Probability and Random Variable Assignment-1

Indupalli Sishir Anand
BT22BTECH11009

Introduction

Question: The coin is tossed 2 times. Find the probability of getting atmost one head.

solution: The probability of getting atmost 1 head can be calculated using the binomial distribution formula:

$$\Pr(X \leq 1) = \Pr(X = 0) + \Pr(X = 1)$$

where X is number of heads obtained and n =2. we know that

$$\Pr(x) = {}^{n}C_{x} p^{x} (1-p)^{n-x}$$

Now,the probability of getting a head on any single toss is $\frac{1}{2}$

$\therefore$

$$\Pr(X = 0) = {}^{2}C_{0} \left(\frac{1}{2}\right)^{0} \left(1 - \left(\frac{1}{2}\right)\right)^{2} = \frac{1}{4}$$

$$\Pr(X = 1) = {}^{2}C_{1} \left(\frac{1}{2}\right)^{1} \left(1 - \left(\frac{1}{2}\right)\right)^{1} = \frac{1}{2}$$

From the binomial distribution formula given above

$$\Pr(X \leq 1) = \frac{1}{4} + \frac{1}{2} = \frac{3}{4}$$

$\therefore$ probability of getting at most one head is $\frac{3}{4}$.