

New Graph

[6, 6, 6, 6, 6, 3], [4, 5, 5, 1, 4, 2]

$$\pi = [1, 3, 3, 2, 3, 6]$$

$$\delta = [1, 1, 1, 2, 2, 5]$$

POSSIBLE RANKS

1 x 18
2 x 9
3 x 6

BASE DETERMINANT 15/128, .1171875000

NullSpace of Δ

{1, 4, 5, 6}, {2, 3}

Nullspace of A

[{1, 4, 5}, {6}] , [{3}, {2}]

1 . Coloring, {}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4$$

R: [6, 6, 6, 6, 6, 3]
B: [4, 5, 5, 1, 4, 2]

` See graph

` ` See pair graph

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

Omega Rank for R :

$$-t^+ \quad t^3$$

, cycles: {{3, 6}} order: 2

$$\begin{pmatrix} 0 & 0 & 6 & 0 & 0 & 12 \\ 0 & 0 & 12 & 0 & 0 & 6 \end{pmatrix}$$

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

Omega Rank for B :

$$-t^3 \quad t^5$$

, cycles: {{1, 4}} order: 4

$$\begin{pmatrix} 2 & 6 & 0 & 4 & 6 & 0 \\ 4 & 0 & 0 & 8 & 6 & 0 \\ 8 & 0 & 0 & 10 & 0 & 0 \\ 10 & 0 & 0 & 8 & 0 & 0 \end{pmatrix}$$

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

2. Coloring, {2}

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

$$R: [6, 5, 6, 6, 6, 3]$$

$$B: [4, 6, 5, 1, 4, 2]$$

` See graph

` ` See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
3 vs 4	4 vs 5	4 vs 5	2 vs 3	3 vs 5

Omega Rank for R :

$$-t^2 + t^4$$

, cycles: {{3, 6}} order: 2

$$\begin{pmatrix} 0 & 0 & 6 & 0 & 3 & 9 \\ 0 & 0 & 9 & 0 & 0 & 9 \\ 0 & 0 & 9 & 0 & 0 & 9 \end{pmatrix}$$

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

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

Omega Rank for B :

$$-t^2 + t^4$$

, cycles: {{1, 4}, {2, 6}} order: 2

$$\begin{pmatrix} 2 & 6 & 0 & 4 & 3 & 3 \\ 4 & 3 & 0 & 5 & 0 & 6 \\ 5 & 6 & 0 & 4 & 0 & 3 \\ 4 & 3 & 0 & 5 & 0 & 6 \\ 5 & 6 & 0 & 4 & 0 & 3 \end{pmatrix}$$

$$[2y_1 - y_2 - y_3, 3y_1 - 2y_3, 0, y_1, y_2, y_3]$$

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

M N

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0 1 0 0 0 1   0 1 0 0 0 1
1 0 0 2 3 0   1 0 1 1 1 0
( 0 0 0 0 0 6 ) ( 0 1 0 0 0 1 )
( 0 2 0 0 0 2 ) ( 0 1 0 0 0 1 )
0 3 0 0 0 3   0 1 0 0 0 1
1 0 6 2 3 0   1 0 1 1 1 0
                NM
                2 0 6 4 6 0
                0 6 0 0 0 12
                ( 2 0 6 4 6 0 )
                ( 2 0 6 4 6 0 )
                2 0 6 4 6 0
                0 6 0 0 0 12
    
