

Importance of Cauchy Distribution in the Field of Statistics

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Synopsis

Objectives

Cauchy distribution has an important impact on the Statistical society, specially in the Estimation Theory. The distribution with density $\frac{1}{\pi(1+x^2)}$ has some peculiar properties which was first observed by Simeon Denis Poisson. This leads to counter examples to some well known and widely accepted results and theories in Statistics.

The Cauchy distribution has also some unique features for which this always seeks a special attention of the Statisticians and make them indulge in rigorous studies of its characteristics. 'Apart from the Normal distribution why Cauchy distribution is needed' - to study this, is another aspect of this project.

Methodology

To study the above mentioned topics, we focus on two broad sections -

- Difference between Normal and Cauchy population
 - Here, we will run a simulation program to observe the behaviour of the tests under the normality assumptions and sample from a Cauchy population
- Cauchy Distribution in Estimation Theory
 - Here, we will check the consistency, Maximum Likelihood Estimation and the concepts of Cramer-Rao Inequality under the Cauchy setup.