New Graph

```
[4, 3, 1, 2], [3, 4, 4, 3]
```

π = [1, 1, 2, 2]

POSSIBLE RANKS

1 x 6
2 x 3

BASE DETERMINANT 3/16, .1875000000

NullSpace of Δ

{1, 2, 3, 4}

Nullspace of A

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

1 . Coloring, {}

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

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

‘ See graph

‘ ‘ See pair graph

‘

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

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

$ [[2, 2, 1, 1] , [1, 1, 2, 2] , [2, 2, 1, 1] , [1, 1, 2, 2]] $

$[y_1, y_1, y_2, y_2]$

$p' = -1 + s^2$ $p' = -s + s^3$

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

$ [[0, 0, 3, 3] , [0, 0, 3, 3]] $

$[0, 0, y_1, y_1]$

$p = s - s^2$

M   N

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

$\tau = 8$, $r' = 1/2$

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

Ranges

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

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

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

Partitions

Action of R on partitions, [[2], [1]]
Action of B on partitions, [[1], [1]]

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

b1 = {1, 3} ‘ , ‘ b2 = {1, 4} ‘ , ‘ b3 = {2, 3} ‘ , ‘ b4 = {2, 4}

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

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

‘ ‘ See level-2 partition graph.

‘

Sandwich	
Coloring	{}
Rank	2
R,B	[4, 3, 1, 2], [3, 4, 4, 3]
π_2	[1, 0, 0, 0, 0, 2]
$\mathbf{u}_2$	[3, 2, 1, 1, 2, 3] (dim 1)
wpp	[2, 2, 2, 2]

2 . Coloring, {2}

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

‘ See graph

‘ ‘ See pair graph

‘

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

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

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

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

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

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

$[0, 0, y_2, y_1]$

3 . Coloring, {3}

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

‘ See graph

‘ ‘ See pair graph

‘

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

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

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

$[0, y_3, y_1, y_2]$

Omega Rank for B : cycles: {{1, 3}}   order: 2
See Matrix

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

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

$p = s^2 - s^3$

4 . Coloring, {4}

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

‘ See graph

‘ ‘ See pair graph

‘

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

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

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

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

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

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

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

$p = s^2 - s^3$

5 . Coloring, {2, 3}

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

‘ See graph

‘ ‘ See pair graph

‘

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

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

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

$[0, y_1, 0, y_2]$

Omega Rank for B : cycles: {{1, 3}} order: 2
See Matrix

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

$[y_1, 0, y_2, 0]$

6 . Coloring, {2, 4}

Ωp(Δ)=0: $p = s^2$ $p' = s^2$

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

‘ See graph

‘ ‘ See pair graph

‘

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

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

$ [[2, 0, 2, 2] , [2, 0, 2, 2] , [2, 0, 2, 2]] $

$[y_1, 0, y_1, y_1]$

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

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

$ [[0, 2, 2, 2] , [0, 2, 2, 2] , [0, 2, 2, 2]] $

$[0, y_1, y_1, y_1]$

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

‘ See 3-level graph

‘

M	N
$ [[0, 0, 1, 1] , [0, 0, 1, 1] , [1, 1, 0, 2] , [1, 1, 2, 0]] $	$ [[0, 0, 1, 1] , [0, 0, 1, 1] , [1, 1, 0, 1] , [1, 1, 1, 0]] $

τ= 6 , r’= 2/3

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

Ranges

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

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

β({1, 3, 4}) = 1/2
β({2, 3, 4}) = 1/2

Partitions
α([{1, 2}, {3}, {4}]) = 1/1

b1 = {1, 2} ‘ , ‘ b2 = {3} ‘ , ‘ b3 = {4}

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

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

‘ ‘ See level-3 partition graph.

‘

Right Group	
Coloring	{2, 4}
Rank	3
R,B	[4, 4, 1, 3], [3, 3, 4, 2]
π_2	[0, 1, 1, 1, 1, 2]
$\mathbf{u}_2$	[0, 1, 1, 1, 1, 1] (dim 1)
wpp	[2, 2, 1, 1]
π_3	[0, 0, 1, 1]
$\mathbf{u}_3$	[0, 0, 1, 1]

7 . Coloring, {3, 4}

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

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

‘ See graph

‘ ‘ See pair graph

‘

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

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

$ [[0, 0, 3, 3] , [0, 0, 3, 3]] $

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

$p = - s + s^2$

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

$ [[2, 2, 1, 1] , [1, 1, 2, 2] , [2, 2, 1, 1] , [1, 1, 2, 2]] $

$[y_1, y_1, y_2, y_2]$

p’ = - s + s ^{3} p’ = - 1 + s ^{2}

M N

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

τ= 8 , r’= 1/2

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

Ranges

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

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

β({1, 2}) = 1/3
β({3, 4}) = 2/3

Partitions
α([{1, 3}, {2, 4}]) = 1/1

b1 = {1, 3} ‘ , ‘ b2 = {2, 4}

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, 4}
Rank	2
R,B	[4, 3, 4, 3], [3, 4, 1, 2]
π_2	[1, 0, 0, 0, 0, 2]
$\mathbf{u}_2$	[1, 0, 1, 1, 0, 1] (dim 1)
wpp	[2, 2, 2, 2]

8 . Coloring, {2, 3, 4}

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

‘ See graph

‘ ‘ See pair graph

‘

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

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

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

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

Omega Rank for B : cycles: {{1, 3}} order: 2
See Matrix

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

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

SUMMARY		
Graph Type		CC
ν(A)		1
ν(Δ)		1
π		[1, 1, 2, 2]
Dbly Stoch		false

SANDWICH		Total 1
No .	**Coloring**	**Rank**
1	{}	2

RT GROUPS		Total 2	
No .	**Coloring**	**Rank**	**Solv**
1	{3, 4}	2	Solvable
2	{2, 4}	3	Solvable

Δ-RANK'D	**SC'D !RK'D**	**τ-RANK'D**	**R/B RANK'D**	**NOT SYNC'D**	**Total Runs**	**2^{n-1}**
5	0	5 , 3	5 , 3	3	8	8