Assignment 6

Prabhath Chellingi - CS20BTECH11038

Download all python codes from

https://github.com/PRABHATH−cs20−11038/AI1103/tree/main/Assignment_6/Codes

and latex-tikz codes from

https://github.com/PRABHATH−cs20−11038/AI1103/tree/main/Assignment_6

Probability−
simulated: 0.19205
actual:0.1937102445

1 Problem

$(GATE(ME)2005 - 2Q)$ A lot has 10% defective items. Ten items are chosen randomly from this lot. The probability that exactly 2 of the chosen items are defective is

2 Solution

Probability of selecting items follows binomial distribution with parameter for selecting defective items,

$$p = \frac{10}{100} = \frac{1}{10} \tag{2.0.1}$$

The probability of getting k defective items by selecting n items is,

$$\Pr(X = k) = \begin{cases} {}^{n}C_k p^k (1-p)^{n-k} & 0 \le k \le n \\ 0 & otherwise \end{cases} \tag{2.0.2}$$

Total no. of items chosen,

$$n = 10 \tag{2.0.3}$$

Probability of getting exactly 2 defective items,

$$\Pr(X = 2) = {}^{10}C_2 \left(\frac{1}{10}\right)^2 \left(1 - \frac{1}{10}\right)^{10-2} \tag{2.0.4}$$

$$\Pr(X = 2) = {}^{10}C_2 \left(\frac{1}{10}\right)^2 \left(\frac{9}{10}\right)^{8} \tag{2.0.5}$$

$$\Pr(X = 2) = 0.1937102445 \tag{2.0.6}$$