Asymptotically Distribution-Free Goodness-of-Fit Testing for Tail Copulas

Assistenzprof. Dr. Sami Umut Can
(Universität von Amsterdam)

November 19, 2014

Let (X1,Y1),...,(Xn,Yn) be an i.i.d. sample from a bivariate distribution function that lies in the max-domain of attraction of an extreme value distribution. The asymptotic joint distribution of the standardized component-wise maxima max(Xi) and max(Yi) is then characterized by the marginal extreme value indices and the tail copula R. The extreme value indices specify the asymptotic marginal distributions of the standardized maxima, and the tail copula specifies the dependence structure. We propose a procedure for constructing asymptotically distribution-free goodness-of-fit tests for the tail copula R. The procedure is based on a transformation of a suitable empirical process derived from a semi-parametric estimator of R. The transformed empirical process converges weakly to a standard Wiener process, paving the way for a multitude of asymptotically distribution-free goodness-of-fit tests. We also extend our results to the m-variate (m>2) case. In a simulation study we show that the limit theorems provide good approximations for finite samples and that tests based on the transformed empirical process have high power.