TABLE C.3: *(Continued)*

μ = Average number of customers or objects served per unit of time

n = Number of customers in the queuing system

ρ = Capacity utilization for the system = $\dfrac{\lambda}{S\mu}$

P_0 = Probability that no customers are in the waiting line system, that is, the service facility is idle

$$P_0 = \frac{1}{\left[\sum_{n=0}^{S-1} \frac{1}{n!}\left(\frac{\lambda}{\mu}\right)^n\right] + \frac{1}{S!}\left(\frac{\lambda}{\mu}\right)^S \frac{S\mu}{S\mu - \lambda}}$$

P_n = Probability that n customers are in the waiting line system

$$P_n = \begin{cases} \dfrac{1}{S!S^{n-s}}\left(\dfrac{\lambda}{\mu}\right)^n P_0 \text{ for } n > S \\ \dfrac{1}{S!}\left(\dfrac{\lambda}{\mu}\right)^n P_0 \text{ for } n \geq S \end{cases}$$

P_w = Probability that an arriving customer must wait for service

$$P_w = \frac{1}{S!}\left(\frac{\lambda}{\mu}\right)^S \frac{S\mu}{S\mu - \lambda} \; P_0$$

L_s = Average number of customers in the waiting line system (waiting and being served)

$$L_s = \frac{\lambda\mu\left(\frac{\lambda}{\mu}\right)^S}{(S-1)!(S\mu - \lambda)^2} \; P_0 + \frac{\lambda}{\mu}$$

W_s = Average time a customer spends in the system (waiting time plus service time)

$$W_s = \frac{Ls}{\lambda}$$

L_q = Average number customers waiting in line (queue) = $L_s - \dfrac{\lambda}{\mu}$

W_q = Average time a customer spends waiting in line for service = $W_s - \dfrac{1}{\mu} = \dfrac{Lq}{\lambda}$