

Estimation of the tail exponent of multivariate regular variation

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Abstract In this study, we consider the problem of estimating the tail exponent of multivariate regular variation. Since any convex combination of a random vector with a multivariate regularly varying tail has a univariate regularly varying tail with the same exponent under certain conditions, to estimate the tail exponent of the multivariate regular variation of a given random vector, we employ a weighted average of Hill's estimators obtained for all of its convex combinations, designed to reduce the variability of estimation. We investigate the asymptotic properties and evaluate the finite sample performance of the weighted average of Hill's estimators. A simulation study and real data analysis are provided for illustration.

Keywords Tail exponent · Multivariate regular variation · Hill's estimator · Empirical process theory

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