

Assignment 1

EE22BTECH11053 - Tanmay Vishwasrao

Question 10.13.3.25

A coin is tossed 3 times. List the possible outcomes. Find the probability of getting (i) all heads (ii) at least 2 heads

Solution: As the coin is tossed 3 times we will get 8 different outcomes. Let us define a random variable X , where getting heads is success.

$$X_i \sim \text{Ber}(p) \quad (1)$$

Parameter	Value	Description
X	0	0 heads
	1	1 head
	2	2 heads
	3	3 heads
n	3	no. of tosses
p	$\frac{1}{2}$	probability of heads

- 1) To get all heads: To get all heads Z should be equal to 3. So we need

$$\Pr(Z = 3) = \binom{n}{3} p^3 (1 - p)^{n-3} \quad (2)$$

$$= \frac{1}{8} \quad (3)$$

- 2) To get atleast 2 heads: To get atleast two heads the value of $Z \geq 2$.

$$\Pr(Z \geq 2) = 1 - \Pr(Z < 2) \quad (4)$$

$$= \sum_{k=2}^3 \binom{n}{k} p^k (1 - p)^{n-k} \quad (5)$$

$$= \frac{1}{2} \quad (6)$$