

New Graph

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

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

POSSIBLE RANKS

1 x 5

BASE DETERMINANT 725/4096, .1770019531

NullSpace of Δ

{1, 2, 3, 4, 5}

Nullspace of A

$$\det(A) = 1/16$$

1 . Coloring, { }

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

B: [4, 3, 4, 3, 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 3	3 vs 3

Omega Rank for R : cycles: {{1, 2}} order: 2

See Matrix

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

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

Omega Rank for B : cycles: $\{\{3, 4\}\}$ order: 2
 See Matrix

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

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

2 . Coloring, $\{2\}$

R: [2, 3, 5, 5, 1]

B: [4, 1, 4, 3, 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 : cycles: $\{\{1, 2, 3, 5\}\}$ order: 4
 See Matrix

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

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

Omega Rank for B : cycles: $\{\{3, 4\}\}$ order: 4
 See Matrix

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

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

3 . Coloring, $\{3\}$

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

B: [4, 3, 5, 3, 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** : cycles: $\{\{1, 2\}\}$ order: 4

See Matrix

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

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

Omega Rank for **B** : cycles: $\{\{2, 3, 5\}\}$ order: 3

See Matrix

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

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

4 . Coloring, $\{4\}$

R: [2, 1, 5, 3, 1]

B: [4, 3, 4, 5, 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** : cycles: $\{\{1, 2\}\}$ order: 4

See Matrix

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

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

Omega Rank for B : cycles: $\{\{2, 3, 4, 5\}\}$ order: 4

See Matrix

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

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

5 . Coloring, $\{5\}$

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

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

‘ 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 3	3 vs 3

Omega Rank for R : cycles: $\{\{1, 2\}\}$ order: 2

See Matrix

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

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

Omega Rank for B : cycles: $\{\{3, 4\}\}$ order: 2

See Matrix

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

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

6 . Coloring, $\{2, 3\}$

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

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

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

‘ See graph

‘ ‘ See pair graph

‘

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

Omega Rank for R : cycles: {{1, 2, 3, 4, 5}} order: 5

See Matrix

$$\$ [[1, 1, 1, 1, 1], [1, 1, 1, 1, 1], [1, 1, 1, 1, 1], [1, 1, 1, 1, 1], [1, 1, 1, 1, 1]] \$$$

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

$$p' = -1 + s \quad p' = -1 + s^2 \quad p' = -1 + s^3 \quad p' = -1 + s^4$$

Omega Rank for B : cycles: {{1, 2, 3, 4, 5}} order: 5

See Matrix

$$\$ [[1, 1, 1, 1, 1], [1, 1, 1, 1, 1], [1, 1, 1, 1, 1], [1, 1, 1, 1, 1], [1, 1, 1, 1, 1]] \$$$

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

$$p' = -s + s^3 \quad p' = 1 - s \quad p' = -s + s^4 \quad p' = -s + s^2$$

‘ See 5-level graph

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M N

$$\$ [[0, 1, 1, 1, 1], [1, 0, 1, 1, 1], [1, 1, 0, 1, 1], [1, 1, 1, 0, 1], [1, 1, 1, 1, 0]] \$ \quad \$ [[0, 1, 1, 1, 1], [1, 0, 1, 1, 1], [1, 1, 0, 1, 1], [1, 1, 1, 0, 1], [1, 1, 1, 1, 0]] \$$$

$$\tau = 5, r' = 4/5$$

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

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

Ranges

Action of R on ranges, [[1]]

Action of B on ranges, [[1]]

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

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

Partitions

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

$$b1 = \{1\} \text{ ' , ' } b2 = \{5\} \text{ ' , ' } b3 = \{2\} \text{ ' , ' } b4 = \{3\} \text{ ' , ' } b5 = \{4\}$$

Action of R and B on the blocks of the partitions: = [2, 5, 1, 3, 4] [3, 4, 2, 5, 1]
with invariant measure [1, 1, 1, 1, 1]

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

' ' See level-5 partition graph.

