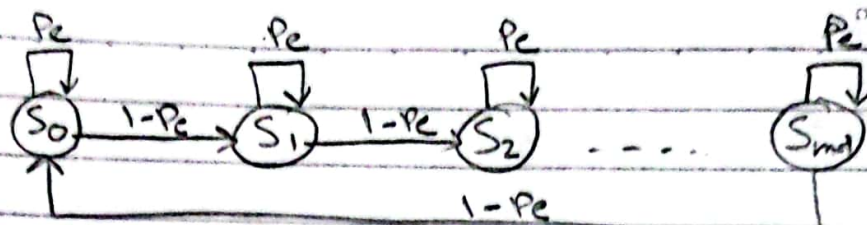S_0: no. of subpackets at the reciever = 0

S_{m-1}: the reciever recieved $(m-1)$ subpackets

$$\Pi = \Pi P$$

$$\begin{bmatrix} \Pi_0 & \Pi_1 & \cdots & \Pi_{m-1} \end{bmatrix} = \begin{bmatrix} \Pi_0 & \Pi_1 & \cdots & \Pi_{m-1} \end{bmatrix} \begin{bmatrix} Pe & 1-Pe & 0 & 0 & \cdots & 0 \\ 0 & Pe & 1-Pe & 0 & \cdots & 0 \\ 0 & 0 & Pe & 1-Pe & \cdots & 0 \\ & & & & \ddots & \\ 1-Pe & 0 & 0 & 0 & \cdots & Pe \end{bmatrix}$$

$Pe\,\Pi_0 + (1-Pe)\,\Pi_{m-1} = \Pi_0 \quad\longrightarrow\quad \Pi_m (1-Pe) = \Pi_0 (1-Pe)$

$(1-Pe)\,\Pi_0 + Pe\,\Pi_1 = \Pi_1 \quad\longrightarrow\quad \Pi_0 (1-Pe) = \Pi_1 (1-Pe)$

$$\Pi_0 = \Pi_1 = \Pi_2 = \cdots = \Pi_{m-1} = \frac{1}{m}$$

$$\sum_{0}^{m-1} \Pi_i = 1 \quad\longrightarrow\quad m\,\Pi_0 = 1 \quad\longrightarrow\quad \boxed{\Pi_0 = \frac{1}{m}}$$

$E_b = 1.5 + 0.22174 = 1.72174 \quad, \quad N_0 = 1$

$P_b = \frac{1}{2}\,\text{erfc}(\sqrt{E_b/N_0}) = Q(\sqrt{2E_b/N_0}) = Q(1.855) = 0.0318$

$Pe = 1 - (1-P_b)^{Lpnt} = 1 - (1 - 0.0318)^{100} = 0.96$

$$delay = \frac{1}{\Pi_{m-1}(1 \cdot Pe)} = \boxed{\frac{m}{1-Pe}} = \frac{m}{0.04}$$

for $m = 10$ $\quad$ $Lpnt = 100$ $\quad\quad$ $delay_{Th} = \frac{10}{0.04} = 250$ time unit

$delay_{Sim} = 252.67$ time unit

there is a slight error of 2.67 time unit between the Analytical results and the Simulation