

Assignment 4

CS20BTECH11028

Download latex-tikz codes from

<https://github.com/Harsha24112002/AI1103/tree/main/Assignment-4>

From (2.0.7)

$$\frac{\Pr(A) - \Pr(AB)}{1 - \Pr(B)} = \Pr(A|\bar{B}) \quad (2.0.9)$$

Hence **option A is correct**

1 PROBLEM GATE MA 1997 1.18

If A and B are two events and the probability $\Pr(B) \neq 1$, then

$$\frac{\Pr(A) - \Pr(A \cap B)}{1 - \Pr(B)}$$

equals

(A) $\Pr(A|\bar{B})$ (C) $\Pr(\bar{A}|B)$

(B) $\Pr(A|B)$ (D) $\Pr(\bar{A}|\bar{B})$

2 SOLUTION

Given A and B are two events,
We know that,

$$A = A(B + \bar{B}) \quad (2.0.1)$$

$$= AB + A\bar{B} \quad (2.0.2)$$

Since AB and $A\bar{B}$ are disjoint events,

$$\Pr(A) = \Pr(AB) + \Pr(A\bar{B}) \quad (2.0.3)$$

Hence,

$$\Pr(A\bar{B}) = \Pr(A) - \Pr(AB) \quad (2.0.4)$$

Since B and \bar{B} are disjoint events,

$$\Pr(B) + \Pr(\bar{B}) = 1 \quad (2.0.5)$$

$$\Pr(\bar{B}) = 1 - \Pr(B) \quad (2.0.6)$$

We know that,

$$\Pr(A|\bar{B}) = \frac{\Pr(A\bar{B})}{\Pr(\bar{B})} \quad (2.0.7)$$

From (2.0.6) and (2.0.4)

$$\frac{\Pr(A) - \Pr(AB)}{1 - \Pr(B)} = \frac{\Pr(A\bar{B})}{\Pr(\bar{B})} \quad (2.0.8)$$