Positive Quadrant Dependence and Copulas

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Abstract.

The main part of the talk is about testing procedures for Positive Quadrant Dependence (PQD) in the data. As PQD can be seen as a feature of the underlying copula of a data generating random vector, the key methodology of the proposed testing procedures is based on evaluating a functional distance between a nonparametric estimator of a copula and the independence copula function. We discuss three types of test statistics: Kolmogorov-Smirnov, Cramér-von-Mises and Anderson-Darling statistics, together with several estimators of a copula. Among the considered estimators are recently proposed kernel estimators. Asymptotic consistency of the test is established. A Monte Carlo power simulation study is presented and the test is applied to insurance and financial data.

The second part of the talk is about constraint copula estimation. In particular, we present preliminary results on imposing a PQD condition on a copula estimator via a P-splines approach.