

AI1103-Assignment 1

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and latex-tikz codes from

events.

$$P(i = k)_t = \binom{n}{k} \left(\frac{1}{4}\right)^k \left(1 - \frac{3}{4}\right)^{n-k}$$

in the above event $n = 2$

$P(i = 0)_t$ denotes the " 0 " number of times the coins showed tail in 2 tosses.

$$P(i = 0)_t = \binom{2}{0} \left(\frac{1}{4}\right)^0 \left(1 - \frac{3}{4}\right)^{2-0} = \frac{3 * 3}{4 * 4} = \frac{9}{16}$$

1.12

A coin is biased so that the head is 3 times as likely to occur as tail. If the coin is tossed twice, find the probability distribution of number of tails.

sol.

In the question given that, coin is biased and head is 3 times as likely to occur as tail.

the coin has tossed twice let i be random variable $i \in \{0, 1, 2\}$ denotes outcomes in a experiment showing number of tails .

$P(i)_h$ denotes the out come is head.

$P(i)_t$ denotes the out come is tail .

Given that,

$$P(i)_h = 3P(i)_t$$

and we know that,

$$P(i)_h + P(i)_t = 1 \quad (0.0.1)$$

$P(i = 1)_t$ denotes the " 1 " number of times the coins showed tail in 2 tosses.

$$p(i = 1)_t = \binom{2}{1} \left(\frac{1}{4}\right)^1 \left(1 - \frac{3}{4}\right)^{2-1} = (2) * \frac{1 * 3}{4 * 4} = \frac{6}{16}$$

$P(i = 2)_t$ denotes the " 2 " number of times the coins showed tail in 2 tosses.

$$p(i = 2)_t = \binom{2}{2} \left(\frac{1}{4}\right)^2 \left(1 - \frac{3}{4}\right)^{2-2} = \frac{1 * 1}{4 * 4} = \frac{1}{16}$$

substitute in eqn (1)

$$P(i)_h = 3P(i)_t$$

$$P(i)_t + 3P(i)_t = 1$$

$$4P(i)_t = 1$$

$$P(i)_t = \frac{1}{4}$$

and

$$P(i)_h = \frac{3}{4}$$

using binomial distribution and now finding probability distribution of number of tails in the