

Answer on Question #68030 - Math - Statistics and Probability

Question

When you toss 5 coins once, if the number of head(s) is the random variable define on the resulting sample space. What is the set of random variable resulting from this experiment?

Solution

When we toss five coins simultaneously, the corresponding sample space S is

$\{HHHHH, HHHHT, HHHTH, HHTHH, HTHHH, THHHH, HHHTT, HHTHT, HTHHT, THHHT, HHTTH, HTHTH, THHTH, HTTHH, THTHH, TTHHH, HHTTT, HTHTT, HTTHT, HTTTH, THHTT, THTHT, THTTH, TTHHT, TTHTH, TTTTH, HTTTT, THTTT, TTHTT, TTTHT, TTTTH, TTTTT\}$,

where H is denoted for a head and T is denoted for a tail.

The dimension of the sample space $|S| = 2^5 = 32$.

If we denote by random variable X the number of heads, then X takes on the values $\{0,1,2,3,4,5\}$ with the corresponding probabilities

$$P\{X = k\} = \binom{5}{k} \left(\frac{1}{2}\right)^k \left(\frac{1}{2}\right)^{5-k} = \binom{5}{k} \left(\frac{1}{2}\right)^5, k \in \{0,1,2,3,4,5\}.$$

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