AI1103-Assignment 3

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Download all python codes from

https://github.com/Ramanathan-Annamalai/AI1103-Probability_and_Random_Variables/tree/main/Assignment%203/Codes

and latex-tikz codes from

https://github.com/Ramanathan-Annamalai/AI1103-Probability_and_Random_Variables/blob/main/Assignment%203/Assignment_3.tex

Question

Let X be a continuous random variable denoting the temperature measured. The range of temperature is [0,100] degree Celsius and let probability density function of X be $f(x)$=0.01 for $0 \leq X \leq 100$.

The mean of X is ?

(A) 2.5
(B) 5.0
(C) 25.0
(D) 50.0

Solution

Given X is a continuous random variable.

The probability density function of X is $f(x)$

$$f(x) = \begin{cases} 0.01 & 0 \leq x \leq 100 \\ 0 & \text{otherwise} \end{cases} \tag{0.0.1}$$

Mean of the random variable X is μ

$$\mu = \int_{-\infty}^{\infty} x\, f(x)\, \mathrm{d}x \tag{0.0.2}$$

$$= \int_{0}^{100} x\,(0.01)\, \mathrm{d}x \tag{0.0.3}$$

$$= (0.01) \int_{0}^{100} x\, \mathrm{d}x \tag{0.0.4}$$

$$= (0.01)\ \frac{x^2}{2}\Big|_0^{100} \tag{0.0.5}$$

$$= 50.0 \text{ degree Celsius} \tag{0.0.6}$$

Answer: **Option (D)**