

Formulário

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

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

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

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

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

$$L_s = \lambda / \mu$$

$$W_q = L_q / \lambda$$

$$W_s = 1 / \mu$$

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