Nonparametric estimation of the spectral measure of an extreme value distribution

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Abstract

Given a random sample from a bivariate distribution function F in the domain of max-attraction of a distribution function G. This G is characterized by the two extreme value indices and its spectral or angular measure. The extreme value indices determine both marginals and the spectral measure measure determines the dependence structure of G. One of the main issues in multivariate extreme value theory is the estimation of this spectral measure. We construct a truly nonparametric estimator of the spectral measure, based on the ranks of the above data. Under natural conditions we prove asymptotic normality for the estimator. In particular, the result is valid for all values of the extreme value indices. The theory of (local) empirical processes is indispensable here. The lecture is based on joint work with Laurens de Haan and Vladimir Piterbarg.