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图1最大流最小割9

图2最大流最小割12

图3最大流最小割9

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我们有

$$P(C_1, x) = 0$$

$$P(C_2, x) = P(P_2, x) - P(C_1, x) = P(P_2, x) - 0 = P(P_2, x)$$

$$P(C_3, x) = P(P_3, x) - P(C_2, x) = P(P_3, x) - P(P_2, x)$$

$$P(C_4, x) = P(P_4, x) - P(P_3, x) + P(P_2, x)$$

$$P(C_5, x) = P(P_5, x) - P(P_4, x) + P(P_3, x) - P(P_2, x)$$

推理得

$$\begin{aligned} P(C_n, x) &= P(P_n, x) - P(P_{n-1}, x) + \cdots + (-1)^n P(P_2, x) \\ &= x(x-1)^{n-1} - x(x-1)^{n-2} + \cdots + (-1)^n x(x-1) \\ &= \frac{x(x-1)^{n-1} + (-1)^n x}{1 + (x-1)^{-1}} \\ &= (x-1)^n + (-1)^n (x-1) \end{aligned}$$

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i.

$$f \circ g = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 5 & 3 & 4 & 1 & 6 \end{pmatrix}$$

$$g \circ f = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 1 & 2 & 5 & 3 & 4 & 6 \end{pmatrix}$$

ii.

$$f^{-1} = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 4 & 3 & 6 & 2 & 5 & 1 \end{pmatrix}$$

$$g^{-1} = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 6 & 4 & 1 & 5 & 2 & 3 \end{pmatrix}$$

iii.

$$f^2 = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 3 & 1 & 4 & 6 & 5 & 2 \end{pmatrix}$$

$$f^5 = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 1 & 2 & 3 & 4 & 5 & 6 \end{pmatrix}$$

iv.

$$f \circ g \circ f = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 6 & 4 & 5 & 2 & 1 & 3 \end{pmatrix}$$

v.

$$g^3 = f \circ g^3 \circ f^{-1} = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 1 & 2 & 5 & 3 & 4 & 6 \end{pmatrix}$$

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i.

$$f * \mathbf{c} = (R, B, R, B, R, R)$$

ii.

$$f^{-1} * \mathbf{c} = (R, R, B, R, R, B)$$

iii.

$$g * \mathbf{c} = (R, R, R, R, B, B)$$

iv.

$$(g \circ f) * \mathbf{c} = (R, B, R, R, B, R)$$

$$(f \circ g) * \mathbf{c} = (R, R, B, R, B, R)$$

v.

$$(g^2 \circ f) * \mathbf{c} = (R, R, R, B, B, R)$$

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$$\frac{p^4 + 2p^3p^2 + 2p}{8}$$

676

$\rho^0$	6	729
$\rho^1$	1	3
$\rho^2$	2	9
$\rho^3$	3	27
$\rho^4$	2	9
$\rho^5$	1	3
$\sigma_i$	3	27
$\tau_i$	4	81

$$\frac{1}{|G|} \sum 3^{c(g)} = \frac{1104}{12} = 92$$