FORMULAS DE INVESTIGACION DE OPERACIONES II

MODELO No. 1 (TASA DE LLEGADAS Y TASA DE SERVICIO CONSTANTE). POBLACION Y LINEA DE ESPERA ∞

PARA S = 1

$Cn = \rho^n$ $\rho = \lambda / (S\mu)$ $Pn = \rho^n \, Po$ $Po = 1 - \rho$

$L = \lambda / (\mu - \lambda)$ $Lq = \lambda^2 / \mu(\mu - \lambda)$ $W = 1/(\mu - \lambda)$ $Wq = \lambda / \mu(\mu - \lambda)$

$P\{W > T\} = e^{-\mu(1-\rho)t}$, para $t \geq 0$ $P\{Wq > t\} = \rho e^{-\mu(1-\rho)t}$, para $t \geq 0$

PARA S > 1 , n > 1

$Cn = (\lambda/\mu)^n / n!$, para n = 1,2 ......, S $Cn = \dfrac{(\lambda/\mu)^n}{S!\, S^{n-S}}$, para n = S, S + 1,...

$$Po = \dfrac{1}{\displaystyle\sum_{n=0}^{S-1} \frac{(\lambda/\mu)^n}{n!} \quad \frac{(\lambda/\mu)^S}{S!} \quad \frac{1}{1 - (\lambda / S\mu)}}$$

$L = Lq + \dfrac{\lambda}{\mu}$

$Lq = \dfrac{Po\,(\lambda/\mu)^S \rho}{S!\,(1-\rho)^2}$ $Wq = \dfrac{Lq}{\lambda}$ $W = Wq + \dfrac{1}{\mu}$

$Pn = \dfrac{(\lambda/\mu)^n \; Po}{n!}$, Si 0 < n > S $Pn = \dfrac{(\lambda/\mu)^n}{S!S^{n-S}} Po$, Si $n \geq S$

$$P\{W > t\} = e^{-\mu t}\left[1 + \frac{Po\,(\lambda/\mu)^{S}}{S!\,(1-\rho)} \cdot \frac{(1 - e^{-\mu t\,(S-1-\lambda/\mu)})}{(S-1-\lambda/\mu)}\right]$$

$$P\{Wq > t\} = [1 - P\{Wq = 0\}]\, e^{-S\mu(1-\rho)t}$$

$$P\{Wq = 0\} = \sum_{n=0}^{S-1} Pn$$

MODELO 2 (LINEA DE ESPERA FINITA, POBLACION ∞, TASA DE LLEGADAS Y SERVICIO CONSTANTES).

PARA S = 1

$\lambda n = \lambda$ para n = 0,1,2,....,M - 1 $\qquad \lambda = 0$ para $n \geq M \qquad \mu_n = \mu$

$Cn = (\lambda/\mu)^n = \rho^n$ para n = 1,2,3...,M $\qquad Cn = 0$ para n > M

$$Po = \frac{1-\rho}{1-\rho^{(M+1)}} \qquad Pn = \frac{1-\rho}{1-\rho^{(M+1)}}\,\rho^n \quad \text{para } n = 0,1,...,M$$

$$L = \frac{\rho}{1-\rho} - \frac{(M+1)\,\rho^{(M+1)}}{1-\rho^{(M+1)}} \qquad Lq = L - (1 - Po) \qquad W = \frac{L}{\bar{\lambda}}$$

$$Wq = \frac{Lq}{\bar{\lambda}} \qquad \bar{\lambda} = \lambda(1 - P_M)$$

PARA S > 1, S < M

$$Cn = \frac{(\lambda/\mu)^n}{n!}, \quad \text{para } n = 1,2,....,S$$

$$Cn = \frac{(\lambda/\mu)^n}{S!\,S^{n-S}}, \quad \text{para } n = S, S+1, ...,M \qquad Cn = 0, \quad \text{para } n > M$$

$$Pn = \frac{(\lambda/\mu)^n}{n!}Po, \quad \text{para } n = 1,2,....,S$$

$$Pn = \frac{(\lambda/\mu)^n}{}\,Po, \quad \text{para } n = S, S+1, ...M \qquad Pn = 0, \text{ para } n > M$$