Evolvement of Probability Theory

Shuai

This is the text at the very beginning of the book *Probability Theory* writen by Loeve. Mathematics could be pure, but every part of science comes from reality. Do not be confused by its abstractness and generality.

Probability theory is concerned with the mathematical analysis of the intuitive notion of "chance" or "randomness", which, like all notions, is born of experience. The quantitative idea of randomness first took form at the gaming tables, and probability theory began, wich Pascal and Fermat(1654), as a theory of games of chance. Since then, the notion of chance has found its way into almost all branches of knowledge. In particular, the discovery that physical "observables", even those which describe the behavior of elementary particles, were to be considered as subject to laws of change made an inverstigation of the notion of chance basic to the whole problem of rational interpretation of nature.

A theory becomes mathematical when it sets up a mathematical model of the phenomena with which it is concerned, that is, when, to describe the phenomena, it uses a collection of well-defined symbols and operations on the symbols. As the number of phenomena, together with their known properties, increases, the mathematical model evolves from early crude notions upon which our intuition was built in the direction of higher generality and abstractness.

In this manner, the inner consistency of the model of random phenomena became doubtful, and this forced a rebuilding of the whole structure in the second quarter of this century, starting with a formulation in terms of axioms and definitions. Thus there appeared a branch of pure mathematics – probability theory – concerned with the construction and inverstigation per se of the mathematical model of randomness.