The Pyrenees International Workshop on Statistics, Probability and Operations Research, SPO 2011 Jaca, September 13–16th 2011

Song's measure of the shape and its application to detect departure from a specific elliptic distribution

Konstantinos Zografos[1], **Apostolos Batsidis**[2]

SUMMARY

The aim of this talk is twofold. On the one hand to present a measure of the shape of a probability distribution and to study its performance in the elliptic family of probability distributions. On the other hand to introduce and study a necessary test for detecting departures from specific elliptic distributions, based on the sample version of Song's measure of the shape. In respect to the first purpose, information theoretic quantities based on Shannon or Rényi entropies and the mutual information provide with nice descriptive measures of a probability distribution. Among them, a measure introduced by Song (2001) on the basis of Rényi entropy, may be used as a descriptive measure of the shape. In the first part of the talk, Song's measure will be applied, studied and compared, with other measures, in the broad class of the elliptic distributions. In the second part of this talk, the empirical version of Song's measure, introduced by Zografos (2008), will be exploited in order to present a necessary test for testing whether a data set is coming from a specific elliptic distribution. The performance of the test is evaluated by means of a simulation study which controls type I error and power.

Keywords: Shannon-Rényi entropy, Song measure, kurtosis, elliptic distributions.

AMS Classification: 62H05, 62E10, 62H15

References

[1] Song, K.-S. (2001). Rényi information, loglikelihood and an intrinsic distribution measure. *J. Statist. Plann. Inference* **93**, 51–69.

[2] Zografos, K. (2008). On Mardia's and Song's measures of kurtosis in elliptical distributions. *J. Multivariate Anal.* **99**, 858–879.

[1]University of Ioannina, Department of Mathematics, 451 10 Ioannina, Greece
kzograf@uoi.gr

[2]University of Ioannina, Department of Mathematics, 451 10 Ioannina, Greece
abatsidis@uoi.gr