

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>

Therefore we have, probability that batch is selected i.e.,

$$\Pr(X = 1) = \frac{\binom{95}{4}}{\binom{100}{4}} \quad (0.0.6)$$

$$= \frac{95 \times 94 \times 93 \times 92}{100 \times 99 \times 98 \times 97} \quad (0.0.7)$$

$$= 0.812 \quad (0.0.8)$$

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 0.812.

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

ANSWER

0.812

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.

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

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

$$= 95 \quad (0.0.3)$$

The batch is accepted \iff all 4 chosen bulbs are non defective.

$$\text{No. of ways to choose 4 bulbs} = \binom{100}{4} \quad (0.0.4)$$

$$\text{No. of ways to choose 4 non-defective bulbs} = \binom{95}{4} \quad (0.0.5)$$

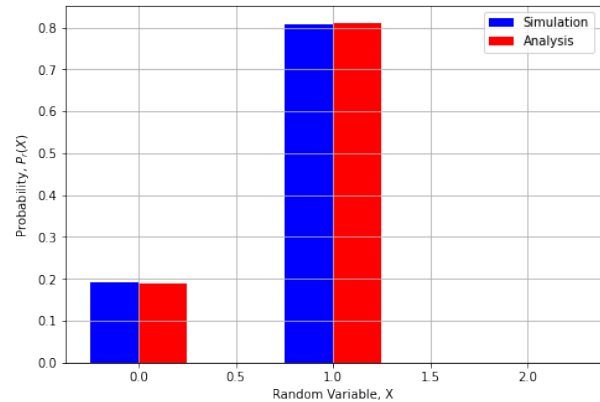


Fig. 0: Theory Vs Simulation