Testing the multivariate regular variation model

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March 1, 2018

Abstract

In this paper, we propose a test for the multivariate regular variation model. The test is based on comparing the extreme value indices of the radial component conditional on the angular component falling in different subsets. We start by establishing the estimator of the conditional extreme value index and prove the joint asymptotic property for all such estimators. The proof is based on the asymptotic property of the local tail empirical process. Combining the test on the constancy across different conditional extreme value indices with testing the regular variation of the radial component, we obtain the test for testing multivariate regular variation. Simulation studies demonstrate the good performance of the proposed tests. We apply this test to examine two datasets used in previous studies that are assumed to follow the multivariate regular variation model.