Assignment-7

Nwjwr Khungur Brahma (AI20BTECH11016)

May 25, 2022

Outline

Question

A telephone occurs at random in the interval $(0, T)$. This means that the probability that it will occur in the interval $0 \leq t \leq t_0$ equals $\frac{t_0}{T}$. Thus the outcomes of this experiment are all points in the interval $(0, T)$. Then what will be the probability of the event that the call will occur in the interval (t_1, t_2)?

Solution

Lets t_1 and t_2 be time such that $(t_1, t_2) \in (0, T)$.
Already given that the probability that the telephone rings at the interval $(0, t_0) = \frac{t_0}{T}$
Lets take the event of call occurs at interval $(0, t_1)$ as E, for the interval $(0, t_2)$ as F and for the interval (t_1, t_2) be Z.

$$\therefore P(E) = \frac{t_1}{T} \text{ and } P(F) = \frac{t_2}{T}$$

From the above we can say that the event $Z = F - E$

$$\begin{aligned} \therefore P(Z) &= P(F - E) && (1)\\ &= P(F) - P(E) && (2)\\ &= \frac{t_2}{T} - \frac{t_1}{T} && (3)\\ &= \frac{t_2 - t_1}{T} && (4) \end{aligned}$$