

# Assignment 6

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Download all python codes from

<https://github.com/cmapsi/AI1103-Probability-and-random-variables/tree/main/Assignment-6/codes>

and latex-tikz codes from

<https://github.com/cmapsi/AI1103-Probability-and-random-variables/blob/main/Assignment-6/main.tex>

## 1 PROBLEM

(GATE MA-2017 Q 50) Let  $E$  and  $F$  be any two events with  $\Pr(E) = 0.4$ ,  $\Pr(F) = 0.3$  and  $\Pr(F|E) = 3 \Pr(F|E')$ . Then  $\Pr(E|F)$  equals .....

## 2 SOLUTION

Given

- 1)  $\Pr(E) = 0.4$
- 2)  $\Pr(F) = 0.3$
- 3)  $\Pr(F|E) = 3 \Pr(F|E')$

From given data

$$\Pr(F|E) = 3 \Pr(F|E') \quad (2.0.1)$$

$$\frac{\Pr(FE)}{\Pr(E)} = 3 \times \frac{\Pr(FE')}{\Pr(E')} \quad (2.0.2)$$

$$\Pr(EF) = 2 \times \Pr(E'F) \quad (2.0.3)$$

We know that

$$\Pr(F) = \Pr(EF) + \Pr(E'F) \quad (2.0.4)$$

Using (2.0.3) and (2.0.4), we get

$$\Pr(F) = \frac{3}{2} \times \Pr(EF) \quad (2.0.5)$$

$$\frac{\Pr(EF)}{\Pr(F)} = \frac{2}{3} \quad (2.0.6)$$

$$\Pr(E|F) = \frac{2}{3} \approx 0.66 \quad (2.0.7)$$

The graph for theoretical result vs simulation is given below

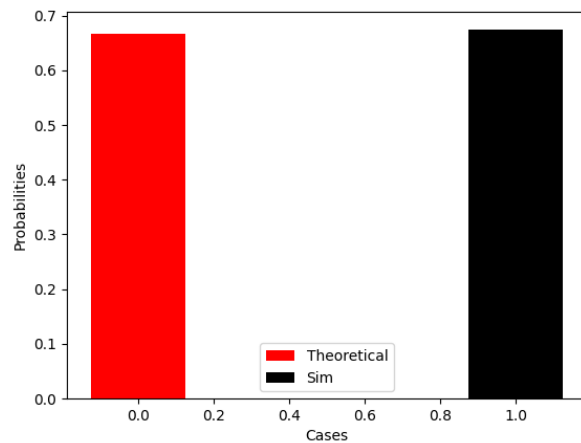


Fig. 3: Theoretical vs simulation