

Assignment1

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Q 1.17 Determine $P(E/F)$, if two coins are tossed once, where

(i) E : tail appears on one coin, F : one coin shows head

(ii) E : no tail appears, F : no head appears

solution

(i) Let X denotes the number of heads shown up during the simultaneous toss of two coins, so where $x_1 = 1, x_2 = 2$ n : number of coins = 2 and p : the probability of getting a head is $\frac{1}{2}$

$$P(F) = P(X \geq 1) = P(X = x_1) + P(X = x_2)$$

By binomial distribution

$$P(X = x_1) = \binom{n}{x_1} p^2$$

$$P(X = x_2) = \binom{n}{x_2} p^2$$

$$\text{hence } P(F) = \binom{n}{x_1} p^2 + \binom{n}{x_2} p^2$$

$$P(F) = \frac{1}{2} + \frac{1}{4} = \frac{3}{4}$$

$$P(EF) = P(X = x_1) = \binom{n}{x_1} p^2$$

$$P(EF) = \frac{1}{2}$$

$$P(E/F) = \frac{2}{3}$$

$$\text{(ii) } P(F) = P(X = x) = \binom{n}{x} p^2, x = 2$$

$$= \frac{1}{4}$$

$$P(EF) = 0$$

$$P(E/F) = 0$$