

**TABLE C.1:** Formulas to Measure Performance of the Single-Line, Single-Server Model

$\lambda$  = Average number of arrivals per unit of time

$\mu$  = Average number of customers or objects served per unit of time

$\rho = \frac{\lambda}{\mu}$  = Capacity utilization for the system

$L_s$  = Average number of customers in the waiting line system (waiting and being served) =  $\frac{\lambda}{\mu - \lambda}$

$L_q$  = Average number customers waiting in line (queue) =  $\frac{\lambda^2}{\mu(\mu - \lambda)}$

$W_s$  = Average time a customer spends in the system (waiting time plus service time) =  $\frac{1}{\mu - \lambda}$

$W_q$  = Average time a customer spends waiting in line for service =  $\frac{\lambda}{\mu(\mu - \lambda)} = \frac{L_q}{\lambda}$

$P_0$  = Probability that no customers are in the waiting line system, that is, the service facility is idle =  $(1 - \frac{\lambda}{\mu})$

$P_n$  = Probability that exactly  $n$  customers are in the waiting line system =  $(\frac{\lambda}{\mu})^n \times P_0 = (\frac{\lambda}{\mu})^n \times (1 - \frac{\lambda}{\mu})$