

Assignment

EE23010: Probability and Random Processes

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Question: If X follows binomial distribution with parameters $n = 5$, p and

$$p_X(2) = 9p_X(3) \quad (1)$$

then p is ?

Solution:

Given, X follows binomial distribution and pmf of X is:

$$p_X(k) = {}^nC_k p^k (1-p)^{n-k} \quad (2)$$

We have, $n = 5$ and p as parameters.

So,

$$p_X(2) = {}^5C_2 p^2 (1-p)^3 \quad (3)$$

$$p_X(3) = {}^5C_3 p^3 (1-p)^2 \quad (4)$$

As, $p_X(2) = 9p_X(3)$

$${}^5C_2 p^2 (1-p)^3 = 9 \left[{}^5C_3 p^3 (1-p)^2 \right] \quad (5)$$

$$(1-p) = 9p \quad (6)$$

$$\implies p = \frac{1}{10} \quad (7)$$