y_5 + 13y_6, 0, 0, 3y_2, 3y_4, 3y_3, 0, 3y_5, 3y_6]$$

$$p = s^3 + s^4 - s^6 - s^7 \quad p = -s^3 + s^5 + s^6 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[y_1, 0, 0, 0, y_2, y_3, y_6, y_6, 0, y_5, y_6, y_4]$$

$$p' = s^4 - s^7 \quad p = s^4 - s^7$$

2024 . Coloring, {2, 4, 5, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, 3, A, A, B, C, 2, 4, 9]

B: [6, 7, 8, 6, A, 3, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 0, 3, 2, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 0, 1, 3, 2, 3, 2, 1] , [0, 3, 0, 2, 0, 0, 1, 3, 1, 1, 3, 2] , [0, 1, 0, 3, 0, 0, 2, 3, 2, 1, 3, 1] , [0, 1, 0, 3, 0, 0, 3, 1, 1, 2, 3, 2] , [0, 2, 0, 3, 0, 0, 3, 1, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 0, 3, 2, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 0, 1, 3, 2, 3, 2, 1]] \$

[0, 3 y₁, 3 y₂, -3 y₂ - 3 y₃ + 8 y₄ - 3 y₅ + 5 y₇, 0, 0, -3 y₁ + 5 y₄ - 3 y₆ + 8 y₇, 3 y₃, 3 y₄, 3 y₅, 3 y₆, 3 y_{7}]}

$$p' = -s^2 + s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 9

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 2, 0, 1, 0, 2, 1, 2] , [1, 0, 2, 0, 2, 3, 0, 2, 0, 3, 0, 3] , [0, 0, 3, 0, 3, 1, 0, 2, 0, 2, 0, 5] , [0, 0, 1, 0, 5, 0, 0, 3, 0, 3, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 1, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$

[y₈, 0, y₉, 0, y₁, y₂, y₃, y₄, 0, y₅, y₆, y_{7}]}

2025 . Coloring, {2, 4, 6, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^6 - 32s^8$$

R: [7, 8, 7, 7, A, 3, A, B, C, 2, 4, 9]

B: [6, 7, 8, 6, 3, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	7 vs 9	9 vs 9

Omega Rank for R : cycles: $\{\{2, 4, 7, 8, 10, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 3, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 0, 1, 3, 2, 3, 2, 1], [0, 3, 0, 2, 0, 0, 1, 3, 1, 1, 3, 2], [0, 1, 0, 3, 0, 0, 2, 3, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 3, 1, 1, 2, 3, 2], [0, 2, 0, 3, 0, 0, 3, 1, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 3, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 0, 1, 3, 2, 3, 2, 1]] \$$

$[0, -3y_2 + 5y_3 - 3y_5 + 8y_7, -3y_1 - 3y_6 + 8y_3 - 3y_4 + 5y_7, 3y_1, 0, 0, 3y_2, 3y_6, 3y_3, 3y_4, 3y_5, 3y_7]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{3, 5, 8, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 0, 1, 0, 2, 1, 2], [1, 0, 3, 0, 2, 3, 0, 2, 0, 2, 0, 3], [0, 0, 2, 0, 3, 1, 0, 3, 0, 3, 0, 4], [0, 0, 3, 0, 4, 0, 0, 2, 0, 1, 0, 6], [0, 0, 4, 0, 6, 0, 0, 3, 0, 0, 0, 3], [0, 0, 6, 0, 3, 0, 0, 4, 0, 0, 0, 3], [0, 0, 3, 0, 3, 0, 0, 6, 0, 0, 0, 4], [0, 0, 3, 0, 4, 0, 0, 3, 0, 0, 0, 6]] \$$

$[y_1, 0, y_2, 0, y_5, y_6, y_3, y_4, 0, y_7, y_8, y_9]$

2026 . Coloring, $\{2, 5, 6, 7, 8, 9, 10, 11, 12\}$

R: [7, 8, 7, 6, 3, 3, A, B, C, 2, 4, 9]

B: [6, 7, 8, 7, A, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 10	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {2, 3, 4, 6, 7, 8, 10, 11}} order: 8
 See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 1, 1] , [0, 2, 1, 1, 0, 2, 2, 2, 1, 2, 1, 2] , [0, 2, 2, 1, 0, 1, 1, 2, 2, 2, 2, 1] , [0, 2, 1, 2, 0, 1, 2, 2, 1, 1, 2, 2] , [0, 1, 1, 2, 0, 2, 1, 2, 2, 2, 2, 1] , [0, 2, 2, 2, 0, 2, 1, 1, 1, 1, 2, 2] , [0, 1, 2, 2, 0, 2, 2, 2, 1, 1, 1] , [0, 1, 2, 1, 0, 2, 2, 1, 1, 2, 2, 2] , [0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 1, 1] , [0, 2, 1, 1, 0, 2, 2, 2, 1, 2, 1, 2]] \$

[0, 3 y₂, 3 y₃, -3 y₃ - 3 y₄ + 8 y₇ - 3 y₈ + 5 y₆, 0, -3 y₂ - 3 y₁ + 5 y₇ - 3 y₅ + 8 y₆, 3 y₁, 3 y₄, 3 y₇, 3 y₈, 3 y₅, 3 y₆]

$$p' = -s + s^9 \quad p = -s + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
 See Matrix

\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 2, 0, 0, 0, 3, 2, 3] , [2, 0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 3] , [0, 0, 0, 0, 3, 2, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

[y₅, 0, 0, 0, y₆, y₄, 2 y₁, y₁, 0, y₂, y₃, y₇]

$$p = -s^5 + s^8$$

2027 . Coloring, {3, 4, 5, 6, 7, 8, 9, 10, 11}

R: [7, 7, 8, 7, 3, 3, A, B, C, 2, 4, 5]
B: [6, 8, 7, 6, A, A, B, C, B, C, 1, 9]

‘ See graph
 ‘ ‘ See pair graph
 ‘

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 9	6 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 9
 See Matrix

