

The Working Group on Risk - CREAR, with the support of the IDS dpt, Institut des Actuaire, Labex MME-DII and the group BFA (SFdS), has the pleasure to invite you to the Seminar by:

Prof. Maria Isabel FRAGA ALVES

DEIO & CEAUL, University of Lisbon (Portugal)

May 31, 2017, 12:30pm – 1:30pm
EEE - ESSEC La Défense (CNIT) – Amphi 202

Tailoring Heavy Tails for a Truncated Scenario

The Pareto tailed models are widely used for assessing the risk of rare events in several fields, as large losses in insurance, size distributions of wild forest fires, large river flows with implications to flooding in hydrology and so many others. Although these power tails reveal a very large applicability to fit heavy-tailed phenomena, in practice natural upper bounds can appear that truncate the probability tail, such as the Maximum Possible Loss in insurance treaties or as river flows measurements in a floods scenario; in other situations, it may also be advisable to apply an upper truncation, ensuring the existence of power moments of the distribution of interest, as to obtain reasonable estimated large loss amounts in insurance. At other instances ultimately at the largest data, deviations from a Pareto tail behaviour become apparent. Along the process of tailoring these heavy tails to truncated Pareto-type distributions, the main features of characteristics of interest in the former are somehow kept, under a light truncation scenario. Given that in practice one does not always know whether the distribution is truncated or not, we consider estimators for extreme quantiles, useful for truncated and non-truncated Pareto-type distributions. The estimator of the tail index for the truncated Pareto distribution proposed in Aban *et al.* (2006) is used under this truncated Pareto type setup. We also propose a truncated Pareto QQ-plot and a formal test for truncation in order to help deciding between a truncated and a non-truncated case. In this way we enlarge the possibilities of extreme value modelling using Pareto tails, offering an alternative scenario by adding a truncation point T that is large with respect to the available data. In the mathematical modelling we hence let $T \rightarrow \infty$ at different speeds compared to the limiting fraction ($k/n \rightarrow 0$) of data used in the extreme value estimation. The method leads to quantile estimators which are especially effective in the case of *rough truncation*. Moreover, an estimator for extremal quantiles of the underlying non-truncated Pareto-type distribution is also proposed for situations when this is relevant. Joint work with Jan Beirlant (KU Leuven) and Ivette Gomes (Lisbon University).

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Maria Isabel Fraga Alves is Associate Professor at the Department of Statistics and Operations Research, Faculty of Sciences, University of Lisbon. Her research interests are in the areas of extreme value theory and statistical inference for extreme values, both under a semi-parametric and parametric setups. Isabel holds a PhD in Statistics and Computation, Probability and Statistics (Univ. Lisbon, 1992) on “Statistical Inference in Extreme Value Models”, a Habilitation Degree of Statistics and Operations Research (Univ. Lisbon, 2004). Former Coordinator of Center of Statistics and Applications of University of Lisbon (2006-2009), she is an Elected Member of International Statistical Institute, Member of the Bernoulli Society for Mathematical Statistics and Probability, of the Portuguese Statistical Society and Portuguese Mathematical Society. Isabel organized several international conferences: EVT2013 - Extremes in Vimeiro Today, REV2011 - Workshop on Risk & Extreme Values in Insurance and Finance, Extremes, Risk and the Environment (Invited Session to the 56th Session of the ISI, 2007).



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