

# ASSIGNMENT 5

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# Outline

- 1 Abstract
- 2 QUESTION:
- 3 ANSWER:

# Abstract

- This document contains the explanation of example 4.5 of Papoulis Pillai Probability book

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A telephone call occurs at random in the interval  $(0,1)$ . In this experiment, the outcomes are time distances  $t$  between 0 and 1 and the probability that  $t$  is between  $t_1$  and  $t_2$  is given by

$$P\{t_1 \leq t \leq t_2\} = t_2 - t_1$$

Find the C.D.F of the given event.

Let the random variable  $x$  such that  $x(t)=t$   $0 \leq t \leq 1$ . Here,  $t$  is the outcome of the experiment and also the corresponding value  $x(t)$  of the random variable  $x$ .

If  $x > 1$ , then  $X(t) \leq x$  for every outcome. Hence

$$F(x) = P\{X \leq x\} = P\{0 \leq t \leq 1\} = P(S) = 1$$

If  $0 \leq x \leq 1$ , then  $X(t) \leq x$ , for  $t$  in  $(0,x)$ . Hence

$$F(x) = P\{X \leq x\} = P\{0 \leq t \leq x\} = x$$

If  $x < 0$ , then  $\{X \leq x\}$  is the impossible event because

$$x(t) \geq 0, \text{ as } 0 \leq t \leq 1 \text{ Hence, } F(x) = P\{X \leq x\} = P\{\phi\} = 0$$