\$ [[0, 2, 2, 2, 2, 0, 3, 1, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 0, 4, 2, 0, 3, 1, 0] , [0, 3, 1, 1, 0, 0, 3, 2, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 4, 1, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 6, 0, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 5, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 5, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 6, 0, 0, 5, 0, 0] , [0, 5, 0, 0, 0, 0, 5, 0, 0, 6, 0, 0]] \$

$$[0, y_1, y_2, y_3, y_4, 0, y_5, y_6, 0, y_7, y_8, y_9]$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 0, 2, 1, 1, 2, 2, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 3, 3], [3, 0, 0, 0, 0, 3, 0, 0, 3, 2, 3, 2], [3, 0, 0, 0, 0, 3, 0, 0, 2, 3, 3, 2], [3, 0, 0, 0, 0, 3, 0, 0, 2, 3, 2, 3], [2, 0, 0, 0, 0, 3, 0, 0, 3, 3, 2, 3], [2, 0, 0, 0, 0, 2, 0, 0, 3, 3, 3, 3], [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 3, 3]] \$$$

$$[y_6 - 2y_5 - y_4 - y_3 + y_2 + y_1, 0, 0, 0, 0, y_6, y_5, y_5, y_4, y_3, y_2, y_1]$$

$$p = -s^2 + s^8 \quad p = s^2 - s^3 + s^4 - s^5 + s^6 - s^7$$

2028 . Coloring, {3, 4, 5, 6, 7, 8, 9, 10, 12}

R: [7, 7, 8, 7, 3, 3, A, B, C, 2, 1, 9]

B: [6, 8, 7, 6, A, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 0, 3, 1, 2, 2, 1, 1], [1, 2, 0, 0, 0, 0, 4, 2, 1, 3, 1, 2], [1, 3, 0, 0, 0, 0, 3, 0, 2, 4, 2, 1], [2, 4, 0, 0, 0, 0, 4, 0, 1, 3, 0, 2], [0, 3, 0, 0, 0, 0, 6, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 3, 0, 1, 6, 0, 2], [0, 6, 0, 0, 0, 0, 4, 0, 2, 3, 0, 1], [0, 3, 0, 0, 0, 0, 6, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 6, 0, 1]] \$$$

$$[3y_2, 3y_1, -3y_2 - 3y_1 - 3y_8 - 3y_7 + 13y_6 - 3y_5 - 3y_4 + 13y_3, 0, 0, 0, 3y_8, 3y_7, 3y_6, 3y_5, 3y_4, 3y_3]$$

$$p = s^5 + s^6 - s^8 - s^9$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[0, 0, 0, 2, 2, 2, 1, 1, 0, 2, 3, 3] , [0, 0, 0, 3, 3, 2, 0, 0, 0, 4, 1, 3] , [0, 0, 0, 1, 3, 3, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 1, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

[0, 0, 0, $y_4, y_5, y_6, y_3, y_3, 0, y_1, y_2, y_7$]

$$p = s^5 - s^8$$

2029 . Coloring, {3, 4, 5, 6, 7, 8, 9, 11, 12}

R: [7, 7, 8, 7, 3, 3, A, B, C, C, 4, 9]

B: [6, 8, 7, 6, A, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 8	9 vs 9

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 3, 1, 2, 2, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 2, 3, 3, 1, 4] , [0, 0, 0, 1, 0, 0, 1, 0, 4, 2, 2, 6] , [0, 0, 0, 2, 0, 0, 1, 0, 6, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 2, 0, 6, 1, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 2, 0, 7] , [0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 9] , [0, 0, 0, 0, 0, 0, 0, 0, 9, 0, 0, 7]] \$

[0, 0, $y_5, y_4, 0, 0, y_3, y_1, y_2, y_8, y_6, y_7$]

Omega Rank for B : cycles: {{2, 5, 8, 10, 12}} order: 5

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 1, 1, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 2, 0, 2, 0, 4, 1, 1] , [1, 4, 0, 0, 1, 3, 0, 2, 0, 3, 0, 2] , [0, 3, 0, 0, 2, 1, 0, 4, 0, 4, 0, 2] , [0, 4, 0, 0, 2, 0, 0, 3, 0, 3, 0, 4] , [0, 3, 0, 0, 4, 0, 0, 4, 0, 2, 0, 3] , [0, 2, 0, 0, 3, 0, 0, 3, 0, 4, 0, 4] , [0, 4, 0, 0, 4, 0, 0, 2, 0, 3, 0, 3] , [0, 3, 0, 0, 3, 0, 0, 4, 0, 4, 0, 2]] \$

[$y_2, y_1, 0, 0, y_7, y_5, y_6, y_4, 0, y_3, y_9, y_8$]

2030 . Coloring, {3, 4, 5, 6, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^6 - 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, B, B, 2, 4, 9]

B: [6, 8, 7, 6, A, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	7 vs 8

Omega Rank for R : cycles: {{2, 7, 10}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 2, 2, 0] , [0, 2, 0, 2, 0, 0, 4, 2, 0, 3, 3, 0] , [0, 3, 0, 3, 0, 0, 4, 0, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 4, 0, 0, 6, 0, 0] , [0, 6, 0, 0, 0, 0, 6, 0, 0, 4, 0, 0] , [0, 4, 0, 0, 0, 0, 6, 0, 0, 6, 0, 0]] \$

$$[0, y_3, y_4, y_2, 0, 0, y_1, y_5, y_4, y_7, y_6, 0]$$

$$p = s^5 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 2, 2, 4] , [2, 0, 0, 0, 4, 2, 0, 0, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$

$$[y_1, 0, 0, 0, y_2, y_3, y_6, y_6, 0, y_7, y_4, y_5]$$

$$p = -s^5 + s^8$$

2031 . Coloring, {3, 4, 5, 6, 7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^3 + 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, 3, A, C, C, 2, 4, 9]

