درس فرآیندهای تصادفی

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Subject:
Year Month Date

Homework 1

S.2.27 : a) $\lambda t = \left(\frac{10 \text{ calls}}{\text{minute}}\right) \cdot \left(\frac{1}{10 \text{ minute}}\right) = 1$

$$P_X(x<2) = \sum_{k=0}^{2} \frac{1}{k!} e^{-1} = \frac{1}{e}\left(1+1+\frac{1}{2}\right) = \frac{5}{2e} = 0.919$$

b) $\lambda t = \left(\frac{10 \text{ calls}}{\text{minute}}\right) \cdot 4 \text{ minute} = 40$

$$P_X(x<2) = \sum_{k=0}^{2} \frac{40^k}{k!} e^{-40} = e^{-40}\left(1+40+\frac{1600}{2}\right)$$

$$= 1841 \cdot e^{-40} = 1.477 \times 10^{-13}$$

S.2.32

$$P_X(K) = P_Y(A) = \binom{n}{k} p^k (1-p)^{n-k} \quad k = 0, 1, 2$$

a) $\rightarrow t = 2 \Rightarrow$ if more than 1 error occurs in 7-bit data block, decoder will be in error: thus the decoder probability is

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$$P_e = \sum_{i=2}^{7} \binom{7}{i} (0.03)^i (1-0.03)^{7-i} =$$

more than ← $i=2$

$\leq$ 0.0171

b) ⟶ Similarly ⟶ $t=2$ ⟶ $P_e = \sum_{i=3}^{15} \binom{15}{i}$

$(0.03)^i (1-0.03)^{15-i} = 0.0094$

c) Similarly ⟶ $t=3$ ⟶ $P_e = \sum_{i=4}^{31} \binom{31}{i} (0.03)^i$

$(1-0.03)^{31-i} = 0.01323$