```

$\tau = 20, r' = 1/2$

R: [6, 5, 6, 6, 6, 3]
 B: [4, 6, 5, 1, 4, 2]

Ranges

Action of R on ranges, [[7], [5], [7], [7], [5], [5], [5]]
 Action of B on ranges, [[6], [3], [2], [6], [4], [1], [3]]

Cycles: R, {{3, 6}}, B, {{1, 4}, {2, 6}}

- $\beta(\{1, 2\}) = 1/18$
- $\beta(\{1, 6\}) = 1/18$
- $\beta(\{2, 4\}) = 1/9$
- $\beta(\{2, 5\}) = 1/6$
- $\beta(\{3, 6\}) = 1/3$
- $\beta(\{4, 6\}) = 1/9$
- $\beta(\{5, 6\}) = 1/6$

Partitions

$\alpha(\{\{1, 3, 4, 5\}, \{2, 6\}\}) = 1/1$

$b_1 = \{1, 3, 4, 5\}, b_2 = \{2, 6\}$

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	{2}
Rank	2
R,B	[6, 5, 6, 6, 6, 3], [4, 6, 5, 1, 4, 2]
π_2	[1, 0, 0, 0, 1, 0, 2, 3, 0, 0, 0, 6, 0, 2, 3]

u_2	[1, 0, 0, 0, 1, 1, 1, 1, 0, 0, 0, 1, 0, 1, 1] (dim 1)
wpp	[4, 2, 4, 4, 4, 2]

3 . Coloring, {3}

R: [6, 6, 5, 6, 6, 3]
 B: [4, 5, 6, 1, 4, 2]

` See graph

` ` See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	4 vs 5	3 vs 3	5 vs 5

Omega Rank for R :

$$-t^+ t^4$$

, cycles: {{3, 5, 6}} order: 3

$$\begin{pmatrix} 0 & 0 & 6 & 0 & 3 & 9 \\ 0 & 0 & 9 & 0 & 6 & 3 \\ 0 & 0 & 3 & 0 & 9 & 6 \end{pmatrix}$$

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

Omega Rank for B :

$$-t^4 t^6$$

, cycles: {{1, 4}} order: 4

$$\begin{pmatrix} 2 & 6 & 0 & 4 & 3 & 3 \\ 4 & 3 & 0 & 5 & 6 & 0 \\ 5 & 0 & 0 & 10 & 3 & 0 \\ 10 & 0 & 0 & 8 & 0 & 0 \\ 8 & 0 & 0 & 10 & 0 & 0 \end{pmatrix}$$

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

4 . Coloring, {4}

$$\Omega p(\Delta)=0: p = s^2 + 4s^4$$

R: [6, 6, 6, 1, 6, 3]
 B: [4, 5, 5, 6, 4, 2]

` See graph

` ` See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
3 vs 4	4 vs 4	4 vs 4	3 vs 3	4 vs 4

Omega Rank for R :

$$-t^2 + t^4$$

cycles: {{3, 6}} order: 2

$$\begin{pmatrix} 2 & 0 & 6 & 0 & 0 & 10 \\ 0 & 0 & 10 & 0 & 0 & 8 \\ 0 & 0 & 8 & 0 & 0 & 10 \end{pmatrix}$$

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

Omega Rank for B :

$$-t + t^5$$

cycles: {{2, 4, 5, 6}} order: 4

$$\begin{pmatrix} 0 & 6 & 0 & 4 & 6 & 2 \\ 0 & 2 & 0 & 6 & 6 & 4 \\ 0 & 4 & 0 & 6 & 2 & 6 \\ 0 & 6 & 0 & 2 & 4 & 6 \end{pmatrix}$$

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

5. Coloring, {5}

R: [6, 6, 6, 6, 4, 3]
 B: [4, 5, 5, 1, 6, 2]

[See graph](#)

[See pair graph](#)

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	2 vs 3	4 vs 5

Omega Rank for R :

$$-s^2 + s^4$$

cycles: {{3, 6}} order: 2

$$\begin{pmatrix} 0 & 0 & 6 & 3 & 0 & 9 \\ 0 & 0 & 9 & 0 & 0 & 9 \\ 0 & 0 & 9 & 0 & 0 & 9 \end{pmatrix}$$

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

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

Omega Rank for B :

$$-t - t^{2^+} t^{4^+} t^5$$

, cycles: {{1, 4}, {2, 5, 6}} order: 6

$$\begin{pmatrix} 2 & 6 & 0 & 1 & 6 & 3 \\ 1 & 3 & 0 & 2 & 6 & 6 \\ (2 & 6 & 0 & 1 & 3 & 6) \\ 1 & 6 & 0 & 2 & 6 & 3 \\ 2 & 3 & 0 & 1 & 6 & 6 \end{pmatrix}$$

$$p = -s - s^{2^+} s^{4^+} s^5$$

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

6 . Coloring, {6}

$$\Omega p(\Delta)=0: p = s^2 - 4s^4$$

$$R: [6, 6, 6, 6, 6, 2]$$

$$B: [4, 5, 5, 1, 4, 3]$$

` See graph

` ` See pair graph

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

Omega Rank for R :

$$-t + t^3$$

, cycles: {{2, 6}} order: 2

$$\begin{pmatrix} 0 & 6 & 0 & 0 & 0 & 12 \\ 0 & 12 & 0 & 0 & 0 & 6 \end{pmatrix}$$

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

Omega Rank for B :

$$-t^3 + t^5$$

, cycles: {{1, 4}} order: 4

$$\begin{pmatrix} 2 & 0 & 6 & 4 & 6 & 0 \\ 4 & 0 & 0 & 8 & 6 & 0 \\ (8 & 0 & 0 & 10 & 0 & 0) \\ 10 & 0 & 0 & 8 & 0 & 0 \end{pmatrix}$$

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

7 . Coloring, {2, 3}

$$\Omega p(\Delta)=0: p = s^2 - 4s^4 \quad p' = s^2 - 2s^3$$

R: [6, 5, 5, 6, 6, 3]

B: [4, 6, 6, 1, 4, 2]

\ See graph

\` See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
2 vs 4	2 vs 4	2 vs 4	1 vs 3	2 vs 4

Ω mega Rank for R :

$$-t \quad t^4$$

,
cycles: {{3, 5, 6}} order: 3

$$\begin{matrix} 0 & 0 & 6 & 0 & 6 & 6 \\ (0 & 0 & 6 & 0 & 6 & 6) \\ 0 & 0 & 6 & 0 & 6 & 6 \end{matrix}$$

$$[0, 0, y_1, 0, y_1, y_1]$$

$$p = -s^+ \quad s^3 \quad p = -s^+ \quad s^2$$

Ω mega Rank for B :

$$-t \quad t^3$$

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cycles: {{1, 4}, {2, 6}} order: 2

$$\begin{matrix} 2 & 6 & 0 & 4 & 0 & 6 \\ 4 & 6 & 0 & 2 & 0 & 6 \\ (2 & 6 & 0 & 4 & 0 & 6) \\ 4 & 6 & 0 & 2 & 0 & 6 \end{matrix}$$

$$[y_2 - y_1, y_2, 0, y_1, 0, y_2]$$

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

\ See 3-level graph

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												M	N																