B: [6, 8, 7, 6, A, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	7 vs 8

Omega Rank for R : cycles: $\{\{2, 7, 10\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 2, 0, 2], [0, 2, 0, 0, 0, 0, 4, 2, 2, 3, 0, 3], [0, 3, 0, 0, 0, 0, 2, 0, 3, 4, 0, 4], [0, 4, 0, 0, 0, 0, 3, 0, 4, 2, 0, 3], [0, 2, 0, 0, 0, 0, 4, 0, 3, 3, 0, 4], [0, 3, 0, 0, 0, 0, 2, 0, 4, 4, 0, 3], [0, 4, 0, 0, 0, 0, 3, 0, 3, 2, 0, 4], [0, 2, 0, 0, 0, 0, 4, 0, 4, 3, 0, 3]] \$$

$$[0, 2y_1, 7y_1 + 7y_6 - 9y_5 - 9y_4 + 7y_3 - 9y_2, 7y_1 + 7y_6 - 9y_5 - 9y_4 + 7y_3 - 9y_2, 0, 0, 2y_6, 2y_5, 2y_4, 2y_3, 0, 2y_2]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p' = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 2, 4, 2], [4, 0, 0, 0, 2, 2, 0, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 4, 0, 0, 0, 4, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6]] \$$

$$[y_1, 0, 0, 0, y_3, y_2, y_7, y_7, 0, y_5, y_6, y_4]$$

$$p = -s^5 + s^8$$

2032 . Coloring, $\{3, 4, 5, 6, 8, 9, 10, 11, 12\}$

R: [7, 7, 8, 7, 3, 3, B, B, C, 2, 4, 9]

B: [6, 8, 7, 6, A, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 8	6 vs 8

Omega Rank for R : cycles: {{4, 7, 11}, {9, 12}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 4, 2, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 6, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 3, 0, 1, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 4, 0, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 6, 0, 1, 0, 4, 2]] \$

$$[0, 3 y_1, 3 y_1, 3 y_6, 0, 0, -6 y_1 - 3 y_6 - 3 y_3 + 13 y_5 - 3 y_4 + 13 y_2, 3 y_3, 3 y_5, 0, 3 y_4, 3 y_2]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = s^3 - s^5 - s^6 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 4, 1, 3] , [1, 0, 0, 0, 3, 2, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 1, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$

$$[y_2, 0, 0, 0, y_1, y_5, y_6, y_6, 0, y_4, y_6, y_3]$$

$$p = -s^4 + s^7 \quad p' = -s^4 + s^7$$

2033 . Coloring, {3, 4, 5, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, 3, A, A, B, C, 2, 4, 9]

B: [6, 8, 7, 6, A, 3, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	8 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6
 See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 0, 4, 1, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 0, 4, 0, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 4, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1]] \$

$$[0, -3y_2 - 3y_1 - 3y_3 - 3y_4 + 13y_5 - 3y_6 - 3y_7 + 13y_8, 3y_2, 3y_1, 0, 0, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7, 3y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

Omega Rank for B : cycles: {{5, 10, 12}, {1, 3, 6, 7, 11}}
 See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 2, 1, 0, 0, 2, 1, 2] , [1, 0, 2, 0, 2, 3, 2, 0, 0, 3, 1, 2] , [1, 0, 3, 0, 2, 1, 2, 0, 0, 2, 2, 3] , [2, 0, 1, 0, 3, 1, 3, 0, 0, 2, 2, 2] , [2, 0, 1, 0, 2, 2, 1, 0, 0, 3, 3, 2] , [3, 0, 2, 0, 2, 2, 1, 0, 0, 2, 1, 3] , [1, 0, 2, 0, 3, 3, 2, 0, 0, 2, 1, 2] , [1, 0, 3, 0, 2, 1, 2, 0, 0, 3, 2, 2]] \$

$$[7y_1, 0, -7y_1 + 9y_5 - 7y_4 - 7y_3 + 9y_2 + 9y_8 - 7y_7 + 9y_6, 0, 7y_5, 7y_4, 7y_3, 7y_2, 0, 7y_8, 7y_7, 7y_6]$$

$$p = s^2 + s^3 + s^4 - s^7 - s^8 - s^9$$

2034 . Coloring, {3, 4, 6, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 - 8s^5 - 8s^6 + 32s^8$$

R: [7, 7, 8, 7, A, 3, A, B, C, 2, 4, 9]

B: [6, 8, 7, 6, 3, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	10 vs 10	10 vs 10	8 vs 9	9 vs 9

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6
 See Matrix

\$ [[0, 2, 1, 2, 0, 0, 3, 1, 2, 3, 1, 1] , [0, 3, 0, 1, 0, 0, 4, 1, 1, 3, 1, 2] , [0, 3, 0, 1, 0, 0, 4, 0, 2, 4, 1, 1] , [0, 4, 0, 1, 0, 0, 4, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 5, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 4, 0, 1, 5, 0, 2] , [0, 5, 0, 0, 0, 0, 4, 0, 2, 4, 0, 1] , [0, 4, 0, 0, 0, 0, 5, 0, 1, 4, 0, 2] , [0, 4, 0, 0, 0, 0, 4, 0, 2, 5, 0, 1]] \$

$$[0, -3y_1 - 3y_4 - 3y_2 - 3y_3 + 13y_5 - 3y_6 - 3y_7 + 13y_8, 3y_1, 3y_4, 0, 0, 3y_2, 3y_3, 3y_5, 3y_6, 3y_7, 3y_8]$$

$$p = -s^5 - s^6 + s^8 + s^9$$

Omega Rank for B : cycles: {{1, 3, 5, 6, 7, 10, 11, 12}} order: 8

See Matrix

\$ [[2, 0, 1, 0, 2, 2, 1, 1, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 2, 1, 0, 0, 2, 1, 2] , [1, 0, 3, 0, 2, 3, 2, 0, 0, 2, 1, 2] , [1, 0, 2, 0, 2, 1, 3, 0, 0, 3, 2, 2] , [2, 0, 2, 0, 2, 1, 2, 0, 0, 1, 3, 3] , [3, 0, 2, 0, 3, 2, 2, 0, 0, 1, 2, 1] , [2, 0, 3, 0, 1, 3, 2, 0, 0, 2, 2, 1] , [2, 0, 1, 0, 1, 2, 3, 0, 0, 3, 2, 2] , [2, 0, 1, 0, 2, 2, 1, 0, 0, 2, 3, 3]] \$

$$[y_1, 0, y_4, 0, y_2, y_3, y_6, y_5, 0, y_7, y_9, y_8]$$

2035 . Coloring, {3, 5, 6, 7, 8, 9, 10, 11, 12}

R: [7, 7, 8, 6, 3, 3, A, B, C, 2, 4, 9]

