

AI1103 - Assignment 2

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PROBLEM

54. Let X be a random variable with the following cumulative distribution function:

$$F(x) = \begin{cases} 0, & x < 0, \\ x^2, & 0 \leq x < \frac{1}{2} \\ \frac{3}{4}, & \frac{1}{2} \leq x < 1 \\ 1, & x \geq 1 \end{cases}$$

Then, $P(\frac{1}{4} < X < 1)$ is equal to.

SOLUTION

$$P(a < x < b) = F(b) - F(a) \quad (1)$$

We want,

$$S = P(\frac{1}{4} < X < 1) \quad (2)$$

$$S = F(1) - F(\frac{1}{4}) \quad (3)$$

$$S = \frac{3}{4} - \frac{1^2}{4^2} \quad (4)$$

$$S = \frac{11}{16} \quad (5)$$

Hence, $P(\frac{1}{4} < X < 1)$ is equal to $\frac{11}{16}$

