KOLMOGOROV AXIOMATIC THEORY OF PROBABILITY - SYNOPSIS

A set is a collection of objects. If A is a set and b an object is the collection of objects which is A then we say b is a member of A or an element of A. If A and B are sets and every member of B is a member of A, we say that B is a subset of A. 2 sets are equal if and only if they have the same members. These sets are usually associated with outcomes of some experiment.

If an experiment is repeated a sufficient number of times, we find that there is some regularity. This observed regularity that the frequency of appearance of any random event oscillates about some fixed number when the number of experiments is large is the basis for the notion of probability.

For every sample space Ω we have a definite set of subsets which compose of one element sets, 2 element sets ... n element sets. Also inclusive are the sure event and empty set. In addition, elementary events can be operated on to form new subsets which are also included in the Borel Field.

A system of Axioms makes precise the notion of probability of a random event. This system of Axioms is defined within a probability space which can be used as a mathematical model of random phenomena. From these 2 Axioms we derive some elementary consequences. From these Axioms and consequences we can formulate special cases of probability such as conditional probability, absolute probability, Bayes Formulae and Independent events. From the probabilities of the outcomes of an experiment, we come to random variable of an experiment.

The value of a random variables X is determined by the outcomes of an experiment and we define a random variable as a numerical valued function on the outcome of a chance experiment. Sometimes the probabilities of a random variable are not directly obvious and to overcome this, we specify the distribution function of a random variable, which must satisfy various conditions.