$$\text{capacity} = \frac{1}{\text{cycle time}} \qquad \text{utilization} = \frac{\text{flow rate}}{\text{capacity}} \qquad \text{flow rate} = \text{minimum (demand, capacity)} \qquad \text{avg. inventory} = \text{avg. flow rate} \times \text{avg. flow time}$$

$$\text{avg. time in queue } T_q = \left(\frac{\text{service time}}{m}\right) \times \left(\frac{\text{utilization}^{\sqrt{2(m+1)}-1}}{1-\text{utilization}}\right) \times \left(\frac{CV_a^2 + CV_p^2}{2}\right) \qquad \text{avg. inventory in queue } I_q = T_q / a \qquad \text{avg. flow time } T = T_q + p$$

where m = number of servers

a = avg. interarrival time

flow rate = avg. arrival rate = $1/a$

p = avg. service time

capacity per server = avg. service rate = $1/p$

capacity for m-server system = m/p

$$\text{utilization} = \frac{\text{flow rate}}{\text{capacity}} = \frac{p}{m \times a}$$

CV_a = coefficient of variation of interarrival time

$$= \frac{\text{standard deviation of interarrival time}}{\text{avg. interarrival time}}$$

CV_p = coefficient of variation of service time

$$= \frac{\text{standard deviation of service time}}{\text{avg. service time}}$$

$$= \frac{\text{time busy}}{\text{time available}}$$