MCS 第8次作业

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5.42

即$p_1 = \frac{1}{2}$ $p_2 = \frac{1}{3}$ $p_3 = \frac{1}{6}$

$p_{12} = \frac{1}{2} \cdot \frac{p_2}{p_1} = \frac{1}{3}$ $p_{13} = \frac{1}{2} \cdot \frac{p_3}{p_1} = \frac{1}{6}$ $p_{11} = 1 - p_{12} - p_{13} = \frac{1}{2}$

$p_{21} = \frac{1}{2} \cdot 1 = \frac{1}{2}$ $p_{23} = \frac{1}{2} \cdot \frac{p_3}{p_2} = \frac{1}{4}$ $p_{22} = 1 - p_{2'} - p_{23} = \frac{1}{4}$

$p_{32} = \frac{1}{2} \cdot 1 = \frac{1}{2}$ $p_{31} = \frac{1}{2} \cdot 1 = \frac{1}{2}$ $p_{33} = 1 - p_{32} - p_{31} = 0$ □

5.44

即$p_{00} = \frac{1}{2}$ $p_{01} = 0$ $p_{10} = 0$ $p_{11} = \frac{1}{2}$

$p_{00,01} = \frac{1}{2} \cdot p(x_2 = 1|\ x_1 = 0) = 0$ $p_{00,10} = \frac{1}{2} \cdot p(x_1 = 1|\ x_2 = 0) = 0$

$p_{01,00} = \frac{1}{2} \cdot p(x_2 = 0|\ x_1 = 0) = \frac{1}{2}$ $p_{01,11} = \frac{1}{2} \cdot p(x_1 = 1|\ x_2 = 1) = \frac{1}{2}$

$p_{10,00} = \frac{1}{2} \cdot p(x_1 = 0|\ x_2 = 0) = \frac{1}{2}$ $p_{10,11} = \frac{1}{2} \cdot p(x_2 = 1|\ x_1 = 1) = \frac{1}{2}$

$p_{11,01} = \frac{1}{2} \cdot p(x_1 = 0|\ x_2 = 1) = 0$ $p_{11,10} = \frac{1}{2} \cdot p(x_2 = 0|\ x_1 = 1) = 0$ □

5.28

令r表示restart value

初始时$\pi_i = (1 - r)\pi_j p_{ji}$

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设加了n个环

$$\begin{cases} \pi_i = (1-r)\pi_j p_{ji} + n(1-r)\pi_k \\ \pi_k = \dfrac{1-r}{n+1}\pi_i \end{cases}$$

$$\Longrightarrow \pi_i = \frac{(n+1)}{2nr - nr^2 - 1} \cdot (1-r)\pi_j p_{ji}$$

$$\lim_{n\to\infty} \pi_i = \frac{1}{2r - r^2} \cdot (1-r)\pi_j p_{ji}$$

即当加点环足够多的时候page rank会变成$\dfrac{1}{2r-r^2}$倍 $\square$