						0	1	0	0	0	1							0	1	1	0	0	1						
						1	0	0	2	0	3							1	0	0	1	1	1						
						0	0	0	0	3	3							1	0	0	1	1	1						
						()							()		
							0	2	0	0	0	2									0	1	1	0	0	1			
						0	0	3	0	0	3							0	1	1	0	0	1						
						1	3	3	2	3	0							1	1	1	1	1	0						
												NM																	

2 3 3 4 6 6
 1 6 6 2 3 6
 $\begin{pmatrix} 1 & 6 & 6 & 2 & 3 & 6 \\ 2 & 3 & 3 & 4 & 6 & 6 \end{pmatrix}$
 2 3 3 4 6 6
 1 3 3 2 3 12

$\tau = 14, r' = 2/3$

R: [6, 5, 5, 6, 6, 3]
 B: [4, 6, 6, 1, 4, 2]

Ranges

Action of R on ranges, [[3], [3], [3]]
 Action of B on ranges, [[2], [1], [2]]

Cycles: R, {{3, 5, 6}}, B, {{1, 4}, {2, 6}}

$\beta(\{1, 2, 6\}) = 1/6$
 $\beta(\{2, 4, 6\}) = 1/3$
 $\beta(\{3, 5, 6\}) = 1/2$

Partitions

$\alpha(\{6\}, \{1, 4, 5\}, \{2, 3\}) = 1/1$

$b_1 = \{6\}, b_2 = \{1, 4, 5\}, b_3 = \{2, 3\}$

Action of R and B on the blocks of the partitions: = [2, 3, 1][3, 2, 1]
 with invariant measure [1, 1, 1]

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

See level-3 partition graph.

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Right Group	
Coloring	{2, 3}
Rank	3
R,B	[6, 5, 5, 6, 6, 3], [4, 6, 6, 1, 4, 2]
π_2	[1, 0, 0, 0, 1, 0, 2, 0, 3, 0, 3, 3, 0, 2, 3]
u_2	[1, 1, 0, 0, 1, 0, 1, 1, 1, 1, 1, 0, 1, 1] (dim 1)
wpp	[3, 2, 2, 3, 3, 1]
π_3	[0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 2, 0, 0, 0, 3, 0]
u_3	[0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1, 0]

8 . Coloring, {2, 4}

R: [6, 5, 6, 1, 6, 3]
 B: [4, 6, 5, 6, 4, 2]

[` See graph](#)

[`` See pair graph](#)

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	3 vs 4	4 vs 4

Omega Rank for R :

$$-t^2 + t^4$$

, cycles: {{3, 6}} order: 2

$$\begin{pmatrix} 2 & 0 & 6 & 0 & 3 & 7 \\ 0 & 0 & 7 & 0 & 0 & 11 \\ 0 & 0 & 11 & 0 & 0 & 7 \\ 0 & 0 & 7 & 0 & 0 & 11 \end{pmatrix}$$

$$[2y_1, 0, 2y_2, 0, 3y_1, 2y_3]$$

$$p = -s^2 + s^4$$

Omega Rank for B :

$$-t^3 + t^5$$

, cycles: {{2, 6}} order: 4

$$\begin{pmatrix} 0 & 6 & 0 & 4 & 3 & 5 \\ 0 & 5 & 0 & 3 & 0 & 10 \\ 0 & 10 & 0 & 0 & 0 & 8 \\ 0 & 8 & 0 & 0 & 0 & 10 \end{pmatrix}$$

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

9 . Coloring, {2, 5}

R: [6, 5, 6, 6, 4, 3]
 B: [4, 6, 5, 1, 6, 2]

[` See graph](#)

[`` See pair graph](#)

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	3 vs 4	3 vs 5

Omega Rank for R :

$$-t^3 + t^5$$

, cycles: {{3, 6}} order: 4

$$\begin{pmatrix} 0 & 0 & 6 & 3 & 3 & 6 \\ 0 & 0 & 6 & 3 & 0 & 9 \\ 0 & 0 & 9 & 0 & 0 & 9 \\ 0 & 0 & 9 & 0 & 0 & 9 \end{pmatrix}$$

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

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

Omega Rank for B :
 $-t^2 + t^4$

, cycles: {{1, 4}, {2, 6}} order: 2

$$\begin{pmatrix} 2 & 6 & 0 & 1 & 3 & 6 \\ 1 & 6 & 0 & 2 & 0 & 9 \\ (2 & 9 & 0 & 1 & 0 & 6) \\ 1 & 6 & 0 & 2 & 0 & 9 \\ 2 & 9 & 0 & 1 & 0 & 6 \end{pmatrix}$$

$$[-4y_1 + y_3, -15y_1 + 4y_3 - y_2, 0, y_1, y_2, y_3]$$

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

10. Coloring, {2, 6}

R: [6, 5, 6, 6, 6, 2]
 B: [4, 6, 5, 1, 4, 3]

` See graph

` ` See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	4 vs 5	3 vs 3	5 vs 5

Omega Rank for R :
 $-t + t^4$

, cycles: {{2, 5, 6}} order: 3

$$\begin{pmatrix} 0 & 6 & 0 & 0 & 3 & 9 \\ (0 & 9 & 0 & 0 & 6 & 3) \\ 0 & 3 & 0 & 0 & 9 & 6 \end{pmatrix}$$

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

Omega Rank for B :
 $-t^4 + t^6$

, cycles: {{1, 4}} order: 4

2 0 6 4 3 3
 4 0 3 5 6 0
 (5 0 0 10 3 0)
 10 0 0 8 0 0
 8 0 0 10 0 0

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

11 . Coloring, {3, 4}

R: [6, 6, 5, 1, 6, 3]
 B: [4, 5, 6, 6, 4, 2]

` See graph

` ` See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	4 vs 4	4 vs 4

Omega Rank for R :

$-t^2 + t^5$

' cycles: {{3, 5, 6}} order: 3

2 0 6 0 3 7
 0 0 7 0 6 5
 (0 0 5 0 7 6)
 0 0 6 0 5 7

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

Omega Rank for B :

$-t + t^5$

' cycles: {{2, 4, 5, 6}} order: 4

0 6 0 4 3 5
 0 5 0 3 6 4
 (0 4 0 6 5 3)
 0 3 0 5 4 6

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

12 . Coloring, {3, 5}

R: [6, 6, 5, 6, 4, 3]
 B: [4, 5, 6, 1, 6, 2]

\ See graph

\ \ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	3 vs 4	4 vs 5

Omega Rank for R :

$$-t \quad t^5$$

, cycles: {{3, 4, 5, 6}} order: 4

$$\begin{pmatrix} 0 & 0 & 6 & 3 & 3 & 6 \\ 0 & 0 & 6 & 3 & 6 & 3 \\ 0 & 0 & 3 & 6 & 6 & 3 \\ 0 & 0 & 3 & 6 & 3 & 6 \end{pmatrix}$$

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

$$p = -s^+ \quad s^2 - s^3 \quad s^4$$

Omega Rank for B :

