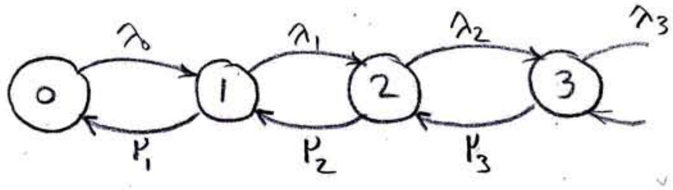
$\boxed{3.16}$



Global balance equations

0: $\boxed{\lambda_0 P_0 = \mu_1 P_1}$

1: $(\mu_1+\lambda_1) P_1 = \mu_2 P_2 + \lambda_0 P_0$ but $\because \lambda_0 P_0 = \mu_1 P_1$ $\therefore \boxed{\lambda_1 P_1 = \mu_2 P_2}$

2: $(\mu_2+\lambda_2) P_2 = \mu_3 P_3 + \lambda_1 P_1$ but $\because \lambda_1 P_1 = \mu_2 P_2$ $\therefore \boxed{\lambda_2 P_2 = \mu_3 P_3}$

$\vdots$

k: $\Rightarrow \boxed{\lambda_k P_k = \mu_{k+1} P_{k+1}}$

define $\rho_k = \dfrac{\lambda_k}{\mu_{k+1}}$.

$P_{k+1} = \rho_k P_k \quad \forall k \geq 0 \quad \Rightarrow \quad P_{k+1} = \rho_k \rho_{k-1} \cdots \rho_0 P_0 \quad \forall k \geq 1$

P_0 is determined using: $\displaystyle\sum_{k=0}^{\infty} P_k = 1$

$$P_0 + \rho_0 P_0 + \rho_0 \rho_1 P_0 + \cdots + (\rho_0 \rho_1 \cdots \rho_k) P_0 + \cdots = 1$$

$$P_0 = \left[1 + \sum_{k=0}^{\infty} \prod_{i=1}^{k} \rho^{i} \right]^{-1}$$