

Assignment 4

AI1110: Probability and Random Variables

Indian Institute of Technology, Hyderabad

JARUPULA SAI KUMAR
CS21BTECH11023

Example [Papoulis Textbook Chapter 4]: Suppose that a random variable x is such that $x(\zeta) = a$ for every ζ in S . We shall find its distribution function.

Solution:

1) if $x \geq a$ then,

$$\implies x(\zeta) = a \leq x, \forall \zeta \quad (1)$$

$$\implies F(x) = \Pr(\mathbf{x} \leq x) \quad (2)$$

$$\implies P\{S\} = 1 \quad (3)$$

$$\therefore F(x) = 1, \forall x \geq a.$$

2) if $x < a$ then,

$$\implies \{\mathbf{x} < x\} \quad (4)$$

$$\implies (\zeta) = a \quad (5)$$

$$\implies F(x) = \Pr(\mathbf{x} \leq x) \quad (6)$$

$$\implies F(x) = \Pr(\phi) = 0 \quad (7)$$

$$\therefore F(x) = 0, \forall x < a.$$