$$-t - t^2 \quad t^4 \quad t^5$$

, cycles: {{2, 5, 6}, {1, 4}} order: 6

$$\begin{pmatrix} 2 & 6 & 0 & 1 & 3 & 6 \\ 1 & 6 & 0 & 2 & 6 & 3 \\ 2 & 3 & 0 & 1 & 6 & 6 \\ 1 & 6 & 0 & 2 & 3 & 6 \\ 2 & 6 & 0 & 1 & 6 & 3 \end{pmatrix}$$

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

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

13 . Coloring, {3, 6}

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

$$R: [6, 6, 5, 6, 6, 2]$$

$$B: [4, 5, 6, 1, 4, 3]$$

\ See graph

\ \ See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
3 vs 4	4 vs 5	4 vs 5	2 vs 3	3 vs 5

Omega Rank for R :

$$-t^2 \quad t^4$$

,

cycles: {{2, 6}} order: 2

$$\begin{pmatrix} 0 & 6 & 0 & 0 & 3 & 9 \\ 0 & 9 & 0 & 0 & 0 & 9 \\ 0 & 9 & 0 & 0 & 0 & 9 \end{pmatrix}$$

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

$$p = -s^{2+} s^3$$

Omega Rank for B :

$$-t^{2+} t^4$$

' cycles: {{3, 6}, {1, 4}} order: 2

$$\begin{pmatrix} 2 & 0 & 6 & 4 & 3 & 3 \\ 4 & 0 & 3 & 5 & 0 & 6 \\ 5 & 0 & 6 & 4 & 0 & 3 \\ 4 & 0 & 3 & 5 & 0 & 6 \\ 5 & 0 & 6 & 4 & 0 & 3 \end{pmatrix}$$

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

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

M N

$$\begin{pmatrix} 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 6 & 0 & 0 & 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 2 & 3 & 0 & 1 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 2 & 0 & 0 & 2 & 0 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 3 & 0 & 0 & 3 & 0 & 0 & 1 & 0 & 0 & 1 \\ 1 & 6 & 0 & 2 & 3 & 0 & 1 & 1 & 0 & 1 & 1 & 0 \end{pmatrix}$$

NM

$$\begin{pmatrix} 2 & 6 & 0 & 4 & 6 & 0 \\ 2 & 6 & 0 & 4 & 6 & 0 \\ 0 & 0 & 6 & 0 & 0 & 12 \\ 2 & 6 & 0 & 4 & 6 & 0 \\ 2 & 6 & 0 & 4 & 6 & 0 \\ 0 & 0 & 6 & 0 & 0 & 12 \end{pmatrix}$$

$$\tau = 20, r' = 1/2$$

$$\begin{aligned} R: & [6, 6, 5, 6, 6, 2] \\ B: & [4, 5, 6, 1, 4, 3] \end{aligned}$$

Ranges

$$\begin{aligned} \text{Action of R on ranges, } & [[7], [3], [3], [7], [7], [3], [3]] \\ \text{Action of B on ranges, } & [[6], [4], [5], [2], [6], [1], [4]] \end{aligned}$$

Cycles: R, {{2, 6}}, B, {{3, 6}, {1, 4}}

$$\begin{aligned} \beta(\{1, 3\}) &= 1/18 \\ \beta(\{1, 6\}) &= 1/18 \\ \beta(\{2, 6\}) &= 1/3 \end{aligned}$$

$$\beta(\{3, 4\}) = 1/9$$

$$\beta(\{3, 5\}) = 1/6$$

$$\beta(\{4, 6\}) = 1/9$$

$$\beta(\{5, 6\}) = 1/6$$

Partitions

$$\alpha(\{\{1, 2, 4, 5\}, \{3, 6\}\}) = 1/1$$

$$b_1 = \{1, 2, 4, 5\}, b_2 = \{3, 6\}$$

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	{3, 6}
Rank	2
R,B	[6, 6, 5, 6, 6, 2], [4, 5, 6, 1, 4, 3]
π_2	[0, 1, 0, 0, 1, 0, 0, 0, 6, 2, 3, 0, 0, 2, 3]
u_2	[0, 1, 0, 0, 1, 1, 0, 0, 1, 1, 1, 0, 0, 1, 1] (dim 1)
wpp	[4, 4, 2, 4, 4, 2]

14 . Coloring, {4, 5}

$$R: [6, 6, 6, 1, 4, 3]$$

$$B: [4, 5, 5, 6, 6, 2]$$

See graph

See pair graph

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	4 vs 4	4 vs 4

Omega Rank for R :

$$-t^3 + t^5$$

cycles: {{3, 6}} order: 4

$$\begin{pmatrix} 2 & 0 & 6 & 3 & 0 & 7 \\ 3 & 0 & 7 & 0 & 0 & 8 \\ 0 & 0 & 8 & 0 & 0 & 10 \\ 0 & 0 & 10 & 0 & 0 & 8 \end{pmatrix}$$

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

Omega Rank for B :

$$-t^2 + t^5$$

,
cycles: {{2, 5, 6}} order: 3

$$\begin{pmatrix} 0 & 6 & 0 & 1 & 6 & 5 \\ 0 & 5 & 0 & 0 & 6 & 7 \\ 0 & 7 & 0 & 0 & 5 & 6 \\ 0 & 6 & 0 & 0 & 7 & 5 \end{pmatrix}$$

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

15 . Coloring, {4, 6}

$$\Omega p(\Delta)=0: p = s^2 + 4s^4$$

$$R: [6, 6, 6, 1, 6, 2]$$

$$B: [4, 5, 5, 6, 4, 3]$$

` See graph

` ` See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
3 vs 4	4 vs 4	4 vs 4	3 vs 3	4 vs 4

Omega Rank for R :

$$-t^2 + t^4$$

,
cycles: {{2, 6}} order: 2

$$\begin{pmatrix} 2 & 6 & 0 & 0 & 0 & 10 \\ 0 & 10 & 0 & 0 & 0 & 8 \\ 0 & 8 & 0 & 0 & 0 & 10 \end{pmatrix}$$

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

Omega Rank for B :

$$-t + t^5$$

,
cycles: {{3, 4, 5, 6}} order: 4

$$\begin{pmatrix} 0 & 0 & 6 & 4 & 6 & 2 \\ 0 & 0 & 2 & 6 & 6 & 4 \\ 0 & 0 & 4 & 6 & 2 & 6 \\ 0 & 0 & 6 & 2 & 4 & 6 \end{pmatrix}$$

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

16 . Coloring, {5, 6}

R: [6, 6, 6, 6, 4, 2]
 B: [4, 5, 5, 1, 6, 3]

` See graph

` ` See pair graph

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Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	2 vs 3	4 vs 5

Omega Rank for R :

$$-t^{2+} t^4$$

, cycles: {{2, 6}} order: 2

$$\begin{pmatrix} 0 & 6 & 0 & 3 & 0 & 9 \\ 0 & 9 & 0 & 0 & 0 & 9 \\ 0 & 9 & 0 & 0 & 0 & 9 \end{pmatrix}$$

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

$$p = -s^{2+} s^3$$

