

Nonparametric Estimation of the Pickands
Dependence Function: Asymptotic Dependence
and Independence Cases

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Many applications in risk analysis require the estimation of the dependence among multivariate maxima, especially in environmental sciences. Such dependence can be described by the Pickands dependence function of the underlying extreme-value copula. A nonparametric estimator is constructed as the sample equivalent of a multivariate extension of the madogram. We discuss the large-sample theory of the estimator and we show its finite-sample performance with a simulation study.

We also describe a statistical test based on the Pickands dependence function to verify whether asymptotic dependence or independence holds. Then, we introduce a Pickands dependence function to describe the extremal dependence under asymptotic independence and we propose an estimator of it. We discuss its main asymptotic properties and its performance is illustrated by a simulation study.