CDA6530

Note Title 10/6/2011

mid-term → Oct. 18th

no class (lecture) in that day

$$\begin{cases} P_i = p \cdot P_{i+1} + q \cdot P_{i-1} \\ P_0 = 0 \quad P_N = 1 \end{cases}$$

$\Rightarrow (p+q) P_i = p P_{i+1} + q P_{i-1}$

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

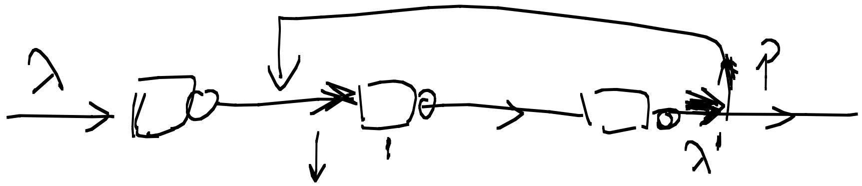
if $Z_i = P_i - P_{i-1}$ $\Rightarrow Z_{i+1} = \alpha Z_i$ where $\alpha = \frac{q}{p}$

$$Z_1 + Z_2 + \cdots Z_N = (P_1 - P_0) + (P_2 - P_1) + \cdots + (P_N - P_{N-1})$$
$$= P_N - P_0 = 1$$

$$\Rightarrow Z_1 + \alpha Z_1 + \alpha^2 Z_1 + \cdots \alpha^{N-1} Z_1 = 1 \Rightarrow Z_1 = \frac{1-\alpha}{1-\alpha^N}$$

$$(1 + \alpha + \alpha^2 + \cdots \alpha^{N-1}) Z_1 = 1$$

$$\frac{1-\alpha^N}{1-\alpha}$$



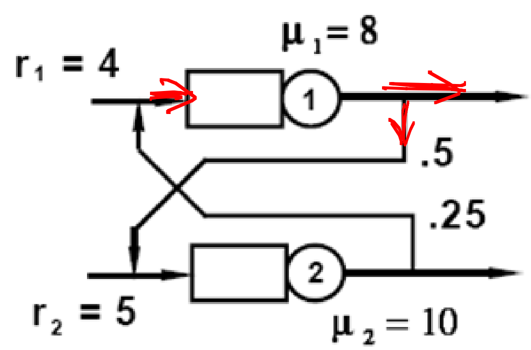
$(\lambda+\lambda' p) = \lambda'$

$\rho_2 = \dfrac{(\lambda+\lambda' p)}{\mu_2}$

response time

= wait. time + service time

$$E[T^{(1)}] = 1/(\mu_1 - \lambda_1) + E[T^{(2)}]/2$$
$$E[T^{(2)}] = 1/(\mu_2 - \lambda_2) + E[T^{(1)}]/4$$



$$E[T^{(1)}] = E[T^{(1)}|A]\cdot P(A) + E[T^{(1)}|B]\cdot P(B)$$

A: ~~directly~~ go out after queue 1

B: divert to queue 2 after queue 1

$$E[T^{(1)}|A] = \frac{1}{\mu_1-\lambda_1} \qquad E[T^{(1)}|B] = \frac{1}{\mu_1-\lambda_1} + E[T^{(2)}]$$

$$E[T^{(1)}] = \frac{1}{\mu_1-\lambda_1}\cdot\frac{1}{2} + \left(\frac{1}{\mu_1-\lambda_1} + E[T^{(2)}]\right)\frac{1}{2}$$