

Probability Assignment 1 (10.13.2.11)

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Question

If you toss a coin 6 times it comes down heads on each occasion. Can you say that the probability of getting a head is 1? Give reasons.

Solution

No, we cannot say that probability of getting a head is 1. Let X denote the no. of heads appeared when 6 coins are tossed. X follows Binomial distribution. Let p be the probability that head is an outcome.

The given information is summarised in Table ??

Parameters	Values	Description
X	6	No. of heads appeared when 6 coins are tossed
n	6	No. of coins tossed
p	1/2	Probability that outcome is head
r	6	For 6th coin

Table 2

$$\Pr(X = r) = {}^nC_r p^r (1 - p)^{n-r} \quad (1)$$

For $X=6$

$$\Pr(X = 6) = {}^6C_6 p^6 (1 - p)^0 \quad (2)$$

$$\Pr(X = 6) = p^6 \quad (3)$$

The given event has occurred with a probability of p^6 . From this we cannot infer that the value of p is 1 (assuming a non-biased coin). Hence, the given statement is false.