Omega Rank for B :

$$-t - t^{2+} t^4 t^5$$

, cycles: {{3, 5, 6}, {1, 4}} order: 6

$$\begin{pmatrix} 2 & 0 & 6 & 1 & 6 & 3 \\ 1 & 0 & 3 & 2 & 6 & 6 \\ 2 & 0 & 6 & 1 & 3 & 6 \\ 1 & 0 & 6 & 2 & 6 & 3 \\ 2 & 0 & 3 & 1 & 6 & 6 \end{pmatrix}$$

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

$$p = -s - s^{2+} s^4 t s^5$$

17 . Coloring, {2, 3, 4}

$\Omega p(\Delta)=0:$ $p = s^{2+} 4s^4$

R: [6, 5, 5, 1, 6, 3]
 B: [4, 6, 6, 6, 4, 2]

` See graph

` ` See pair graph

`

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
3 vs 4	4 vs 4	4 vs 4	4 vs 4	3 vs 3

Omega Rank for R :

$$-t^2 + t^5$$

cycles: {{3, 5, 6}} order: 3

$$\begin{pmatrix} 2 & 0 & 6 & 0 & 6 & 4 \\ 0 & 0 & 4 & 0 & 6 & 8 \\ 0 & 0 & 8 & 0 & 4 & 6 \\ 0 & 0 & 6 & 0 & 8 & 4 \end{pmatrix}$$

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

Omega Rank for B :

$$-t^2 + t^4$$

cycles: {{2, 6}} order: 2

$$\begin{pmatrix} 0 & 6 & 0 & 4 & 0 & 8 \\ 0 & 8 & 0 & 0 & 0 & 10 \\ 0 & 10 & 0 & 0 & 0 & 8 \end{pmatrix}$$

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

18 . Coloring, {2, 3, 5}

$$R: [6, 5, 5, 6, 4, 3]$$

$$B: [4, 6, 6, 1, 6, 2]$$

` See graph

` ` See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	3 vs 4	2 vs 4

Omega Rank for R :

$$-t + t^5$$

cycles: {{3, 4, 5, 6}} order: 4

$$\begin{pmatrix} 0 & 0 & 6 & 3 & 6 & 3 \\ 0 & 0 & 3 & 6 & 6 & 3 \\ 0 & 0 & 3 & 6 & 3 & 6 \\ 0 & 0 & 6 & 3 & 3 & 6 \end{pmatrix}$$

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

$$p = -s + s^2 - s^3 + s^4$$

Omega Rank for B :

$$-t + t^3$$

cycles: {{2, 6}, {1, 4}} order: 2

$$\begin{pmatrix} 2 & 6 & 0 & 1 & 0 & 9 \\ 1 & 9 & 0 & 2 & 0 & 6 \\ 2 & 6 & 0 & 1 & 0 & 9 \\ 1 & 9 & 0 & 2 & 0 & 6 \end{pmatrix}$$

$$[y_1, -15y_1 + 4y_2, 0, -4y_1 + y_2, 0, y_2]$$

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

19 . Coloring, {2, 3, 6}

$$\Omega p(\Delta)=0: \quad p = s^2 - 4s^4 \quad p' = s^2 - 2s^3$$

R: [6, 5, 5, 6, 6, 2]
 B: [4, 6, 6, 1, 4, 3]

` See graph

` ` See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
2 vs 4	2 vs 4	2 vs 4	1 vs 3	2 vs 4

Ω Rank for R :

$$-t \quad t^4$$

,
 cycles: {{2, 5, 6}} order: 3

$$\begin{pmatrix} 0 & 6 & 0 & 0 & 6 & 6 \\ 0 & 6 & 0 & 0 & 6 & 6 \\ 0 & 6 & 0 & 0 & 6 & 6 \end{pmatrix}$$

$$[0, y_1, 0, 0, y_1, y_1]$$

$$p = -s^+ s^2 \quad p = -s^+ s^3$$

Ω Rank for B :

$$-t \quad t^3$$

,
 cycles: {{3, 6}, {1, 4}} order: 2

$$\begin{pmatrix} 2 & 0 & 6 & 4 & 0 & 6 \\ 4 & 0 & 6 & 2 & 0 & 6 \\ 2 & 0 & 6 & 4 & 0 & 6 \\ 4 & 0 & 6 & 2 & 0 & 6 \end{pmatrix}$$

$$[y_1 - y_2, 0, y_1, y_2, 0, y_1]$$

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

` See 3-level graph

,

$$\begin{matrix}
 & & & & & & M & N \\
 \begin{pmatrix}
 0 & 0 & 1 & 0 & 0 & 1 \\
 0 & 0 & 0 & 0 & 3 & 3 \\
 1 & 0 & 0 & 2 & 0 & 3 \\
 0 & 0 & 2 & 0 & 0 & 2 \\
 0 & 3 & 0 & 0 & 0 & 3 \\
 1 & 3 & 3 & 2 & 3 & 0
 \end{pmatrix} & & \begin{pmatrix}
 0 & 1 & 1 & 0 & 0 & 1 \\
 1 & 0 & 0 & 1 & 1 & 1 \\
 1 & 0 & 0 & 1 & 1 & 1 \\
 0 & 1 & 1 & 0 & 0 & 1 \\
 0 & 1 & 1 & 0 & 0 & 1 \\
 1 & 1 & 1 & 1 & 1 & 0
 \end{pmatrix} \\
 & & & & & & NM \\
 & & & & & & 2 & 3 & 3 & 4 & 6 & 6 \\
 & & & & & & 1 & 6 & 6 & 2 & 3 & 6 \\
 & & & & & & \begin{pmatrix}
 1 & 6 & 6 & 2 & 3 & 6 \\
 2 & 3 & 3 & 4 & 6 & 6
 \end{pmatrix} \\
 & & & & & & 2 & 3 & 3 & 4 & 6 & 6 \\
 & & & & & & 1 & 3 & 3 & 2 & 3 & 12
 \end{matrix}$$

$\tau = 14, r' = 2/3$

R: [6, 5, 5, 6, 6, 2]
 B: [4, 6, 6, 1, 4, 3]

Ranges

Action of R on ranges, [[2], [2], [2]]
 Action of B on ranges, [[3], [3], [1]]

Cycles: R, {{2, 5, 6}}, B, {{3, 6}, {1, 4}}

$\beta(\{1, 3, 6\}) = 1/6$
 $\beta(\{2, 5, 6\}) = 1/2$
 $\beta(\{3, 4, 6\}) = 1/3$

Partitions

$\alpha(\{1, 4, 5, \{6\}, \{2, 3\}\}) = 1/1$

$b_1 = \{1, 4, 5\}, b_2 = \{6\}, b_3 = \{2, 3\}$

Action of R and B on the blocks of the partitions: = [3, 1, 2] [1, 3, 2]
 with invariant measure [1, 1, 1]

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

See level-3 partition graph.

Right Group	
Coloring	{2, 3, 6}
Rank	3
R,B	[6, 5, 5, 6, 6, 2], [4, 6, 6, 1, 4, 3]
π_2	[0, 1, 0, 0, 1, 0, 0, 3, 3, 2, 0, 3, 0, 2, 3]
u_2	[1, 1, 0, 0, 1, 0, 1, 1, 1, 1, 1, 1, 0, 1, 1] (dim 1)

wpp	[3, 2, 2, 3, 3, 1]
π_3	[0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 3, 0, 2, 0, 0]
u_3	[0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1, 0]

20 . Coloring, {2, 4, 5}

R: [6, 5, 6, 1, 4, 3]
 B: [4, 6, 5, 6, 6, 2]

` See graph

` ` See pair graph

,

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
4 vs 4	5 vs 5	5 vs 5	5 vs 5	3 vs 4

Omega Rank for R :

$$-t^4 + t^6$$

, cycles: {{3, 6}} order: 4