B: [6, 8, 7, 7, A, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	6 vs 10	7 vs 8

Omega Rank for R : cycles: {{9, 12}, {3, 4, 6, 8, 11}, {2, 7, 10}}

See Matrix

\$ [[0, 2, 2, 2, 0, 1, 2, 1, 2, 2, 1, 1] , [0, 2, 1, 1, 0, 2, 2, 2, 1, 2, 1, 2] , [0, 2, 2, 1, 0, 1, 2, 1, 2, 2, 2, 1] , [0, 2, 1, 2, 0, 1, 2, 2, 1, 2, 1, 2] , [0, 2, 1, 1, 0, 2, 2, 1, 2, 2, 2, 1] , [0, 2, 2, 2, 0, 1, 2, 1, 1, 2, 1, 2] , [0, 2, 1, 1, 0, 2, 2, 2, 2, 1, 1] , [0, 2, 2, 1, 0, 1, 2, 1, 1, 2, 2, 2] , [0, 2, 1, 2, 0, 1, 2, 2, 2, 2, 1, 1] , [0, 2, 1, 1, 0, 2, 2, 1, 1, 2, 2, 2]] \$

$$[0, 2y_4, 7y_4 - 2y_1 - 2y_2 - 2y_3 - 2y_5, 2y_1, 0, 2y_2, 2y_4, 2y_3, 3y_4 - 2y_6, 2y_4, 2y_5, 2y_6]$$

$$p = -s - s^2 + s^6 + s^7 \quad p = s - s^3 - s^6 + s^8 \quad p = -s - s^4 + s^6 + s^9 \quad p = s - s^5 - s^6 + s^{10}$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 2, 1, 0, 2, 3, 3], [3, 0, 0, 0, 3, 2, 0, 0, 0, 3, 2, 3], [2, 0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 2, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$$

$$[y_4, 0, 0, 0, y_3, y_2, 2y_1, y_1, 0, y_6, y_5, y_7]$$

$$p = s^5 - s^8$$

2036 . Coloring, {4, 5, 6, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^6 - 32s^8$$

R: [7, 7, 7, 7, 3, 3, A, B, C, 2, 4, 9]

B: [6, 8, 8, 6, A, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 7

Omega Rank for R : cycles: {{9, 12}, {2, 7, 10}} order: 6
See Matrix

$$\$ [[0, 2, 2, 2, 0, 0, 4, 0, 2, 2, 1, 1], [0, 2, 0, 1, 0, 0, 6, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 6, 0, 1], [0, 6, 0, 0, 0, 0, 4, 0, 1, 3, 0, 2], [0, 3, 0, 0, 0, 0, 6, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 3, 0, 1, 6, 0, 2], [0, 6, 0, 0, 0, 0, 4, 0, 2, 3, 0, 1], [0, 3, 0, 0, 0, 0, 6, 0, 1, 4, 0, 2]] \$$$

$$[0, -3y_1 - 3y_4 + 13y_3 - 3y_2 - 9y_5 + 13y_6, 6y_5, 3y_1, 0, 0, 3y_4, 0, 3y_3, 3y_2, 3y_5, 3y_6]$$

$$p = -s^3 - s^4 + s^6 + s^7 \quad p = -s^3 + s^5 + s^6 - s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6
See Matrix

\$ [[2, 0, 0, 0, 2, 2, 0, 2, 0, 2, 3, 3] , [3, 0, 0, 0, 3, 2, 0, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 3, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5] , [0, 0, 0, 0, 5, 0, 0, 0, 0, 4, 0, 7] , [0, 0, 0, 0, 7, 0, 0, 0, 0, 5, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 7, 0, 5]] \$

$$[2y_1, 0, 0, 0, 2y_2, 2y_3, 0, 2y_4, 0, 2y_5, 3y_4, 2y_6]$$

$$p = s^4 - s^7$$

2037 . Coloring, {2, 3, 4, 5, 6, 7, 8, 9, 10, 11}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 - 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, B, C, 2, 4, 5]

B: [6, 7, 7, 6, A, A, B, C, B, C, 1, 9]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	8 vs 9	6 vs 7

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 2, 0, 2, 2, 0, 2, 1, 1] , [0, 2, 2, 1, 1, 0, 2, 4, 0, 2, 2, 0] , [0, 2, 1, 2, 0, 0, 1, 4, 0, 2, 4, 0] , [0, 2, 0, 4, 0, 0, 2, 3, 0, 1, 4, 0] , [0, 1, 0, 4, 0, 0, 4, 2, 0, 2, 3, 0] , [0, 2, 0, 3, 0, 0, 4, 1, 0, 4, 2, 0] , [0, 4, 0, 2, 0, 0, 3, 2, 0, 4, 1, 0] , [0, 4, 0, 1, 0, 0, 2, 4, 0, 3, 2, 0] , [0, 3, 0, 2, 0, 0, 1, 4, 0, 2, 4, 0]] \$

$$[0, -y_1 + y_2 + y_3 - y_4 + y_5 + y_6 - y_7 - y_8, y_1, y_2, y_3, 0, y_4, y_5, 0, y_6, y_7, y_8]$$

$$p = s^4 - s^5 + s^6 - s^7 + s^8 - s^9$$

Omega Rank for B : cycles: {{1, 6, 9, 10, 11, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 0, 2, 2, 0, 2, 2, 3, 3] , [3, 0, 0, 0, 0, 2, 0, 0, 3, 2, 4, 2] , [4, 0, 0, 0, 0, 3, 0, 0, 2, 2, 3, 2] , [3, 0, 0, 0, 0, 4, 0, 0, 2, 3, 2, 2] , [2, 0, 0, 0, 0, 3, 0, 0, 2, 4, 2, 3] , [2, 0, 0, 0, 0, 2, 0, 0, 3, 3, 2, 4] , [2, 0, 0, 0, 0, 2, 0, 0, 4, 2, 3, 3]] \$

$$[y_1 - y_2 - y_3 - y_4 + y_5 + y_6, 0, 0, 0, 0, y_1, y_2, 0, y_3, y_4, y_5, y_6]$$

$$p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

2038 . Coloring, {2, 3, 4, 5, 6, 7, 8, 9, 10, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, B, C, 2, 1, 9]

