The a priori procedure for estimating the location parameter under Elliptical settings

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Abstract

The a priori procedure (APP) provides minimum sample sizes for estimating parameters of the population distribution that ensure precision and confidence in sample statistics. In this paper, we extend the APP to include the family of elliptical distributions, which is a member of a broad family of probability distributions and is an extension of the family of normal distributions. Properties of the elliptical distribution are discussed. Under the uncorrelated assumption and with a given precision and a confidence level, the desired sample size for estimating the location parameter is obtained for generalized elliptically symmetric logistic, symmetric Kotz Type, and $\boldsymbol{t}$ distributions, respectively. The confidence interval for the location parameter is constructed based on the desired sample size using elliptical distribution. Three real data examples are given to illustrate our main results. In addition, the Shinyapp program links for some of the elliptical distributions are provided for researchers and practitioners to use. In the program, the desired sample size is calculated.

Keywords: Elliptical distribution, a priori procedure, estimation of location, required sample size