

Prediction of the Next Earthquake in the North Anatolian Fault Zone Using the classical and Bayesian Predictive Distributions

The estimation of the time of the next earthquake, in a given seismic region, is one of the most useful and difficult tasks of scientists who study and predict earthquakes. In this study, we examine the previous times between earthquakes in the North Anatolian seismic region near Izmit Turkey. The Kolmogorov-Smirnov test shows that the time between earthquakes is a random variable that follows the exponential distribution. Based on this finding the classical and Bayesian predictive probability distributions of the time for the upcoming earthquake are derived. The mean and median of the two predictive distributions are used to estimate the time for the next earthquake; furthermore prediction intervals for the time of the next earthquake are derived. It is found that the Bayesian approach gives better estimates than the classical approach.

Elementary probability theory will be reviewed in order to make this seminar appealing to audiences of all areas of mathematics and physics.