AI1103: Assignment 1

BATHINI ASHWITHA CS20BTECH11008

Download all python codes from

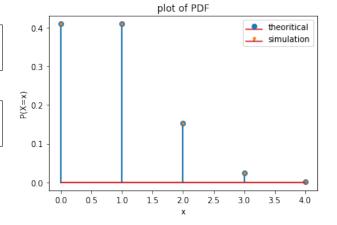
https://github.com/ASHWITHA-11008/ Assignment-1/blob/main/assignment-1.py

and latex-tikz codes from

https://github.com/ASHWITHA-11008/ Assignment-1/blob/main/Assignment-1.tex

1 Problem-1.13

From a lot of 30 bulbs which include 6 defectives, a sample of 4 bulbs is drawn at random with replacement. Find the probability distribution of the number of defective bulbs.



2 Solution:

Given 30 bulbs which include 6 defectives and 4 bulbs are drawn at random with replacement.

Let us assume a random variable X: X=Number of defective bulbs drawn.

Binomial distribution:

$$Pr(X = k) = {}^{n}C_{k} \times \left(\frac{6}{30}\right)^{k} \times \left(\frac{24}{30}\right)^{n-k}$$

$$Pr(X = 0) = {}^{4}C_{0} \times \left(\frac{24}{30}\right)^{4} = 0.4096$$

$$Pr(X = 1) = {}^{4}C_{1} \times \left(\frac{6}{30}\right) \times \left(\frac{24}{30}\right)^{3} = 0.4096$$

$$Pr(X = 2) = {}^{4}C_{2} \times \left(\frac{6}{30}\right)^{2} \times \left(\frac{24}{30}\right)^{2} = 0.1536$$

$$Pr(X = 3) = {}^{4}C_{3} \times \left(\frac{6}{30}\right)^{3} \times \left(\frac{24}{30}\right) = 0.0256$$

$$Pr(X = 4) = {}^{4}C_{4} \times \left(\frac{6}{30}\right)^{4} = 0.016$$