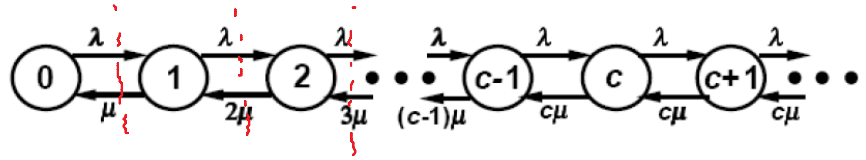
Wednesday, November 18, 2015 12:08 PM

$$\begin{cases}\lambda\pi_{i-1} = i\mu\pi_i, & i \le c,\\ \lambda\pi_{i-1} = c\mu\pi_i, & i > c\end{cases}$$

$\lambda\pi_0 = \mu\pi_1$ $\quad \rho = \lambda/\mu$



$\lambda\pi_1 = 2\mu\pi_2$

$\lambda\pi_2 = 3\mu\pi_3$

$\to \pi_1 = \rho\pi_0, \quad \pi_2 = \frac{1}{2}\rho\pi_1 = \frac{1}{2}\rho^2\pi_0$

$$\pi_i = \frac{\rho^i}{i!}\pi_0 = \frac{\rho^i}{i!}e^{-\rho}$$

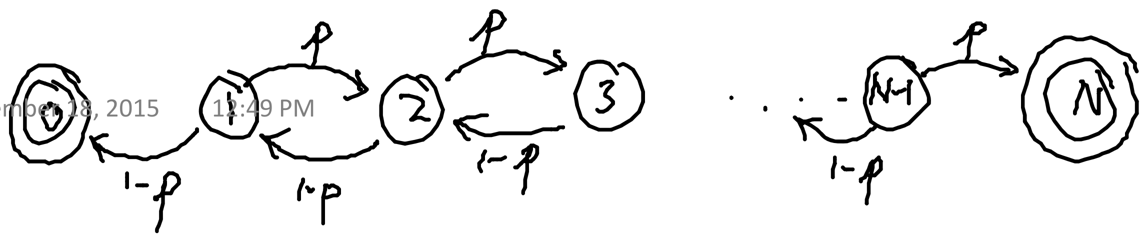
$$\sum_{i=0}^{\infty}\pi_i = 1 \Rightarrow \pi_0 + \rho\pi_0 + \frac{1}{2}\rho^2\pi_0 + \frac{1}{3\times 2}\rho^3\pi_0 + \cdots = 1$$

$$\Rightarrow \pi_0\Big(\underbrace{1 + \rho + \frac{1}{2}\rho^2 + \cdots \frac{\rho^i}{i!}}_{e^\rho} + \cdots\Big) = 1 \Rightarrow \pi_0 = e^{-\rho}$$

$$e^\alpha = \sum_{n=0}^{\infty}\frac{\alpha^n}{n!}$$

$$\sum_{i=1}^{\infty}\frac{\rho^{i-1}}{(i-1)!} = \sum_{j=0}^{\infty}\frac{\rho^j}{j!} = e^\rho$$

$$P(A|B) = \frac{P(AB)}{P(B)}$$

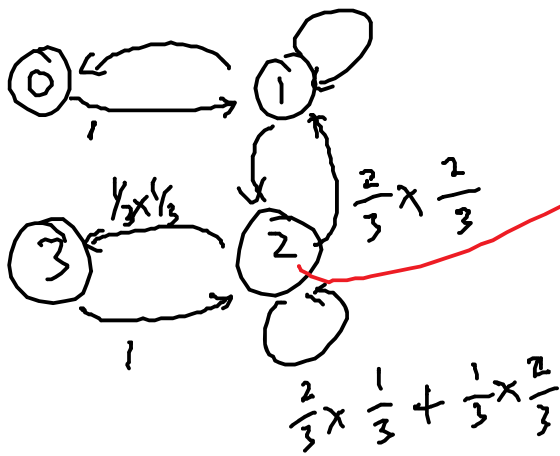


$$P_i = p\cdot P_{i+1} + q\cdot P_{i-1}$$

$$P_0 = 0, \quad P_N = 1$$

$$\begin{cases} P_1 = p\cdot P_2 \\ P_2 = pP_3 + (1-p)P_1 \\ \quad\vdots \\ P_{N-1} = pP_N + (1-p)P_{N-2} = p + (1-p)P_{N-2} \end{cases}$$

\# of White



$$\frac{1}{9} + \frac{4}{9} + \left(\frac{2}{9} + \frac{2}{9}\right) = 1$$

$$\begin{cases} \pi P = \pi \\ \pi \mathbf{1} = 1 \end{cases}$$

$$P = \begin{array}{c|cccc} & 0 & 1 & 2 & 3 \\ \hline 0 & 0 & 1 & 0 & 0 \\ 1 & 1/9 & 4/9 & 4/9 & 0 \\ 2 & 0 & 4/9 & 4/9 & 1/9 \\ 3 & 0 & 0 & 1 & 0 \end{array}$$