Assignment 3

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Download all python codes from

https://github.com/GouthamSai22/AI1103/blob/main/Assignment3/Codes

and latex-tikz codes from

https://github.com/GouthamSai22/AI1103/blob/main/Assignment3/main.tex

1 PROBLEM 1 FROM GATE(MA) 2010

Let E and F be any two events with $P(E \cup F) = 0.8$, P(E) = 0.4 and P(E|F) = 0.3 then P(F) is (A) $\frac{3}{7}$ (B) $\frac{4}{7}$ (C) $\frac{3}{5}$ (D) $\frac{2}{5}$

2 Solution

Given,

$$Pr(E) = 0.4$$
 (2.0.1)

$$Pr(E+F) = 0.8$$
 (2.0.2)

$$Pr(E|F) = 0.3$$
 (2.0.3)

By definition,

$$Pr(E|F) = \frac{Pr(EF)}{Pr(F)}$$
 (2.0.4)

$$\Rightarrow \Pr(EF) = \Pr(E|F) \times \Pr(F)$$
 (2.0.5)

$$\Rightarrow \Pr(EF) = 0.3 \times \Pr(F) \tag{2.0.6}$$

Now using the identity,

$$Pr(E + F) = Pr(E) + Pr(F) - Pr(EF)$$
 (2.0.7)

From Equation 2.0.1, Equation 2.0.2 and Equation 2.0.6

$$\Rightarrow$$
 0.8 = 0.4 + Pr(F) - (0.3 × Pr(F)) (2.0.8)

$$\Rightarrow 0.4 = (1 - 0.3) \times Pr(F)$$
 (2.0.9)

$$\Rightarrow \Pr(F) = \frac{0.4}{0.7} \tag{2.0.10}$$

$$\Pr(F) = \frac{4}{7}$$
 (2.0.11)