```

2 0 6 3 3 4
3 0 4 3 0 8
(3 0 8 0 0 7)
0 0 7 0 0 11
0 0 11 0 0 7
    
```

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

Omega Rank for B :

$$\text{tailcheck } -t^2 + t^4$$

, cycles: {{2, 6}} order: 2

```

0 6 0 1 3 8
(0 8 0 0 0 10)
0 10 0 0 0 8
0 8 0 0 0 10
    
```

$$[0, y_1, 0, y_2, 3y_2, y_3]$$

$$p = -s^2 + s^4$$

21 . Coloring, {2, 4, 6}

R: [6, 5, 6, 1, 6, 2]
 B: [4, 6, 5, 6, 4, 3]

` See graph

` ` See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	4 vs 4	4 vs 4

Omega Rank for R :

$$-t^2 \quad t^5$$

, cycles: {{2, 5, 6}} order: 3

$$\begin{pmatrix} 2 & 6 & 0 & 0 & 3 & 7 \\ 0 & 7 & 0 & 0 & 6 & 5 \\ 0 & 5 & 0 & 0 & 7 & 6 \\ 0 & 6 & 0 & 0 & 5 & 7 \end{pmatrix}$$

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

Omega Rank for B :

$$-t \quad t^5$$

, cycles: {{3, 4, 5, 6}} order: 4

$$\begin{pmatrix} 0 & 0 & 6 & 4 & 3 & 5 \\ 0 & 0 & 5 & 3 & 6 & 4 \\ 0 & 0 & 4 & 6 & 5 & 3 \\ 0 & 0 & 3 & 5 & 4 & 6 \end{pmatrix}$$

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

22 . Coloring, {2, 5, 6}

$$R: [6, 5, 6, 6, 4, 2]$$

$$B: [4, 6, 5, 1, 6, 3]$$

` See graph

` ` See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	3 vs 4	4 vs 5

Omega Rank for R :

$$-t \quad t^5$$

, cycles: {{2, 4, 5, 6}} order: 4

$$\begin{pmatrix} 0 & 6 & 0 & 3 & 3 & 6 \\ 0 & 6 & 0 & 3 & 6 & 3 \\ 0 & 3 & 0 & 6 & 6 & 3 \\ 0 & 3 & 0 & 6 & 3 & 6 \end{pmatrix}$$

$$p = -s^+ s^2 - s^3 + s^4$$

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

Omega Rank for B :

$$-t - t^2 + t^4 + t^5$$

cycles: {{3, 5, 6}, {1, 4}} order: 6

```

2 0 6 1 3 6
1 0 6 2 6 3
(2 0 3 1 6 6)
1 0 6 2 3 6
2 0 6 1 6 3
    
```

$$p = -s - s^2 + s^4 + s^5$$

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

23 . Coloring, {3, 4, 5}

R: [6, 6, 5, 1, 4, 3]
 B: [4, 5, 6, 6, 6, 2]

` See graph

` ` See pair graph

`

Δ -Rank	A+(1/2) Δ	A-(1/2) Δ	R	B
4 vs 4	5 vs 5	5 vs 5	5 vs 5	4 vs 4

Omega Rank for R :

$$-t + t^6$$

cycles: {{1, 3, 4, 5, 6}} order: 5

