

Copula Fitting to Time-Dependent Data, with Applications to Wind Speed Modelling

László Varga, Pál Rakonczai and András Zempléni

Copulae became popular tools in multivariate modeling, with several fitting methods readily available. General copula models are based on independent samples. In an earlier paper Rakonczai and Zempléni (2007) focused on the goodness of fit for copulae. To assume complete independence for a given sample obtained from a time series data is usually too optimistic. Now, as in real applications time dependence is a common feature, we turn to the investigation of the effect of this phenomenon to the proposed test-statistics, especially to the Kendall's process approach of Genest, Quessy, and Rémillard (2006). The block-bootstrap methodology is used for defining the effective sample size for time-dependent observations. The critical values are computed by simulation from independent samples with the adjusted size, determined by circular and stationary block bootstrap methods (Lahiri, 2003). The methods are illustrated by simulated examples and by 2 and 3-dimensional models for 50-years long observations of wind speed data for German towns. We present an automatic block-length selection algorithm, by fitting an AR(1) process to the data, with innovations, having an extreme value distribution. We also give prediction regions for the possible joint wind speed maxima.

References

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