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 in range [0,100].

The probability density function is $Pr(X = x)$

$$Pr(X = x) = f(x) \quad \forall\, x \in [0, 100] \tag{0.0.1}$$

$$= 0.01 \quad \forall\, x \in [0, 100] \tag{0.0.2}$$

Mean of the random variable X is $E(X)$

$$E(X) = \int x\, Pr(X = x)\, \mathrm{d}x \tag{0.0.3}$$

$$= \int x\, f(x)\, \mathrm{d}x \tag{0.0.4}$$

$$= \int_0^{100} x\,(0.01)\, \mathrm{d}x \tag{0.0.5}$$

$$= (0.01) \int_0^{100} x\, \mathrm{d}x \tag{0.0.6}$$

$$= (0.01)\, \frac{x^2}{2}\Big|_0^{100} \tag{0.0.7}$$

$$= 50.0 \text{ degree Celsius} \tag{0.0.8}$$

Answer: **Option (D)**