M/M/1

$$\pi_0 = 1 - \rho$$

$$\pi_n = \rho^n \pi_0 = \rho^n (1-\rho), n \geq 1$$

$$L_q = \frac{\rho^2}{1-\rho}$$

$$L_s = \rho$$

$$L = \frac{\rho}{1-\rho}$$

$$W_q = \frac{\rho}{\mu(1-\rho)}$$

$$W_s = 1/\mu$$

$$W = \frac{1}{\mu(1-\rho)}$$

$$W_q(t) = \begin{cases} \rho, \text{para t} = 0 \\ \rho e^{-\mu(1-\rho)t}, \text{para t} \geq 0 \end{cases}$$

M/M/s

$$\pi_0 = \left[\frac{(s\rho)^s}{s!(1-\rho)} + \sum_{n=0}^{s-1} \frac{(s\rho)^n}{n!} \right]^{-1}$$

$$\pi_n = \begin{cases} \dfrac{(s\rho)^n \pi_0}{n!}, \, para \, 1 \leq \text{n} \leq \text{s} \\ \dfrac{s^s \rho^n \pi_0}{s!}, \, para \, \text{n} \geq \text{s} \end{cases}$$

$$P_B = \frac{\pi_s}{1-\rho}$$

$$L_q = \frac{s^s \rho^{s+1} \pi_0}{s!(1-\rho)^2}$$

$$L_s = \lambda / \mu$$

$$W_q = L_q / \lambda$$

$$W_s = 1/\mu$$

$$W_q(t) = \begin{cases} 1 - \dfrac{(s\rho)^s \pi_0}{s!(1-\rho)}, \, para \, \text{t} = 0 \\ \dfrac{(s\rho)^s \pi_0}{s!(1-\rho)} e^{-s\mu(1-\rho)t}, \, para \, \text{t} > 0 \end{cases}$$