'

Right Group	
Coloring	{2, 3}
Rank	5
R,B	[2, 3, 4, 5, 1], [4, 1, 5, 3, 2]
π_2	[1, 1, 1, 1, 1, 1, 1, 1, 1, 1]
u_2	[1, 1, 1, 1, 1, 1, 1, 1, 1, 1] (dim 1)
wpp	[1, 1, 1, 1, 1]
π_5	[1]
u_5	[1]

7 . Coloring, {2, 4}

R: [2, 3, 5, 3, 1]

B: [4, 1, 4, 5, 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 : cycles: $\{\{1, 2, 3, 5\}\}$ order: 4
See Matrix

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

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

Omega Rank for B : cycles: $\{\{1, 2, 4, 5\}\}$ order: 4
See Matrix

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

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

8 . Coloring, $\{2, 5\}$

R: [2, 3, 5, 5, 2]

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

‘ 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 3	3 vs 3

Omega Rank for R : cycles: $\{\{2, 3, 5\}\}$ order: 3
See Matrix

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

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

Omega Rank for B : cycles: $\{\{3, 4\}\}$ order: 2

See Matrix

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

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

9 . Coloring, $\{3, 4\}$

R: [2, 1, 4, 3, 1]

B: [4, 3, 5, 5, 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 4	4 vs 4

Omega Rank for R : cycles: $\{\{1, 2\}, \{3, 4\}\}$ order: 2

See Matrix

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

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

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

Omega Rank for B : cycles: $\{\{2, 3, 5\}\}$ order: 3

See Matrix

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

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

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

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

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

‘ 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 : cycles: $\{\{1, 2\}\}$ order: 4

See Matrix

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

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

Omega Rank for B : cycles: $\{\{1, 3, 4, 5\}\}$ order: 4

See Matrix

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

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

11 . Coloring, {4, 5}

R: [2, 1, 5, 3, 2]

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

‘ 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 : cycles: $\{\{1, 2\}\}$ order: 4

See Matrix

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

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

Omega Rank for B : cycles: $\{\{1, 4, 5\}\}$ order: 3
See Matrix

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

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

12 . Coloring, $\{2, 3, 4\}$

R: $[2, 3, 4, 3, 1]$

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

‘ 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 : cycles: $\{\{3, 4\}\}$ order: 4
See Matrix

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

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

Omega Rank for B : cycles: $\{\{1, 2, 4, 5\}\}$ order: 4
See Matrix

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

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

13 . Coloring, $\{2, 3, 5\}$

R: [2, 3, 4, 5, 2]

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

‘ 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 : cycles: {{2, 3, 4, 5}} order: 4

See Matrix

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

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

Omega Rank for B : cycles: {{1, 3, 4, 5}} order: 4

See Matrix

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

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

14 . Coloring, {2, 4, 5}

R: [2, 3, 5, 3, 2]

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

‘ 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 3	3 vs 3

Omega Rank for R : cycles: {{2, 3, 5}} order: 3

See Matrix

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

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

Omega Rank for B : cycles: $\{\{1, 4, 5\}\}$ order: 3
See Matrix

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

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

15 . Coloring, $\{3, 4, 5\}$

R: $[2, 1, 4, 3, 2]$

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

‘ 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 4	4 vs 4

Omega Rank for R : cycles: $\{\{3, 4\}, \{1, 2\}\}$ order: 2
See Matrix

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

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

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

Omega Rank for B : cycles: $\{\{1, 4, 5\}\}$ order: 3
See Matrix

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

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

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

R: [2, 3, 4, 3, 2]

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

‘ 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 3	3 vs 3

Omega Rank for R : cycles: {{3, 4}} order: 2

See Matrix

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

[0, y_3 , y_2 , y_1 , 0]

Omega Rank for B : cycles: {{1, 4, 5}} order: 3

See Matrix

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

[y_1 , 0, 0, y_2 , y_3]

SUMMARY	
Graph Type	NOT CC
$v(A)$	0
$v(\Delta)$	1
π	[1, 1, 1, 1, 1]
Dbly Stoch	true

SANDWICH		Total 0
No .	Coloring	Rank

RT GROUPS		Total 1	
No .	Coloring	Rank	Solv
1	{2, 3}	5	["group", Not Solvable]

Δ-RANK'D	SC'D !RK'D	τ-RANK'D	R/B RANK'D	NOT SYNC'D	Total Runs	2^{n-1}
15	0	15 , 15	13 , 15	1	16	16
