

AI1103-Assignment 7

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Download all python codes from

<https://github.com/ayushjha2612/AI11003/tree/main/Assignment7/Codes>

and latex-tikz codes from

<https://github.com/ayushjha2612/AI11003/tree/main/Assignment7>

And let

$$\Pr(Y = 0) = \frac{1}{20} \quad (0.0.7)$$

$$= q = 1 - p \quad (0.0.8)$$

We have to choose 4 non defective bulbs, so finally using binomial distribution we have,

$$\Pr(X = 1) = \binom{4}{4} p^4 q^{4-4} \quad (0.0.9)$$

$$= \left(\frac{19}{20}\right)^4 \quad (0.0.10)$$

$$= 0.814 \quad (0.0.11)$$

GATE 2014(ME - SET3), Q.10 (APTI. SECTION)

A batch of one hundred bulbs is inspected by testing four randomly chosen bulbs. The batch is rejected if even one of the bulbs is defective. A batch typically has five defective bulbs. The probability that the current batch is accepted is —.

Therefore, the probability that the current batch is accepted is 0.814.

The theory Vs simulation plot can be viewed at figure 0.

ANSWER

0.814

SOLUTION

Let the random variable X represent that the batch is accepted or not.

$X = 0$ if the batch is not accepted and $X = 1$ if it is accepted.

And let Y be the random variable representing if a bulb is defective or not.

$Y = 0$ if the bulb is defective and $Y = 1$ if it is a non-defective.

$$\text{Total no. of bulbs} = 100 \quad (0.0.1)$$

$$\text{No. of non-defective bulbs} = 100 - 5 \quad (0.0.2)$$

$$= 95 \quad (0.0.3)$$

$$\Pr(Y = 1) = \frac{95}{100} \quad (0.0.4)$$

$$= \frac{19}{20} \quad (0.0.5)$$

$$= p \quad (0.0.6)$$

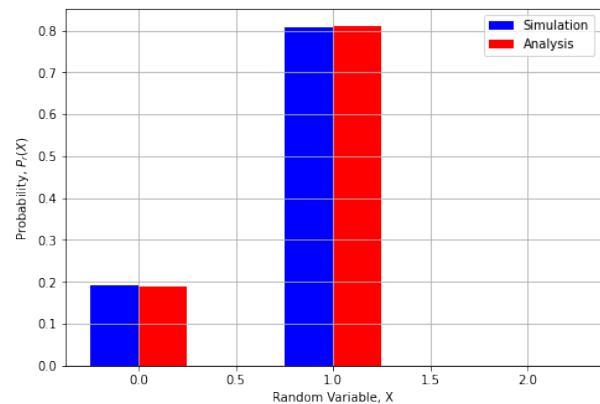


Fig. 0: Theory Vs Simulation