Assignment 14

K.A. Raja Babu

Download all python codes from

https://github.com/ka−raja−babu/Matrix−Theory/tree/main/Assignment14

and latex-tikz codes from

https://github.com/ka−raja−babu/Matrix−Theory/tree/main/Assignment14

1 Question No. 6.17

A person plays a game of tossing a coin thrice. For each head, he is given Rs 2 by the organiser of the game and for each tail,he has to give Rs 1.50 to the organiser. Let X denote the amount gained or lost by the person. Show that X is a random variable and exhibit it as a function on the sample space of the experiment.

2 Solution

Let X_1, X_2, X_3 be the three tosses of coin such that head and tail represent success and failure respectively and let $X = X_1 + X_2 + X_3$.

$\therefore$ Value of X is given by

$$X(HHH) = X_1 + X_2 + X_3 = 1 + 1 + 1 = 3 \quad (2.0.1)$$

$$X(HHT) = X_1 + X_2 + X_3 = 1 + 1 + 0 = 2 \quad (2.0.2)$$

$$X(HTH) = X_1 + X_2 + X_3 = 1 + 0 + 1 = 2 \quad (2.0.3)$$

$$X(THH) = X_1 + X_2 + X_3 = 0 + 1 + 1 = 2 \quad (2.0.4)$$

$$X(TTH) = X_1 + X_2 + X_3 = 0 + 0 + 1 = 1 \quad (2.0.5)$$

$$X(THT) = X_1 + X_2 + X_3 = 0 + 1 + 0 = 1 \quad (2.0.6)$$

$$X(HTT) = X_1 + X_2 + X_3 = 1 + 0 + 0 = 1 \quad (2.0.7)$$

$$X(TTT) = X_1 + X_2 + X_3 = 0 + 0 + 0 = 0 \quad (2.0.8)$$

$\because$ $X = \{0, 1, 2, 3\}$ is a real valued function with sample space as domain.

Hence , X is a random variable.

Expression	Value
Pr(X=0)	$\frac{1}{8}$
Pr(X=1)	$\frac{3}{8}$
Pr(X=2)	$\frac{3}{8}$
Pr(X=3)	$\frac{1}{8}$

TABLE 2.1: Probability Distribution of X

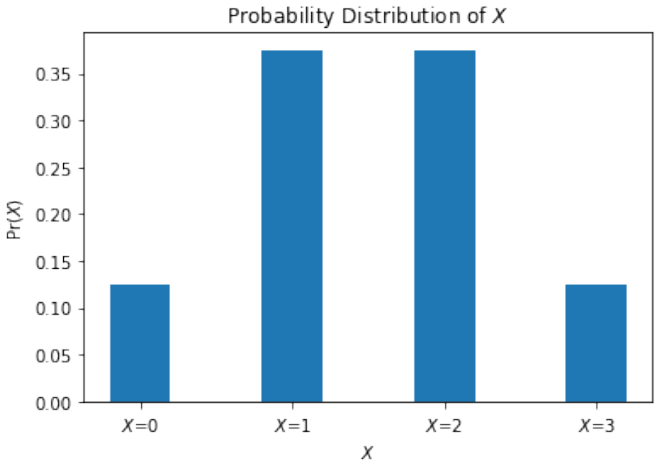

Fig. 2.1: Probability Distribution of X