



Gradual change-point analysis based on Spearman matrices for multivariate time series

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Abstract

It may happen that the behavior of a multivariate time series is such that the underlying joint distribution is gradually moving from one distribution to another between unknown times of change. Under this context of a possible gradual-change, tests of change-point detection in the dependence structure of multivariate series are developed around the associated sequence of Spearman matrices. It is formally established that the proposed test statistics for that purpose are asymptotically marginal-free under a general strong-mixing assumption, and written as functions of integrated Brownian bridges. Consistent estimators of the pair of times of change, as well as of the before-the-change and after-the-change Spearman matrices, are also proposed. A simulation study examines the sampling properties of the introduced tools, and the methodologies are illustrated on a synthetic dataset.

Keywords α -mixing · Copula · Gradual-change model · Integrated Brownian bridge · Marginal-free procedures

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