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Editorial

Pioneered by Leonard Tippett (1902–1985), extreme value theory has become an important branch of probability and statistics. Since 1983, there have been a series of international conferences on extreme value analysis, and there are a fast growing number of published papers on extreme value theory and its applications. The most recent event on extreme value theory is the Eighth Conference on Extreme Value Analysis which took place in Shanghai, China in July 2013, also known as EVA 2013. The papers presented in the conference covered a wide range of research topics.

Statistics and Its Interface (SII) aims to promote outstanding research in all statistical related areas. Two special issues (I, II) on extreme value analysis are the most recent research results from participants in EVA 2013 and some other invited contributors. The goal of the two SII special issues is to expose to the academic and applied community how the state of the art techniques in extreme value theory can be used to tackle diverse real world problems. The authors show precisely how theoretical framework can be transformed into methodologies for real data analysis. A brief discussion of some of the contributed papers will demonstrate that readers can obtain quantitative techniques and analysis approaches from authors' contributions.

The SII special issue II contains ten excellent interesting articles with more application than theory. The paper by Yang, Tan and Zhong investigates the uniformly asymptotic behavior of the finite-time and infinite-time ruin probabilities in a nonstandard compound renewal risk model with or without a constant interest rate. Dombry and Ribatet study the exceedances of a stochastic process above a high threshold and their connections with generalized Pareto processes and define an exceedance through a homogeneous cost functional and show that the limiting (rescaled) distribution is a Pareto process whose spectral measure can be characterized. Dupuis, Sun, and Wang develop a new method of detecting and estimating the change-points in the tail of multiple time series data, and conduct a thorough comparison of different methods in terms of performance on the estimation of change-points and computational time. Ferreira presents new ways to estimate spatial dependence parameter, the areal coefficient, and obtain asymptotic normality of the resulting quantile and tail probability estimators. The method is used to evaluate the effect of the areal coefficient on return values, by an application to three case studies on precipitation extremes. Kojadinovic, Shang, and Yan develop goodness-of-t tests for spatial models based on max-stable processes. Approximate p-values for the resulting margin-free tests are obtained by means of a one- or two-level parametric bootstrap. An application of the tests to rainfall data is finally presented. Ling and Peng establish the upper tail dependence coefficients of two classes of skew slash distributions. The difference of tail dependence coefficients of the two types skew slash distributions sheds light on the model choice for random variables with asymptotic dependence. Chassan, Azaïs, Buscarlet, and Suard give a precise estimation of the extreme magnetic storms frequency per time unit (year) throughout a solar cycle. An innovative approach based on a proportional hazard model is developed. The model can be used to forecast occurrence intensity for the current 24th solar cycle. Abdelaziz studies the reduced bias of the mean estimator for a heavy-tailed distribution. A kernel type estimator for the mean and a reduced bias estimator are proposed. The asymptotic distributional properties of the proposed estimators are derived and their performances are compared with other estimators. Klüppelberg, Haug and Kuhn introduce a technique to analyse the dependence structure of an elliptical copula with focus on extreme observations. The paper describes the extreme dependence structure by an elliptical copula, which preserves a 'correlation-like' structure in the extremes. A new method is tested on real financial data assessing extreme risk dependence. Finally, the paper by Malinowski, Schlather and Zhang combines marked point process (MPP) theory with extreme value analysis to capture dependence between the tail behavior of inter-transaction returns and the pattern of transaction times. Suitable measures of interaction are provided, based on second-order moments of MPPs. Applying these measures to financial transaction data, it is verified that the extreme value index of the return distribution is indeed locally increased, i.e., on the scale of minutes, by the existence of surrounding transactions.

During the review process, authors and reviewers made a lot of efforts to improve the quality of accepted papers in the special issues. We sincerely thank all authors and reviewers for their contributions to the special issues.

Special Issue Editors:
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