B: [6, 7, 7, 6, A, A, B, C, B, C, 4, 5]

‘ See graph

‘ ‘ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 9	7 vs 7

Omega Rank for R : cycles: {{1, 2, 7, 8, 10, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[2, 2, 2, 0, 0, 0, 2, 2, 2, 2, 1, 1], [1, 2, 0, 0, 0, 0, 2, 4, 1, 2, 2, 2], [2, 2, 0, 0, 0, 0, 1, 2, 2, 2, 4, 1], [4, 2, 0, 0, 0, 0, 2, 2, 1, 1, 2, 2], [2, 1, 0, 0, 0, 0, 4, 2, 2, 2, 2, 1], [2, 2, 0, 0, 0, 0, 2, 1, 1, 4, 2, 2], [2, 4, 0, 0, 0, 0, 2, 2, 2, 2, 1, 1], [1, 2, 0, 0, 0, 0, 2, 4, 1, 2, 2, 2], [2, 2, 0, 0, 0, 0, 1, 2, 2, 2, 4, 1]] \$$$

$$[-3y_3 + 5y_4 - 3y_5 + 8y_7, -3y_1 - 3y_2 + 8y_4 - 3y_6 + 5y_7, 3y_1, 0, 0, 0, 3y_2, 3y_3, 3y_4, 3y_5, 3y_6, 3y_7]$$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[0, 0, 0, 2, 2, 2, 2, 0, 0, 2, 3, 3], [0, 0, 0, 3, 3, 2, 0, 0, 0, 4, 2, 2], [0, 0, 0, 2, 2, 3, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$$

$$[0, 0, 0, y_4, y_1, y_2, y_3, 0, 0, y_7, y_5, y_6]$$

2039 . Coloring, {2, 3, 4, 5, 6, 7, 8, 9, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 + 2s^4 + 8s^5 + 8s^6 - 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, B, C, C, 4, 9]

B: [6, 7, 7, 6, A, A, B, C, B, 2, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 8	8 vs 8

Omega Rank for R : cycles: {{9, 12}} order: 8

See Matrix

\$ [[0, 0, 2, 2, 0, 0, 2, 2, 2, 2, 1, 3] , [0, 0, 0, 1, 0, 0, 2, 2, 3, 2, 2, 4] , [0, 0, 0, 2, 0, 0, 1, 0, 4, 2, 2, 5] , [0, 0, 0, 2, 0, 0, 2, 0, 5, 1, 0, 6] , [0, 0, 0, 0, 0, 0, 2, 0, 6, 2, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 6, 2, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, 0, y_1, y_1 + y_5 - y_2 - y_3 - y_4 + y_7 + y_6, 0, 0, y_5, y_2, y_3, y_4, y_7, y_6]$$

$$p = -s^7 + s^8$$

Omega Rank for B : cycles: {{1, 2, 6, 7, 10, 11}} order: 6

See Matrix

\$ [[2, 2, 0, 0, 2, 2, 2, 0, 0, 2, 3, 1] , [3, 2, 0, 0, 1, 2, 2, 0, 0, 4, 2, 0] , [2, 4, 0, 0, 0, 3, 2, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 4, 0, 0, 3, 2, 0] , [2, 3, 0, 0, 0, 2, 3, 0, 0, 2, 4, 0] , [4, 2, 0, 0, 0, 2, 3, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 4, 2, 0, 0, 2, 3, 0] , [3, 2, 0, 0, 0, 3, 2, 0, 0, 4, 2, 0]] \$

$$[y_1, y_2, 0, 0, y_3, y_4, y_5, 0, 0, y_6, y_7, y_8]$$

2040 . Coloring, {2, 3, 4, 5, 6, 7, 8, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = 3s^2 + 10s^3 + 40s^5 + 32s^6 + 32s^7 + 128s^8 \quad p = 9s^2 + 20s^4 + 40s^5 + 16s^6 + 96s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, 3, A, B, B, 2, 4, 9]

B: [6, 7, 7, 6, A, A, B, C, C, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 8	7 vs 7

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$\$ [[0, 2, 2, 2, 0, 0, 2, 2, 2, 2, 2, 0], [0, 2, 0, 2, 0, 0, 2, 4, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 2, 2, 0, 2, 4, 0], [0, 2, 0, 4, 0, 0, 4, 2, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 4, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 2, 0, 4, 2, 0], [0, 4, 0, 2, 0, 0, 2, 4, 0, 2, 2, 0], [0, 2, 0, 2, 0, 0, 2, 4, 0, 2, 4, 0]] \$$

$$[0, y_3, y_4, y_3 + y_1 - y_2 - y_5 + y_6, 0, 0, y_1, y_2, y_4, y_5, y_6, 0]$$

$$p = -s^2 + s^8 \quad p = -s^2 + s^3 - s^4 + s^5 - s^6 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$\$ [[2, 0, 0, 0, 2, 2, 2, 0, 0, 2, 2, 4], [2, 0, 0, 0, 4, 2, 0, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 4, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6]] \$$

$$[y_2, 0, 0, 0, y_1, y_5, y_3, 0, 0, y_4, y_6, y_7]$$

2041 . Coloring, {2, 3, 4, 5, 6, 7, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 - 8s^4 + 8s^5 - 32s^7 \quad p = s^2 - 12s^4 - 8s^5 + 16s^6 - 32s^7 - 64s^8$$

R: [7, 8, 8, 7, 3, 3, A, C, C, 2, 4, 9]

B: [6, 7, 7, 6, A, A, B, B, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	8 vs 8	8 vs 8	6 vs 8	7 vs 7

