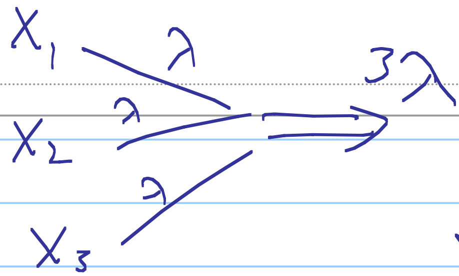
Note Title 10/4/2011



$P(X_i > t) = e^{-\lambda t}$

$X_1, \quad X_2, \quad X_3 \sim \text{iid} \quad \exp(\lambda)$

$$Y = \min(X_1, X_2, X_3)$$

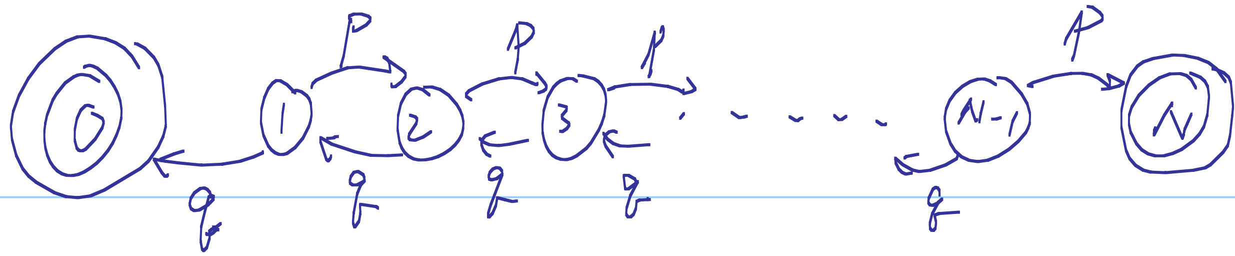
$$P(Y \le t) = 1 - P(Y > t)$$

$$= 1 - P(X_1 > t) \cdot P(X_2 > t) \cdot P(X_3 > t)$$

$$= 1 - e^{-3\lambda t}$$

$$\begin{cases} \pi Q = 0 \\ \pi \mathbf{1} = 1 \end{cases} \qquad \begin{cases} \pi P = \pi \\ \pi \mathbf{1} = 1 \end{cases}$$

continuous-time MC   discrete-time MC



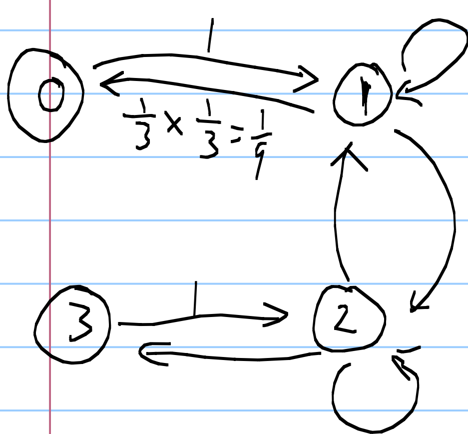
- $P_i = p\cdot P_{i+1} + q\cdot P_{i-1}$

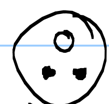
$i=1 \quad P_1 = p\cdot P_2 + q\cdot 0 = pP_2$

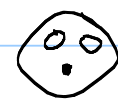
- $P_0=0,\ P_N=1$

$i=2 \quad P_2 = pP_3 + qP_2$

$\vdots$







$\frac{1}{3}\times\frac{2}{3}+\frac{2}{3}\times\frac{1}{3}=\frac{4}{9}$

$\frac{2}{3}\times\frac{2}{3}=\frac{4}{9}$

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

$$P = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 1/9 & 4/9 & 4/9 & 0 \\ 0 & 4/9 & 4/9 & 1/9 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$

$$P = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 1/9 & 4/9 & 4/9 & 0 \\ 0 & 4/9 & 4/9 & 1/9 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$

$$\pi P = 1 \qquad \pi = [\pi_0 \; \pi_1 \; \pi_2 \; \pi_3)$$

$$\pi (P - I) = (0\,0\,0\,0)$$

$$(\pi_0 \cdot \pi_1 \cdot \pi_3) \cdot \begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \end{pmatrix} = 1$$

$$\pi \cdot \underbrace{\left[\; P - I \; \right]}_{A} = \underbrace{(1 \; 0 \; 0 \; 0)}_{B}$$

$$\pi = B \cdot A^{-1}$$