

Bayesian Inference for Stable Distributions

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Stable distributions are a rich class of probability distributions that allow skewness and heavy tails. Another important property of the stable distributions with respect to its use as a model is the Generalized Central Limit Theorem which states that regardless of the existence of the variance, the limiting distribution of a sum of independent and identically distributed random variables is stable. Quantile method, empirical sample characteristic function method, numerical maximum likelihood estimation and Bayesian methods are several estimation techniques for parameters of stable distributions. A new Bayesian approach using Metropolis random walk chain and direct numerical integration is proposed. The performance of the method is examined by simulation and a numerical example is demonstrated on real life data.

Keywords: Stable distribution, Metropolis-Hastings algorithm, Parameter estimation, Posterior distribution