Centro de Estatística e Aplicações
Universidade de Lisboa

SEMINÁRIOS

CLUSTER-BASED EXTREMAL INFERENCE FOR MULTIVARIATE TIME SERIES

Dr. Anja Janssen, *KTH Royal Institute of Technology, Stockholm*

Abstract: Statistical procedures for inference on extremal properties of a multivariate time series are affected by the underlying extremal dependence structures. Many common time series models exhibit a clustering of extreme values and this will typically affect the variance of estimators which were built for i.i.d. observations. On the other hand, the behavior of quantities of interest, for example marginal distributions of the spectral tail process, is closely related to the overall dependence structure which we see in extremal clusters. We explore how this connection can be exploited to derive new estimators for extremal quantities. This is joint work with Holger Drees, University of Hamburg.

TESTING INDEPENDENCE OF RANDOM ELEMENTS WITH THE DISTANCE COVARIANCE

Dr. Thomas Mikosch, *University of Copenhagen*

Abstract: This is joint work with Herold Dehling (Bochum), Muneya Matsui (Nagoya), Gennady Samorodnitsky (Cornell) and Laleh Tafakori (Melbourne). Distance covariance was introduced by Székely, Rizzo and Bakirov (2007) as a measure of dependence between vectors of possibly distinct dimensions. Since then it has attracted attention in various fields of statistics and applied probability. The distance covariance of two random vectors X,Y is a weighted L2 distance between the joint characteristic function of (X,Y) and the product of the characteristic functions of X and Y . It has the desirable property that it is zero if and only if X,Y are independent. This is in contrast to classical measures of dependence such as the correlation between two random variables: zero correlation corresponds to the absence of linear dependence but does not give any information about other kinds of dependencies.
We consider the distance covariance for stochastic processes X,Y defined on some interval and having square integrable paths, including Lévy processes, fractional Brownian, diffusions, stable processes, and many more. Since distance covariance is defined for vectors we consider discrete approximations to X,Y . We show that sample versions of the discretized distance covariance converge to zero if and only if X,Y are independent. The sample distance covariance is a degenerate V –statistic and, therefore, has rate of convergence which is much faster than the classical root n rates. This fact also shows nicely in simulation studies for independent X,Y in contrast to dependent X,Y .

COFFEE BREAK

ON A MINIMUM DISTANCE PROCEDURE TO SELECT THE SAMPLE FRACTION IN THE POT APPROACH

Dr. Holger Drees, *University of Hamburg*

Abstract: Many estimators of the extreme value index and other tail parameters use a certain fraction of largest observations. The data-driven choice of this fraction is a notoriously difficult problem. The influential paper Clauset, Shalizi and Newman (2009) suggests fitting a generalized Pareto distribution (GPD) to the top k order statistics for all possible k and choose the value that minimizes the Kolmogorov-Smirnov distance between the fitted GPD and the empirical cdf of the exceedances. By the example of the Hill estimator, we will argue why this minimum distance selection procedure usually leads to an inefficient tail estimator. In particular, often a serious underestimation of the optimal sample fraction leads to a largely increased asymptotic variance, which can also be observed in simulations.

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