

Probability Assignment 1

EE22BTECH11210 - KUMAR ARYAN

Question : Given two independent events A and B such that $\Pr(A) = 0.3$, $\Pr(B) = 0.6$. Find

- 1) $\Pr(AB)$
- 2) $\Pr(AB')$
- 3) $\Pr(A + B)$
- 4) $\Pr(A'B')$

Solution : Given $\Pr(A) = 0.3$, $\Pr(B) = 0.6$.

- 1) $\Pr(AB)$: As A and B are independent events.

$$\begin{aligned}\Pr(AB) &= \Pr(A) \times \Pr(B) \quad (1) \\ &= 0.3 \times 0.6 \\ &= 0.18\end{aligned}$$

- 2) $\Pr(AB')$: Since A and B are independent,

$$\begin{aligned}\Pr(AB') &= \Pr(A) \times \Pr(B') \quad (2) \\ &= 0.3 \times (1 - 0.6) \\ &= 0.12\end{aligned}$$

- 3) $\Pr(A + B)$: As we know,

$$\begin{aligned}\Pr(A + B) &= \Pr(A) + \Pr(B) - \Pr(AB) \quad (3) \\ \Pr(A + B) &= 0.3 + 0.6 - 0.18 \\ \Pr(A + B) &= 0.72\end{aligned}$$

- 4) $\Pr(A'B')$: As we know,

$$A'B' = (A + B)' \quad (4)$$

Therefore,

$$\begin{aligned}\Pr(A'B') &= 1 - \Pr(A + B) \quad (5) \\ &= 1 - 0.72 \\ &= 0.28\end{aligned}$$