```

2 0 6 3 3 4
3 0 4 3 6 2
(3 0 2 6 4 3)
6 0 3 4 2 3
4 0 3 2 3 6
    
```

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

Omega Rank for B :

$$-t^2 + t^5$$

cycles: {{2, 5, 6}} order: 3

$$\begin{pmatrix} 0 & 6 & 0 & 1 & 3 & 8 \\ 0 & 8 & 0 & 0 & 6 & 4 \\ 0 & 4 & 0 & 0 & 8 & 6 \\ 0 & 6 & 0 & 0 & 4 & 8 \end{pmatrix}$$

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

24 . Coloring, {3, 4, 6}

R: [6, 6, 5, 1, 6, 2]
 B: [4, 5, 6, 6, 4, 3]

` See graph

` ` See pair graph

`

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	3 vs 4	4 vs 4

Omega Rank for R :

tailcheck $-t^2 + t^4$

, cycles: {{2, 6}} order: 2

$$\begin{pmatrix} 2 & 6 & 0 & 0 & 3 & 7 \\ 0 & 7 & 0 & 0 & 0 & 11 \\ 0 & 11 & 0 & 0 & 0 & 7 \\ 0 & 7 & 0 & 0 & 0 & 11 \end{pmatrix}$$

$$[2y_3, 2y_2, 0, 0, 3y_3, 2y_1]$$

$$p = -s^2 + s^4$$

Omega Rank for B :

$-t^3 + t^5$

, cycles: {{3, 6}} order: 4

$$\begin{pmatrix} 0 & 0 & 6 & 4 & 3 & 5 \\ 0 & 0 & 5 & 3 & 0 & 10 \\ 0 & 0 & 10 & 0 & 0 & 8 \\ 0 & 0 & 8 & 0 & 0 & 10 \end{pmatrix}$$

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

25 . Coloring, {3, 5, 6}

R: [6, 6, 5, 6, 4, 2]
 B: [4, 5, 6, 1, 6, 3]

[` See graph](#)

[`` See pair graph](#)

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	3 vs 4	3 vs 5

Omega Rank for R :

$$-t^3 + t^5$$

, cycles: {{2, 6}} order: 4

$$\begin{pmatrix} 0 & 6 & 0 & 3 & 3 & 6 \\ 0 & 6 & 0 & 3 & 0 & 9 \\ 0 & 9 & 0 & 0 & 0 & 9 \\ 0 & 9 & 0 & 0 & 0 & 9 \end{pmatrix}$$

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

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

Omega Rank for B :

$$-t^2 + t^4$$

, cycles: {{3, 6}, {1, 4}} order: 2

$$\begin{pmatrix} 2 & 0 & 6 & 1 & 3 & 6 \\ 1 & 0 & 6 & 2 & 0 & 9 \\ (2 & 0 & 9 & 1 & 0 & 6) \\ 1 & 0 & 6 & 2 & 0 & 9 \\ 2 & 0 & 9 & 1 & 0 & 6 \end{pmatrix}$$

$$[y_1, 0, 4y_1 + y_2 - y_3, y_2, y_3, y_1 + 4y_2]$$

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

26 . Coloring, {4, 5, 6}

$$R: [6, 6, 6, 1, 4, 2]$$

$$B: [4, 5, 5, 6, 6, 3]$$

[` See graph](#)

[`` See pair graph](#)

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	4 vs 4	4 vs 4

Omega Rank for R :

$$-t^3 + t^5$$

, cycles: {{2, 6}} order: 4

$$\begin{pmatrix} 2 & 6 & 0 & 3 & 0 & 7 \\ 3 & 7 & 0 & 0 & 0 & 8 \\ 0 & 8 & 0 & 0 & 0 & 10 \\ 0 & 10 & 0 & 0 & 0 & 8 \end{pmatrix}$$

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

Omega Rank for B :

$$-t^2 + t^5$$

cycles: {{3, 5, 6}} order: 3

$$\begin{pmatrix} 0 & 0 & 6 & 1 & 6 & 5 \\ 0 & 0 & 5 & 0 & 6 & 7 \\ 0 & 0 & 7 & 0 & 5 & 6 \\ 0 & 0 & 6 & 0 & 7 & 5 \end{pmatrix}$$

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

27 . Coloring, {2, 3, 4, 5}

R: [6, 5, 5, 1, 4, 3]

B: [4, 6, 6, 6, 6, 2]

` See graph

` ` See pair graph

`

Δ-Rank	A+(1/2)Δ	A-(1/2)Δ	R	B
4 vs 4	5 vs 5	5 vs 5	5 vs 5	3 vs 3

Omega Rank for R :

$$-t + t^6$$

cycles: {{1, 3, 4, 5, 6}} order: 5

$$\begin{pmatrix} 2 & 0 & 6 & 3 & 6 & 1 \\ 3 & 0 & 1 & 6 & 6 & 2 \\ (6 & 0 & 2 & 6 & 1 & 3) \\ 6 & 0 & 3 & 1 & 2 & 6 \\ 1 & 0 & 6 & 2 & 3 & 6 \end{pmatrix}$$

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

Omega Rank for B :

$$-t^2 + t^4$$

cycles: {{2, 6}} order: 2

$$\begin{pmatrix} 0 & 6 & 0 & 1 & 0 & 11 \\ 0 & 11 & 0 & 0 & 0 & 7 \\ 0 & 7 & 0 & 0 & 0 & 11 \end{pmatrix}$$

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

28 . Coloring, {2, 3, 4, 6}

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

$$\begin{aligned} R: & [6, 5, 5, 1, 6, 2] \\ B: & [4, 6, 6, 6, 4, 3] \end{aligned}$$

\ See graph

\ \ See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