Omega Rank for R : cycles: {{9, 12}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 0, 2, 2, 2, 2, 0, 2] , [0, 2, 0, 0, 0, 0, 2, 4, 2, 2, 0, 4] , [0, 2, 0, 0, 0, 0, 0, 2, 4, 2, 0, 6] , [0, 2, 0, 0, 0, 0, 0, 2, 6, 0, 0, 6] , [0, 0, 0, 0, 0, 0, 0, 2, 6, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8] , [0, 0, 0, 0, 0, 0, 0, 0, 8, 0, 0, 8]] \$

$$[0, -y_2 + y_3 + y_6 + y_4 - y_5, y_1, y_1, 0, 0, y_2, y_3, y_6, y_4, 0, y_5]$$

$$p = -s^6 + s^7 \quad p = -s^6 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

\$ [[2, 0, 0, 0, 2, 2, 2, 0, 0, 2, 4, 2] , [4, 0, 0, 0, 2, 2, 0, 0, 0, 4, 2, 2] , [2, 0, 0, 0, 2, 4, 0, 0, 0, 4, 0, 4] , [0, 0, 0, 0, 4, 2, 0, 0, 0, 6, 0, 4] , [0, 0, 0, 0, 4, 0, 0, 0, 0, 6, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 4, 0, 6] , [0, 0, 0, 0, 6, 0, 0, 0, 0, 6, 0, 4]] \$

$$[y_1, 0, 0, 0, y_2, y_3, y_4, 0, 0, y_5, y_6, y_7]$$

2042 . Coloring, {2, 3, 4, 5, 6, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p = s^3 - 8s^6 - 16s^7 \quad p' = s^3 - 8s^6 - 16s^7$$

R: [7, 8, 8, 7, 3, 3, B, B, C, 2, 4, 9]

B: [6, 7, 7, 6, A, A, A, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	6 vs 8	6 vs 7

Omega Rank for R : cycles: {{9, 12}, {4, 7, 11}} order: 6

See Matrix

\$ [[0, 2, 2, 2, 0, 0, 2, 2, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 2, 4, 1, 0, 4, 2] , [0, 0, 0, 4, 0, 0, 3, 0, 2, 0, 6, 1] , [0, 0, 0, 6, 0, 0, 4, 0, 1, 0, 3, 2] , [0, 0, 0, 3, 0, 0, 6, 0, 2, 0, 4, 1] , [0, 0, 0, 4, 0, 0, 3, 0, 1, 0, 6, 2] , [0, 0, 0, 6, 0, 0, 4, 0, 2, 0, 3, 1] , [0, 0, 0, 3, 0, 0, 6, 0, 1, 0, 4, 2]] \$

$$[0, 3 y_1, 3 y_1, -6 y_1 - 3 y_2 - 3 y_3 + 13 y_4 - 3 y_5 + 13 y_6, 0, 0, 3 y_2, 3 y_3, 3 y_4, 0, 3 y_5, 3 y_6]$$

$$p = -s^3 + s^5 + s^6 - s^8 \quad p' = -s^3 - s^4 + s^6 + s^7$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 2, 2, 0, 0, 4, 1, 3], [1, 0, 0, 0, 3, 2, 0, 0, 0, 6, 0, 4], [0, 0, 0, 0, 4, 1, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$$

$$[y_1, 0, 0, 0, y_2, y_3, 2 y_5, 0, 0, y_4, y_5, y_6]$$

$$p = -s^4 + s^7$$

2043 . Coloring, {2, 3, 4, 5, 7, 8, 9, 10, 11, 12}

$$\Omega p(\Delta)=0: \quad p' = s^2 - 2s^3 + 8s^4 - 8s^5 + 32s^7 \quad p = s^2 + 4s^4 + 8s^5 - 16s^6 + 32s^7 + 64s^8$$

R: [7, 8, 8, 7, 3, A, A, B, C, 2, 4, 9]

B: [6, 7, 7, 6, A, 3, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}, {9, 12}} order: 6

See Matrix

$$\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 2, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 3, 2, 2, 3, 1], [0, 2, 0, 3, 0, 0, 2, 2, 1, 1, 3, 2], [0, 1, 0, 3, 0, 0, 3, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 0, 3, 1, 1, 3, 2, 2], [0, 3, 0, 2, 0, 0, 2, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 2, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 3, 2, 2, 3, 1]] \$$$

$$[0, 3 y_7, 3 y_6, 3 y_5, 0, 0, 3 y_4, 3 y_3, 3 y_2, -3 y_5 - 3 y_3 + 8 y_2 + 5 y_1, -3 y_7 - 3 y_6 - 3 y_4 + 5 y_2 + 8 y_1, 3 y_1]$$

$$p' = s^2 - s^8 \quad p = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 6, 7, 11\}, \{5, 10, 12\}\}$

See Matrix

$\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 1, 0, 0, 2, 2, 1], [2, 0, 2, 0, 1, 3, 2, 0, 0, 3, 1, 2], [1, 0, 3, 0, 2, 2, 2, 0, 0, 1, 2, 3], [2, 0, 2, 0, 3, 1, 3, 0, 0, 2, 2, 1], [2, 0, 1, 0, 1, 2, 2, 0, 0, 3, 3, 2], [3, 0, 2, 0, 2, 2, 1, 0, 0, 1, 2, 3], [2, 0, 2, 0, 3, 3, 2, 0, 0, 2, 1, 1]] \$$

$[-3 y_3 + 5 y_1 - 3 y_2 - 3 y_4 + 5 y_6 - 3 y_7 + 5 y_5, 0, 3 y_3, 0, 3 y_1, 3 y_2, 3 y_4, 0, 0, 3 y_6, 3 y_7, 3 y_5]$

$$p = -s - s^2 - s^3 + s^6 + s^7 + s^8$$

2044 . Coloring, $\{2, 3, 4, 6, 7, 8, 9, 10, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = -9s^2 + 4s^4 - 24s^5 - 16s^6 + 96s^7 + 64s^8 \quad p = -3s^2 + 2s^3 - 8s^5 + 32s^7$$

