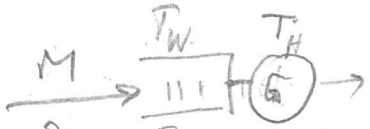
M/G/1 Delay System



$$T_F = T_W + T_H$$

T_H : DF $F_H(t)$, PDF $f_H(t)$, $LT = \mathcal{L}\{f_H(t)\} = \phi_H(s)$

T_W : $\phi_W(s) = \dfrac{(1-\rho)s}{s - \lambda + \lambda\,\phi_H(s)}$, $\rho = \lambda h = \dfrac{\lambda}{\mu}$

T_F : $\phi_F(s) = \phi_W(s) \cdot \phi_H(s)$, as T_W, T_H are independent of each other

Pollaczek-Khintchine Formula:

Mean Waiting Time $E[T_W]$

$$E[T_W] = \frac{\rho(1+c_H^2)}{2(1-\rho)}\,h$$

Probability of Delay

$$W = P\{T_W > 0\} = \rho$$

Mean Flow Time $E[T_F]$

$$E[T_F] = E[T_W] + E[T_H] = \frac{h}{2(1-\rho)}\left(2 - \rho + c_H^2\right)$$