

Answer on Question #62598 – Math – Statistics and Probability

Question

Find the probability function corresponding to the random variable X when a coin is tossed twice: assuming that the coin is fair?

Solution

If a coin is tossed twice, then the sample space is $S = \{HH, HT, TH, TT\}$, where H and T mean head and tail respectively. Let X represent the number of heads that may come up. Hence X is the random variable that takes the value 0, 1, and 2. Assuming that the coin is fair, we have

$$P(X = 0) = P(\{TT\}) = \frac{1}{4}$$

$$P(X = 1) = P(\{HT\}) + P(\{TH\}) = \frac{1}{4} + \frac{1}{4} = \frac{1}{2}$$

$$P(X = 2) = P(\{HH\}) = \frac{1}{4}$$

Thus, the probability mass function is given by

$$p_X(0) = \frac{1}{4}, p_X(1) = \frac{1}{2}, p_X(2) = \frac{1}{4},$$

or it is given by the next table:

$X = x$	0	1	2
$p_X(x)$	1/4	1/2	1/4

Let the random variable Y represent the number of tails that may come up. It should be noted that the random variable Y has the same probability mass function.

Answer:

$X=x$	0	1	2
$p_X(x)$	1/4	1/2	1/4