3 vs 4	4 vs 4	4 vs 4	4 vs 4	3 vs 3

Omega Rank for R :

$$-t^2 + t^5$$

, cycles: {{2, 5, 6}} order: 3

$$\begin{pmatrix} 2 & 6 & 0 & 0 & 6 & 4 \\ 0 & 4 & 0 & 0 & 6 & 8 \\ 0 & 8 & 0 & 0 & 4 & 6 \\ 0 & 6 & 0 & 0 & 8 & 4 \end{pmatrix}$$

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

Omega Rank for B :

$$-t^2 + t^4$$

, cycles: {{3, 6}} order: 2

$$\begin{pmatrix} 0 & 0 & 6 & 4 & 0 & 8 \\ 0 & 0 & 8 & 0 & 0 & 10 \\ 0 & 0 & 10 & 0 & 0 & 8 \end{pmatrix}$$

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

29 . Coloring, {2, 3, 5, 6}

$$\begin{aligned} R: & [6, 5, 5, 6, 4, 2] \\ B: & [4, 6, 6, 1, 6, 3] \end{aligned}$$

\ See graph

`` See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	3 vs 4	2 vs 4

Ω Rank for R :

$$-t \quad t^5$$

, cycles: {{2, 4, 5, 6}} order: 4

$$\begin{pmatrix} 0 & 6 & 0 & 3 & 6 & 3 \\ 0 & 3 & 0 & 6 & 6 & 3 \\ 0 & 3 & 0 & 6 & 3 & 6 \\ 0 & 6 & 0 & 3 & 3 & 6 \end{pmatrix}$$

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

$$p = -s^+ s^2 - s^{3+} s^4$$

Ω Rank for B :

$$-t \quad t^3$$

, cycles: {{3, 6}, {1, 4}} order: 2

$$\begin{pmatrix} 2 & 0 & 6 & 1 & 0 & 9 \\ 1 & 0 & 9 & 2 & 0 & 6 \\ 2 & 0 & 6 & 1 & 0 & 9 \\ 1 & 0 & 9 & 2 & 0 & 6 \end{pmatrix}$$

$$[y_1 - 4y_2, 0, y_1, y_2, 0, 4y_1 - 15y_2]$$

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

30 . Coloring, {2, 4, 5, 6}

$$R: [6, 5, 6, 1, 4, 2]$$

$$B: [4, 6, 5, 6, 6, 3]$$

` See graph

`` See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	5 vs 5	4 vs 4

Ω Rank for R :

$$-t \quad t^6$$

, cycles: {{1, 2, 4, 5, 6}} order: 5

2 6 0 3 3 4
 3 4 0 3 6 2
 (3 2 0 6 4 3)
 6 3 0 4 2 3
 4 3 0 2 3 6

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

Omega Rank for B :

$$-t^2 + t^5$$

, cycles: {{3, 5, 6}} order: 3

0 0 6 1 3 8
 (0 0 8 0 6 4)
 0 0 4 0 8 6
 0 0 6 0 4 8

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

31 . Coloring, {3, 4, 5, 6}

R: [6, 6, 5, 1, 4, 2]

B: [4, 5, 6, 6, 6, 3]

` See graph

` ` See pair graph

,

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	5 vs 5	3 vs 4

Omega Rank for R :

$$-t^4 + t^6$$

, cycles: {{2, 6}} order: 4

2 6 0 3 3 4
 3 4 0 3 0 8
 (3 8 0 0 0 7)
 0 7 0 0 0 11
 0 11 0 0 0 7

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

Omega Rank for B :

$$\text{tailcheck } -t^2 + t^4$$

, cycles: {{3, 6}} order: 2

$$\begin{pmatrix} 0 & 0 & 6 & 1 & 3 & 8 \\ 0 & 0 & 8 & 0 & 0 & 10 \\ 0 & 0 & 10 & 0 & 0 & 8 \\ 0 & 0 & 8 & 0 & 0 & 10 \end{pmatrix}$$

$$[0, 0, y_1, y_2, 3y_2, y_3]$$

$$p = -s^2 + s^4$$

32 . Coloring, {2, 3, 4, 5, 6}

R: [6, 5, 5, 1, 4, 2]
 B: [4, 6, 6, 6, 6, 3]

` See graph

` ` See pair graph

`

Δ -Rank	$A+(1/2)\Delta$	$A-(1/2)\Delta$	R	B
4 vs 4	5 vs 5	5 vs 5	5 vs 5	3 vs 3

Omega Rank for R :

$$-t + t^6$$

' cycles: {{1, 2, 4, 5, 6}} order: 5

$$\begin{pmatrix} 2 & 6 & 0 & 3 & 6 & 1 \\ 3 & 1 & 0 & 6 & 6 & 2 \\ (6 & 2 & 0 & 6 & 1 & 3) \\ 6 & 3 & 0 & 1 & 2 & 6 \\ 1 & 6 & 0 & 2 & 3 & 6 \end{pmatrix}$$

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

Omega Rank for B :

$$-t^2 + t^4$$

' cycles: {{3, 6}} order: 2

$$\begin{pmatrix} 0 & 0 & 6 & 1 & 0 & 11 \\ (0 & 0 & 11 & 0 & 0 & 7) \\ 0 & 0 & 7 & 0 & 0 & 11 \end{pmatrix}$$

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

SUMMARY	
Graph Type	CC

$v(A)$	2
$v(\Delta)$	2
π	[1, 3, 3, 2, 3, 6]
Dbly Stoch	false

SANDWICH		Total 0
No .	Coloring	Rank

RT GROUPS		Total 4	
No .	Coloring	Rank	Solv
1	{2}	2	Solvable
2	{3, 6}	2	Solvable
3	{2, 3}	3	Not Solvable
4	{2, 3, 6}	3	Not Solvable

Δ -RANK'D	SC'D !RK'D	τ -RANK'D	R/B RANK'D	NOT SYNC'D	Total Runs	2^{n-1}
22	0	28 , 26	18 , 18	4	32	32
