11.16.3.17.1

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Problem Statement

For an event A, $p(A) = 0.42$. Find $p(A')$.

Theoretical Solution

$$p\left(A'\right) = 1 - p\left(A\right) \tag{3.1}$$

$$p\left(A'\right) = 0.58 \tag{3.2}$$

Solution using Bernoulli R.V

The Bernoulli R.V is defined as,

$$X_i = \begin{cases} 0 & A' \\ 1 & A \end{cases} \tag{3.3}$$

The PMF represents probability of each outcome in the sample space S .

$$S = [0, 1],$$

The PMF is given as:

$$p_X(n) = \begin{cases} 1 - 0.42 & n = 0 \\ 0.42 & n = 1 \\ 0 & n \notin S. \end{cases} \tag{3.4}$$

Simulation Process

1) We will define a Bernoulli random variable that generates 1 for A and 0 for A'.
2) $P(1) = P(A) = 0.42$ and $P(0) = P(A') = 0.58$
3) It will generate 10000 values.
4) Then will find $P(A)$ and $P(A')$
5) At last we will show stem plot.

Using random function 10000 times obtain 0 or 1, where $p(1) = 0.42$

$$p(A) = \frac{\text{Number of 1}}{10000} \tag{3.5}$$

$$p(A') = \frac{\text{Number of 0}}{10000} \tag{3.6}$$

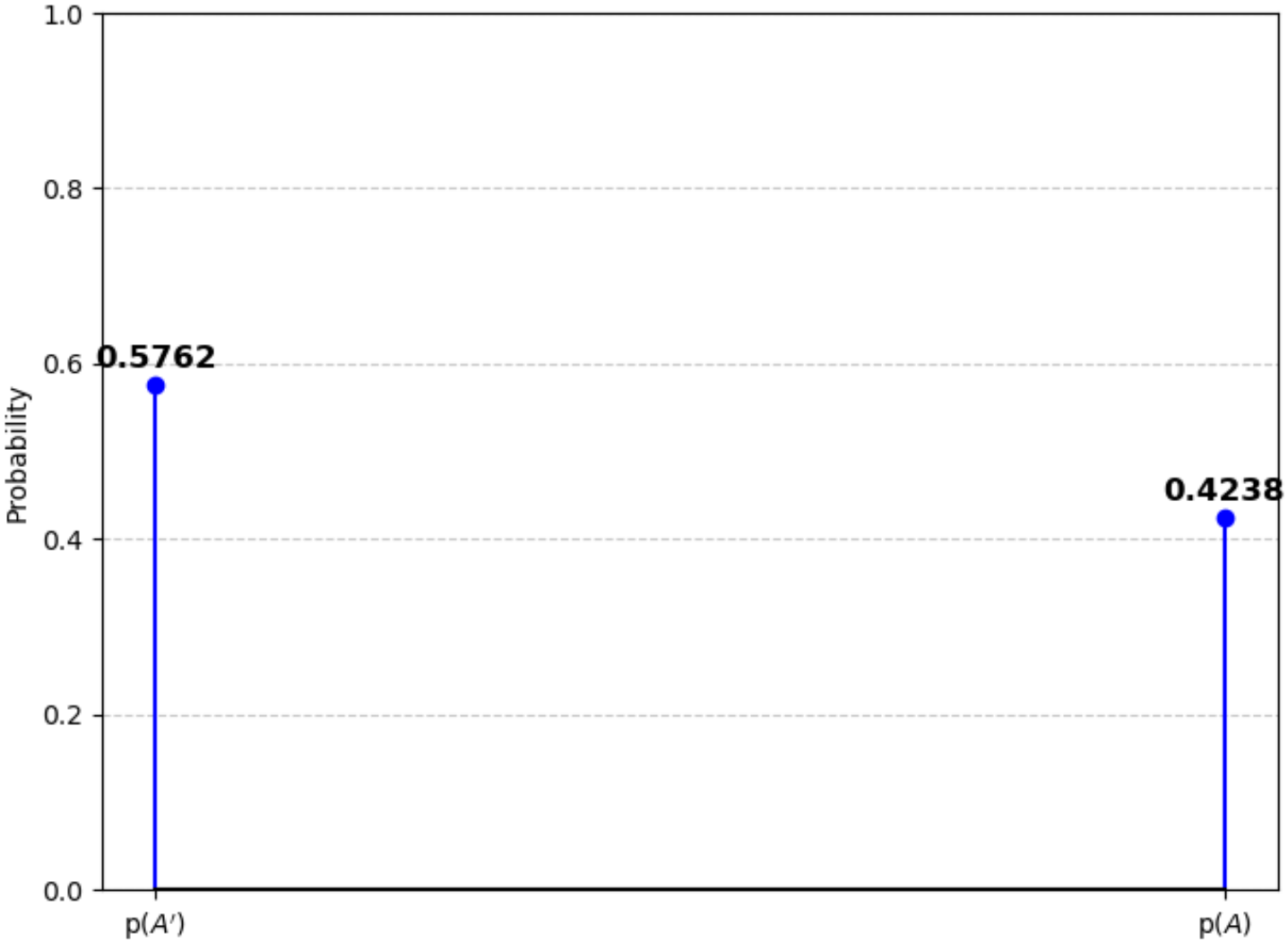
Final Solution

We get,

$$p(A) = 0.4238 \tag{3.7}$$

$$p(A') = 0.5762 \tag{3.8}$$

Plot



Codes

https://github.com/Dhawal24112006/EE1003/tree/main/NCERT/Q7/codes