

Assignment 3

Mahin Bansal

May 16, 2022

Question

A coin is tossed three times ,consider the following events.A:'No head appears', B:'Exactly one head appears' and C:'Atleast two heads appears'. Do they form a set of mutually exclusive and exhaustive events?

Solution

The sample space of the experiment is

$$S = \begin{pmatrix} HHH \\ HHT \\ HTH \\ THH \\ HTT \\ THT \\ TTH \\ TTT \end{pmatrix}$$

and $A = (TTT)$,

$$B = \begin{pmatrix} HTT \\ THT \\ TTH \end{pmatrix} ,$$

$$C = \begin{pmatrix} HHT \\ HTH \\ THH \\ HHH \end{pmatrix}$$

Now ,

$$A \cup B \cup C = \begin{pmatrix} HHH \\ HHT \\ HTH \\ THH \\ HTT \\ THT \\ TTH \\ TTT \end{pmatrix} = S$$

Therefore , A ,B and C are exhaustive events . Also ,
 $A \cap B = \phi$, $A \cap C = \phi$ and $B \cap C = \phi$

Therefore , the events are pair-wise disjoint ,i.e, they are mutually exclusive.Hence ,A,B and C form a set of mutually exclusive and exhaustive events.