Assignment

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AI21MTECH02003

Download the python code and LaTex code from

Code source: https://github.com/harshal9876/AI5002/blob/main/Assignment_9/Codes/Assignment_9.py
LaTex code :https://github.com/harshal9876/AI5002/blob/main/Assignment_9/Assignment_9.tex

1 GATE EC 8

Problem: Consider a dice with the property that the probability of a face with n dots showing up is proportional to n. The probability of the face with three dots showing up is ?

2 Solution

Given , Pr(N) is proportional to n where n={1, 2, 3, 4, 5, 6} is random variable. Let the proportionality constant be 'c'.
Then $\Pr(N = n) = n \times c$, tabulating the outcomes:

n	1	2	3	4	5	6
$\Pr(N = n) = n \times c$	1c	2c	3c	4c	5c	6c

As the sum of all probability is equal to 1

$$\Sigma_{n=1}^{6} \Pr(N = n) = 1 \tag{2.0.1}$$
$$c + 2c + 3c + 4c + 5c + 6c = 1 \tag{2.0.2}$$
$$21c = 1 \tag{2.0.3}$$
$$c = \frac{1}{21} \tag{2.0.4}$$

The probability of three dots showing up is 3c
Giving the probability to be:

$$\Pr(N = 3) = 3 \times c \tag{2.0.5}$$
$$= 3 \times \frac{1}{21} \tag{2.0.6}$$
$$= \frac{3}{21} \tag{2.0.7}$$
$$= \frac{1}{7} \tag{2.0.8}$$
$$= 0.1428 \tag{2.0.9}$$

The probability of getting a face with three dots showing up is 0.1428

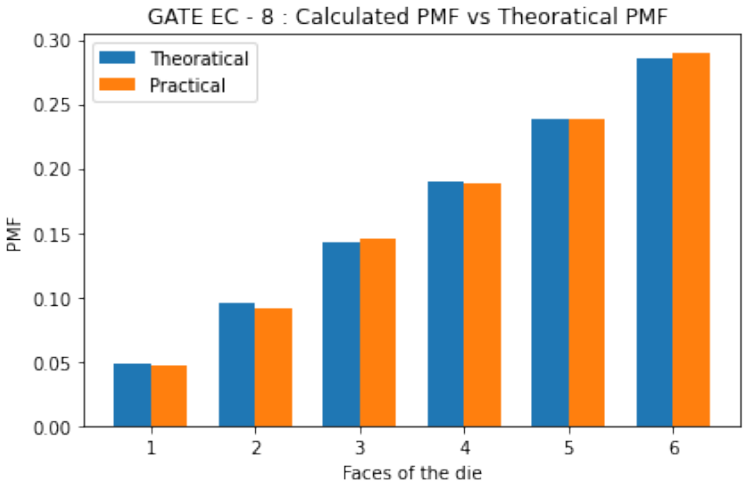

Fig. 1: Calculated PMF versus theoretical PMF

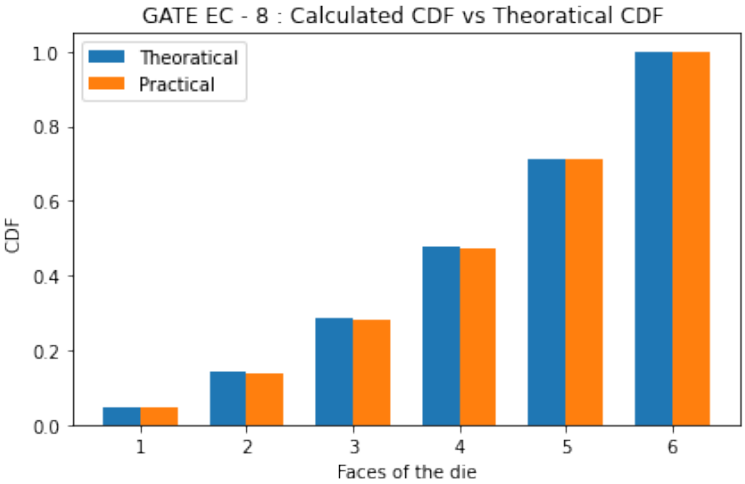

Fig. 2: Calculated CDF versus theoretical CDF