

Assignment 1

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Download all python codes from

<https://github.com/srikan-p/AI1103/tree/main/Assignment1/codes>

and latex codes from

<https://github.com/srikan-p/AI1103/tree/main/Assignment1>

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PROBLEM

(Prob 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.

SOLUTION

Let Ω be the sample space.

Let X_0 be a random variable where, $X_0 \in \{2, -1.5\}$

$$X_1 = X_0 + Y$$

$$X_2 = X_1 + Y'$$

Here, $Y, Y' \in \{2, -1.5\}$. X_1, X_2, Y, Y' are random variables.

$$X = X_2$$

The value of X is obtained from a random process.

So, X is a random variable.

Let c be the number of heads.

$$c = \frac{(X_0 + 1.5)}{3.5} + \frac{(Y + 1.5)}{3.5} + \frac{(Y' + 1.5)}{3.5}$$

We can relate X with c ,

$$X = 2c - 1.5(3 - c)$$

$$X = 3.5c - 4.5$$

c	X
0	-4.5
1	-1
2	2.5
3	6

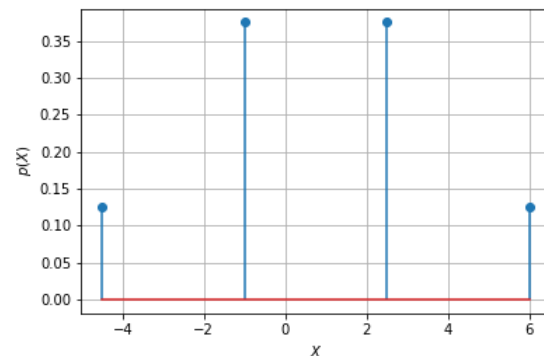


Fig. 0: Plot of probability of X against X