

AI1103-Assignment 2

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Download all python codes from

<https://github.com/ayushjha2612/AI11003/tree/main/Assignment2/Codes>

and latex-tikz codes from

<https://github.com/ayushjha2612/AI11003/tree/main/Assignment2>

Similarly we have,

$$\Pr(X = 1) = 3 \times \Pr(X_1 \neq X_2) \times \Pr(X_1 \neq X_2) \times \Pr(X_1 = X_2) \quad (0.0.5)$$

$$= 3 \times \frac{5}{6} \times \frac{5}{6} \times \frac{1}{6} \quad (0.0.6)$$

$$= \frac{75}{216} \quad (0.0.7)$$

$$= 0.34722 \quad (0.0.8)$$

PROBLEM 5.27

Find the probability distribution of number of doublets in three throws of a pair of dice?

SOLUTION

Let $X_1, X_2 \in \{1, 2, 3, 4, 5, 6\}$ represent the two dice. We have,

$$\Pr(X_1 = X_2) = \frac{6}{36} = \frac{1}{6}$$

Similarly we have,

$$\Pr(X_1 \neq X_2) = \frac{30}{36} = \frac{5}{6}$$

Let the number of doublets in three throws of a pair of dice be represented by a random variable, X . When a pair of dice is thrown three times the number of doublets can be 0, 1, 2 and 3 respectively. So X can take these values

$$\Pr(X = 0) = \Pr(X_1 \neq X_2) \times \Pr(X_1 \neq X_2) \times \Pr(X_1 \neq X_2) \quad (0.0.1)$$

$$= \frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} \quad (0.0.2)$$

$$= \frac{125}{216} \quad (0.0.3)$$

$$= 0.5787 \quad (0.0.4)$$

Note : 3 is multiplied as we have to select which dice will have doublet

$$\Pr(X = 2) = 3 \times \Pr(X_1 \neq X_2) \times \Pr(X_1 = X_2) \times \Pr(X_1 = X_2) \quad (0.0.9)$$

$$= 3 \times \frac{5}{6} \times \frac{1}{6} \times \frac{1}{6} \quad (0.0.10)$$

$$= \frac{15}{216} \quad (0.0.11)$$

$$= 0.06944 \quad (0.0.12)$$

And lastly,

$$\Pr(X = 3) = \Pr(X_1 = X_2) \times \Pr(X_1 = X_2) \times \Pr(X_1 = X_2) \quad (0.0.13)$$

$$= \frac{1}{6} \times \frac{1}{6} \times \frac{1}{6} \quad (0.0.14)$$

$$= \frac{1}{216} \quad (0.0.15)$$

$$= 0.00463 \quad (0.0.16)$$

The probability distribution of number of doublets in three throws of a pair of dice can be found out at figure 0.

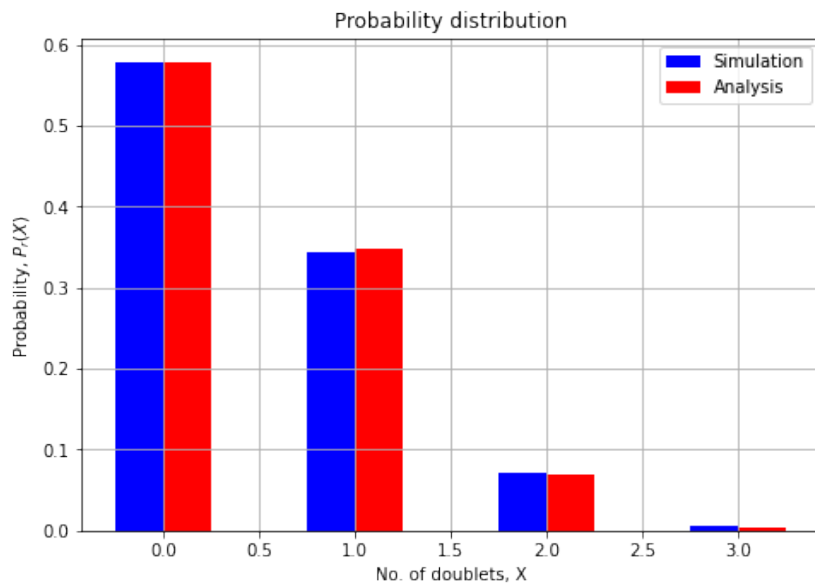


Fig. 0: Probability distribution