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Bayesian copula selection. (English) Zbl 1157.62359
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Summary: In recent years, the use of copulas has grown extremely fast and with it, the need for a simple and reliable method to choose the right copula family. Existing methods pose numerous difficulties and none is entirely satisfactory. We propose a Bayesian method to select the most probable copula family among a given set. The copula parameters are treated as nuisance variables, and hence do not have to be estimated. Furthermore, by a parameterization of the copula density in terms of Kendall's τ, the prior on the parameter is replaced by a prior on τ, conceptually more meaningful. The prior on τ, common to all families in the set of tested copulas, serves as a basis for their comparison. Using simulated data sets, we study the reliability of the method and observe the following: (1) the frequency of successful identification approaches 100% as the sample size increases, (2) for weakly correlated variables, larger samples are necessary for reliable identification.

MSC:

62F15 Bayesian inference
62H20 Measures of association (correlation, canonical correlation, etc.)
62H05 Characterization and structure theory for multivariate probability distributions; copulas

Keywords:

copulas; model selection; Bayes' theorem; goodness-of-fit test; Kendall's tau; pseudo-likelihood

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