

Testing statistical hypotheses based on the density power divergence

A. Basu · A. Mandal · N. Martin · L. Pardo

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Abstract The family of density power divergences is an useful class which generates robust parameter estimates with high efficiency. None of these divergences require any non-parametric density estimate to carry out the inference procedure. However, these divergences have so far not been used effectively in robust testing of hypotheses. In this paper, we develop tests of hypotheses based on this family of divergences. The asymptotic variances of the estimators are generally different from the inverse of the Fisher information matrix, so that the usual drop-in-divergence type statistics do not lead to standard Chi-square limits. It is shown that the alternative test statistics proposed herein have asymptotic limits which are described by linear combinations of Chi-square statistics. Extensive simulation results are presented to substantiate the theory developed.

Keywords Density power divergence · Linear combination of Chi-squares · Robustness · Tests of hypotheses