AI1103 : Assignment 5

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Download latex codes from

https://github.com/srivatsav01/Assignment−5/blob/main/Assignment−5.tex

STATISTICS-1 2016 Question 3

If in 6 trials,X is a binomial variate which follows the relation $9\Pr(X=4) = \Pr(X=2)$,then what is the probability of success?

Solution

Let probability of success be p.
Binomial variate X follows following distribution.

$$\Pr(X=k) = \binom{n}{k} \times (p)^k \times (1-p)^{n-k}$$

Given

$$9\Pr(X=4) = \Pr(X=2), n=6$$

$$\Pr(X=4) = \binom{6}{4} \times (p)^4 \times (1-p)^2 \tag{1}$$

$$\Pr(X=2) = \binom{6}{2} \times (p)^2 \times (1-p)^4 \tag{2}$$

$$\frac{\Pr(X=2)}{\Pr(X=4)} = 9 \tag{3}$$

$$\frac{(1-p)^2}{p^2} = 9 \tag{4}$$

$$8p^2 + 2p - 1 = 0 \tag{5}$$

$$p = \frac{1}{4} \tag{6}$$