



$$s(t) = P_H(t) + P_{FS}(t) = 1 - P_C(t)$$

$$P_H(t + \Delta t) = (1 - \lambda \Delta t) P_H(t)$$

$$P_C(t + \Delta t) = 1 P_C(t) + (1 - c) \lambda \Delta t P_H(t)$$

$$P_{FS}(t + \Delta t) = 1 P_{FS}(t) + c \lambda \Delta t P_H(t)$$

$P_H(0) = 1$  حالت المبدئي

$$P_H'(t) = -\lambda P_H(t) \xrightarrow{\mathcal{L}} sP_H(s) - 1 = -\lambda P_H(s)$$

$$P_C'(t) = (1 - c) \lambda P_H(t) \xrightarrow{\mathcal{L}} sP_C(s) = (1 - c) \lambda P_H(s)$$

$$P_{FS}'(t) = c \lambda P_H(t) \xrightarrow{\mathcal{L}} sP_{FS}(s) = c \lambda P_H(s)$$

$$(s + \lambda) P_H(s) = 1 \xrightarrow{\mathcal{L}^{-1}} \boxed{e^{-\lambda t}}$$

$$sP_{FS}(s) = c \lambda P_H(s) \implies P_{FS} = c \left( \frac{1}{s} \cdot \frac{1}{s + \lambda} \right) \xrightarrow{\mathcal{L}^{-1}} \boxed{c(1 - e^{-\lambda t})}$$

$$\boxed{P_H + P_{FS} = e^{-\lambda t} + c(1 - e^{-\lambda t})}$$

Answer