R: [7, 8, 8, 7, A, 3, A, B, C, 2, 4, 9]

B: [6, 7, 7, 6, 3, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
6 vs 8	9 vs 9	9 vs 9	7 vs 9	8 vs 8

Omega Rank for R : cycles: $\{\{2, 4, 7, 8, 10, 11\}, \{9, 12\}\}$ order: 6

See Matrix

$\$ [[0, 2, 1, 2, 0, 0, 2, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 2, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 3, 2, 2, 3, 1], [0, 2, 0, 3, 0, 0, 2, 2, 1, 1, 3, 2], [0, 1, 0, 3, 0, 0, 3, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 0, 3, 1, 1, 3, 2, 2], [0, 3, 0, 2, 0, 0, 2, 2, 2, 3, 1, 1], [0, 3, 0, 1, 0, 0, 2, 3, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 3, 2, 2, 3, 1]] \$$

$[0, 3 y_1, -3 y_1 - 3 y_2 + 5 y_4 - 3 y_6 + 8 y_7, -3 y_3 + 8 y_4 - 3 y_5 + 5 y_7, 0, 0, 3 y_2, 3 y_3, 3 y_4, 3 y_5, 3 y_6, 3 y_7]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

Omega Rank for B : cycles: $\{\{1, 3, 5, 6, 7, 10, 11, 12\}\}$ order: 8

See Matrix

$\$ [[2, 0, 1, 0, 2, 2, 2, 0, 0, 1, 3, 3], [3, 0, 2, 0, 3, 2, 1, 0, 0, 2, 2, 1], [2, 0, 3, 0, 1, 3, 2, 0, 0, 2, 1, 2], [1, 0, 1, 0, 2, 2, 3, 0, 0, 3, 2, 2], [2, 0, 2, 0, 2, 1, 1, 0, 0, 2, 3, 3], [3, 0, 2, 0, 3, 2, 2, 0, 0, 1, 1, 2], [1, 0, 3, 0, 2, 3,$

$$2, 0, 0, 2, 2, 1], [2, 0, 2, 0, 1, 1, 3, 0, 0, 3, 2, 2]] \$$$

$$[y_1, 0, y_2, 0, y_7, y_3, y_4, 0, 0, y_6, y_8, y_5]$$

2045 . Coloring, {2, 3, 5, 6, 7, 8, 9, 10, 11, 12}

R: [7, 8, 8, 6, 3, 3, A, B, C, 2, 4, 9]

B: [6, 7, 7, 7, A, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	9 vs 10	7 vs 7

Omega Rank for R : cycles: {{3, 4, 6, 8, 11}, {9, 12}} order: 10

See Matrix

$$\$ [[0, 2, 2, 2, 0, 1, 1, 2, 2, 2, 1, 1], [0, 2, 1, 1, 0, 2, 0, 4, 1, 1, 2, 2], [0, 1, 2, 2, 0, 1, 0, 3, 2, 0, 4, 1], [0, 0, 1, 4, 0, 2, 0, 3, 1, 0, 3, 2], [0, 0, 2, 3, 0, 4, 0, 1, 2, 0, 3, 1], [0, 0, 4, 3, 0, 3, 0, 2, 1, 0, 1, 2], [0, 0, 3, 1, 0, 3, 0, 4, 2, 0, 2, 1], [0, 0, 3, 2, 0, 1, 0, 3, 1, 0, 4, 2], [0, 0, 1, 4, 0, 2, 0, 3, 2, 0, 3, 1], [0, 0, 2, 3, 0, 4, 0, 1, 1, 0, 3, 2]] \$$$

$$[0, -3 y_1 - 3 y_2 - 3 y_3 - 3 y_6 - 3 y_7 + 13 y_8 - 3 y_4 - 3 y_9 + 13 y_5, 3 y_1, 3 y_2, 0, 3 y_3, 3 y_6, 3 y_7, 3 y_8, 3 y_4, 3 y_9, 3 y_5]$$

$$p = -s^4 - s^5 + s^9 + s^{10}$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$$\$ [[2, 0, 0, 0, 2, 1, 3, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 2, 0, 0, 0, 3, 3, 2], [3, 0, 0, 0, 2, 3, 0, 0, 0, 5, 0, 3], [0, 0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$$

$$[y_1, 0, 0, 0, y_6, y_5, y_4, 0, 0, y_2, y_3, y_7]$$

2046 . Coloring, {2, 4, 5, 6, 7, 8, 9, 10, 11, 12}

R: [7, 8, 7, 7, 3, 3, A, B, C, 2, 4, 9]
B: [6, 7, 8, 6, A, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	7 vs 9	7 vs 8

Omega Rank for R : cycles: {{2, 4, 7, 8, 10, 11}, {9, 12}} order: 6

See Matrix

$\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 2, 1, 1], [0, 2, 0, 1, 0, 0, 4, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 0, 1, 2, 2, 4, 2, 1], [0, 4, 0, 2, 0, 0, 1, 3, 1, 1, 2, 2], [0, 1, 0, 2, 0, 0, 2, 4, 2, 1, 3, 1], [0, 1, 0, 3, 0, 0, 2, 1, 1, 2, 4, 2], [0, 2, 0, 4, 0, 0, 3, 1, 2, 2, 1, 1], [0, 2, 0, 1, 0, 0, 4, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 0, 1, 2, 2, 4, 2, 1]] \$$

$[0, -3 y_2 + 5 y_7 - 3 y_4 + 8 y_5, -3 y_1 - 3 y_3 + 8 y_7 - 3 y_6 + 5 y_5, 3 y_1, 0, 0, 3 y_2, 3 y_3, 3 y_7, 3 y_6, 3 y_4, 3 y_5]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 2, 3, 3], [3, 0, 0, 0, 3, 2, 0, 0, 0, 4, 1, 3], [1, 0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 1, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$

$[y_1, 0, 0, 0, y_2, y_7, y_6, y_6, 0, y_5, y_4, y_3]$

$$p = -s^5 + s^8$$

2047 . Coloring, {3, 4, 5, 6, 7, 8, 9, 10, 11, 12}

R: [7, 7, 8, 7, 3, 3, A, B, C, 2, 4, 9]
B: [6, 8, 7, 6, A, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
8 vs 8	10 vs 10	10 vs 10	8 vs 9	7 vs 8

