EE22BTECH11045 - Samudrala Chaithanya

Question 10.13.2.13

If I toss a coin 3 times and get head each time, should I expect a tail to have a higher chance in the 4th toss? Give reason in support of your answer.

Solution: Let X be a random variable denoting the toss of the coin.

$$X = \begin{cases} 0, & \text{tail} \\ 1, & \text{head} \end{cases} \tag{1}$$

$$p_X(0) = p_X(1) = \frac{1}{2} \tag{2}$$

Probability of getting a tail in the fourth toss is independent on the probability of the outcome of before 3 tosses.

Probability of getting a tail

$$p_X(0) = \frac{1}{2} \tag{3}$$

Hence, the fourth toss has equal probability of getting head and tail as its outcome.

TABLE 1: Table

Parameters	Values	Description
X	0	Tail
	1	Head