

Assignment 3

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Download all python codes from

<https://github.com/Ananthoju-Pranav-Sai/AI1103/tree/main/Assignment%203/Codes>

and latex codes from

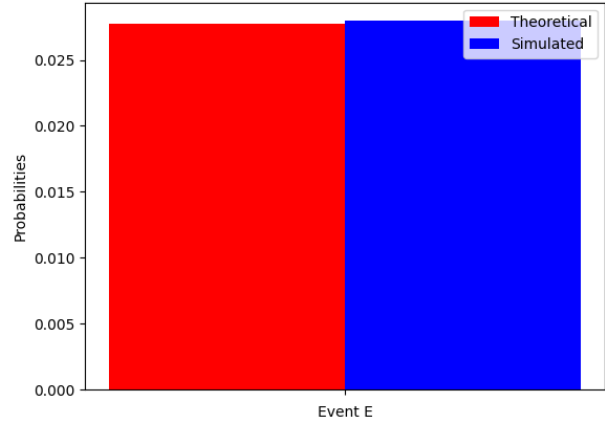
<https://github.com/Ananthoju-Pranav-Sai/AI1103/blob/main/Assignment%203/main.tex>

$$\Rightarrow \Pr(E) = \sum_{i=1}^6 \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} \quad (4.5)$$

$$\Rightarrow \Pr(E) = \frac{6}{216} \quad (4.6)$$

$$\Rightarrow \Pr(E) = 0.0277 \quad (4.7)$$

Theoretical v/s Simulated probabilities :



GATE-PROBLEM 4

Three fair cubical dice are thrown simultaneously. The probability that all three dice have the same number of dots on the faces showing up is (up to third decimal place).

SOLUTION

Let $X_i \in \{1,2,3,4,5,6\}$, $i=\{1,2,3\}$ be the random variables representing the outcome for each die. As the dice are fair the probability mass function (pmf) is expressed as

$$p_{X_i}(n) = \Pr(X_i = n) = \begin{cases} \frac{1}{6} & 1 \leq n \leq 6 \\ 0 & \text{otherwise} \end{cases} \quad (4.1)$$

Let E be the event “All the three dice have the same number of dots on the face showing”.

$$\Pr(E) = \sum_{i=1}^6 \Pr(X_1 = i, X_2 = i, X_3 = i) \quad (4.2)$$

As the events $X_1 = i, X_2 = i$ and $X_3 = i$ are independent we have

$$\Pr(X_1 = i, X_2 = i, X_3 = i) = p_{X_1}(i) \cdot p_{X_2}(i) \cdot p_{X_3}(i) \quad (4.3)$$

$$\therefore \Pr(E) = \sum_{i=1}^6 p_{X_1}(i) \cdot p_{X_2}(i) \cdot p_{X_3}(i) \quad (4.4)$$