Indian Institute of Technology Hyderabad

PROBABILITY ASSIGNMENT

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1 problem

Let A and B be independent events with $P(A) = 0.3$ and $P(B) = 0.4$ find (i).$P(AB)$ (ii).$P(A + B)$ (iii).$P(A \mid B)$ (iv).$P(B \mid A)$

2 solution

Since A and B are independent events, we have

$$(i).P(AB) = P(A)P(B) \tag{1}$$
$$P(AB) = 0.3 \times 0.4 \tag{2}$$
$$P(AB) = 0.12 \tag{3}$$

$$(ii).P(A + B) = P(A) + P(B) - P(AB) \tag{4}$$
$$P(A + B) = 0.3 + 0.4 - 0.12 = 0.58 \tag{5}$$

$$(iii).P(A \mid B) = \frac{0.12}{0.40} = 0.3 \tag{6}$$

$$(iv).P(B \mid A) = \frac{P(B + A)}{P(A)} = \frac{0.12}{0.30} = 0.4 \tag{7}$$