Assignment 1

AI1110: Probability and Random Variables
Indian Institute of Techonology Hyderabad

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Question 13.2.12:

Problem Statement

A die is tossed thrice. Find the probability of getting an odd number at least once.

Solution

Let X be a random variable defined as the number of odd number occurrences in three trials. Probability of an observation being odd is;

$$p = \frac{1}{2} \tag{1}$$

$$n = 3 \tag{2}$$

Let $F_X(i)$ be the **Cumulative distribution function**(CDF) such that;

$$F_X(i) = \sum_{0}^{i} \Pr(X) \tag{3}$$

$$\Pr(X = i) = {}^{n}C_i \times p^i \times (1-p)^{(n-i)} \tag{4}$$

Required probability is equivalent to;

$$\Pr(1 \le X \le 3) = F_X(3) - F_X(0) \tag{5}$$

$$= \frac{7}{8} \tag{6}$$

Python code: [1]

References

[1] https://github.com/Gunethra/AI1110_2023/tree/master/Assignment_1/code.

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