

AI1103 Assignment-2

Rohan Atkurkar
CS20BTECH11041



भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

Download all latex-tikz codes from

https://github.com/Rohan673/AI1103/blob/main/AI1103_Assignment2/Assignment2.tex

SOLUTION

Using, Total PDF ($\Pr(-\infty < X < \infty) = 1$)
So,

$$\iint_{-\infty}^{+\infty} f(x, y) dx dy = 1 \quad (1)$$

$$0 + \int_{y=0}^{y=\infty} \int_{x=0}^{x=y} a \times e^{-2y} dx dy = 1 \quad (2)$$

$$a \times \int_{y=0}^{y=\infty} (ye^{-2y}) dy = 1 \quad (3)$$

$$a \times \frac{1}{4} = 1 \quad (4)$$

$$\text{So, } a = 4 \quad (5)$$

Therefore, the correct option is (A).

PROBLEM

Gate EC: Q.69

Let X and Y be continuous random variables with joint probability density function

$$f(x, y) = \begin{cases} a \times e^{-2y} & 0 < x < y < \infty \\ 0 & \text{otherwise} \end{cases}$$

The value of a is

- (A) 4
- (B) 2
- (C) 1
- (D) 0.5