Omega Rank for R : cycles: $\{\{9, 12\}, \{2, 7, 10\}\}$ order: 6

See Matrix

$\$ [[0, 2, 2, 2, 0, 0, 3, 1, 2, 2, 1, 1], [0, 2, 0, 1, 0, 0, 4, 2, 1, 3, 1, 2], [0, 3, 0, 1, 0, 0, 3, 0, 2, 4, 2, 1], [0, 4, 0, 2, 0, 0, 4, 0, 1, 3, 0, 2], [0, 3, 0, 0, 0, 0, 6, 0, 2, 4, 0, 1], [0, 4, 0, 0, 0, 0, 3, 0, 1, 6, 0, 2], [0, 6, 0, 0, 0, 0, 4, 0, 2, 3, 0, 1], [0, 3, 0, 0, 0, 0, 6, 0, 1, 4, 0, 2], [0, 4, 0, 0, 0, 0, 3, 0, 2, 6, 0, 1]] \$$

$[0, -3 y_1 - 3 y_2 - 3 y_3 - 3 y_8 + 13 y_6 - 3 y_7 - 3 y_4 + 13 y_5, 3 y_1, 3 y_2, 0, 0, 3 y_3, 3 y_8, 3 y_6, 3 y_7, 3 y_4, 3 y_5]$

$$p = -s^5 - s^6 + s^8 + s^9$$

Omega Rank for B : cycles: $\{\{5, 10, 12\}\}$ order: 6

See Matrix

$\$ [[2, 0, 0, 0, 2, 2, 1, 1, 0, 2, 3, 3], [3, 0, 0, 0, 3, 2, 0, 0, 0, 4, 1, 3], [1, 0, 0, 0, 3, 3, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 1, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6]] \$$

$[y_1, 0, 0, 0, y_7, y_6, y_5, y_5, 0, y_4, y_3, y_2]$

$$p = -s^5 + s^8$$

2048 . Coloring, $\{2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

$$\Omega p(\Delta)=0: \quad p = s^3 - 2s^4 + 8s^5 - 8s^6 + 32s^8$$

R: [7, 8, 8, 7, 3, 3, A, B, C, 2, 4, 9]

B: [6, 7, 7, 6, A, A, B, C, B, C, 1, 5]

‘ See graph

‘ ‘ See pair graph

‘

Δ-Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
7 vs 8	9 vs 9	9 vs 9	7 vs 9	7 vs 7

Omega Rank for R : cycles: {{9, 12}, {2, 4, 7, 8, 10, 11}} order: 6

See Matrix

$\$ [[0, 2, 2, 2, 0, 0, 2, 2, 2, 2, 1, 1], [0, 2, 0, 1, 0, 0, 2, 4, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 2, 2, 2, 4, 1], [0, 2, 0, 4, 0, 0, 2, 2, 1, 1, 2, 2], [0, 1, 0, 2, 0, 0, 4, 2, 2, 2, 2, 1], [0, 2, 0, 2, 0, 0, 2, 1, 1, 4, 2, 2], [0, 4, 0, 2, 0, 0, 2, 2, 2, 2, 1, 1], [0, 2, 0, 1, 0, 0, 2, 4, 1, 2, 2, 2], [0, 2, 0, 2, 0, 0, 1, 2, 2, 2, 4, 1]] \$$

$[0, -3 y_2 - 3 y_1 + 8 y_4 - 3 y_6 + 5 y_7, 3 y_2, 3 y_3, 0, 0, 3 y_1, -3 y_3 + 5 y_4 - 3 y_5 + 8 y_7, 3 y_4, 3 y_5, 3 y_6, 3 y_7]$

$$p = -s^2 + s^8 \quad p' = -s^2 + s^8$$

Omega Rank for B : cycles: {{5, 10, 12}} order: 6

See Matrix

$\$ [[2, 0, 0, 0, 2, 2, 2, 0, 0, 2, 3, 3], [3, 0, 0, 0, 3, 2, 0, 0, 0, 4, 2, 2], [2, 0, 0, 0, 2, 3, 0, 0, 0, 5, 0, 4], [0, 0, 0, 0, 4, 2, 0, 0, 0, 5, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 6, 0, 5], [0, 0, 0, 0, 5, 0, 0, 0, 0, 5, 0, 6], [0, 0, 0, 0, 6, 0, 0, 0, 0, 5, 0, 5]] \$$

$[y_4, 0, 0, 0, y_3, y_2, y_1, 0, 0, y_7, y_6, y_5]$

SUMMARY	
Graph Type	CC
$v(A)$	4
$v(\Delta)$	4
π	[1, 1, 1, 1, 1, 1, 2, 1, 1, 2, 2, 2]
Dbly Stoch	false

SANDWICH		Total 0
No .	Coloring	Rank

RT GROUPS		Total 12	
No .	Coloring	Rank	Solv
1	{2, 3, 5, 6, 7, 8, 9, 11, 12}	2	Not Solvable
2	{2, 3, 5, 6, 7, 8, 9, 10, 12}	2	Not Solvable
3	{2, 3, 4, 5, 6, 7, 8, 11}	8	Not Solvable
4	{2, 3, 6, 7, 8, 10}	2	Not Solvable
5	{2, 3, 6, 7, 8, 11}	2	Not Solvable
6	{5, 9, 12}	2	Not Solvable
7	{2, 3, 4, 9, 10}	8	Not Solvable
8	{10, 11}	2	Not Solvable
9	{2, 3, 4, 9, 10, 11}	8	Not Solvable
10	{5, 9, 10, 11, 12}	2	Not Solvable
11	{}	2	Not Solvable
12	{2, 3, 4, 5, 6, 7, 8}	8	Not Solvable

Δ-RANK'D	SC'D !RK'D	τ-RANK'D	R/B RANK'D	NOT SYNC'D	Total Runs	2^{n-1}
998	60	1935 , 1927	433 , 585	12	2048	2048
