Presentations by Professor Paul Embrechts of ETH (September, 2016)

1) September 7th (Wed) 13:00 -15:00
   Japan Joint Statistical Meeting of Japan http://www.jfssa.jp/taikai/2016/index.html
   Session: "Quantitative Risk Management in Finance"
   http://www.jfssa.jp/taikai/2016/table/program_detail/0907.html
   Place: Kanazawa University, Ishikawa
   Title: Quantile-based Risk Sharing
   Abstract: We address the problem of risk sharing among agents using a two-parameter class of quantile-based risk measures, the so-called Range-Value-at-Risk (RVaR), as their preferences. The family of RVaR includes as special cases the Value-at-Risk (VaR) and the Expected Shortfall (ES), the two popular and competing regulatory risk measures. We first present an inequality for RVaR aggregation, showing that a special form of subadditivity is satisfied by RVaR. Then, the risk sharing problem is solved by explicit construction. Three relevant issues in the optimal allocations are investigated: extra sources of randomness, comonotonicity, and model uncertainty. We show that in general, a robust optimal allocation exists if and only if none of the underlying risk measures is a VaR. Practical implications of the main results for risk management and policy makers are discussed, including gambling behaviour, moral hazard, regulatory arbitrage, and model misspecification. In particular, in the context of regulatory capital reduction, we provide some general guidelines on how a regulatory risk measure can lead to certain desirable or undesirable properties of risk sharing among firms, and show novel advantages of ES from the perspective of a regulator. This talk is based on joint work with Hailyan Liu and Ruodu Wang (University of Waterloo).

2) September 13th (Tue) 17:00 -- 18:30
   Place: Keio University Mita Campus, Graduate School Building room #313
   Title: "Hawkes Graphs"
   Abstract: In this talk the Hawkes skeleton and the Hawkes graph are introduced. These objects summarize the branching structure of a multivariate Hawkes point process in a compact, yet meaningful way. I demonstrate how graph-theoretic vocabulary is very convenient for the discussion of multivariate Hawkes processes. I also show how the graph view may be used for the specification and estimation of Hawkes models from large, multitype event streams. We pay special attention to computational issues in the implementation. This makes the results applicable to data with dozens of event streams and thousands of events per component. A simulation study confirms that the presented procedure works as desired. The talk finishes with an application to the modeling of order book data in the context of high frequency finance. The results presented are based on joint work with Matthias Kirchner, RiskLab, ETH Zurich.

3) September 14th (Wed) 17:00 – 19:00 Meeting at The Institute of Actuaries of Japan (Members Only)

Title: "Risk Management: Then, Now and Tomorrow"

Abstract: Financial institutions in insurance and banking find themselves in constant search for a balance between the various stakeholders involved. In this talk I will mainly look at this "search for balance" between a company and the relevant regulators. First of all (THEN) I will give a historic overview of ideas in the realm of finance and insurance that have helped to shape modern financial and insurance markets. Following this short overview, I will discuss how various regulatory regimes, like Basel I/II/III and Solvency I/II have until now reacted to these market developments (NOW). In particular, I will be critical about some of the shortcomings of the current regulatory frameworks in place. In a final part I will give my personal view on the risk management challenges facing the world of insurance and banking going forward (TOMORROW).

4) September 16th (Fri) 16:50-18:35 University of Tokyo, Dept. of Economics:

Place: Seminar Room 1 on the 1st floor of the Economics Research Annex (Kojima Hall)

Title: "An extreme value approach for modeling Operational Risk losses depending on covariates "

Abstract: In financial risk management, Operational Risk data typically appear as entries in a BLxRT-matrix where BL stands for the number of business lines, and RT corresponds to risk types. For instance (BL) Corporate Finance and (RT) Internal Fraud. Banks and insurance companies of ten, at least for internal purposes, model Operational Risk losses based on such a data matrix and use a particular risk measure to be statistically estimated. From a mathematical point of view the (internal) data available consists of BLxRT marked point processes. A typical example consists of a (BL=8, RT=7)-matrix, with historical data in each cell. As risk measure one often takes a high quantile of the total matrix loss distribution function over a one year horizon (referred to in the industry as a one-year Value-at-Risk). In order to analyze this problem we introduce a dynamic version of Extreme Value Theory (EVT) introducing as co-variables rows, columns from the data matrix as well as time. The Operational Risk example is just mentioned as a motivating example, the general EVT methodology discussed is applicable well beyond this example.

This talk is based on joint work with Valerie Chavez-Demoulin (EPF Lausanne) and Marius Hofert (University of Waterloo)

5) September 21st (Wed) Keio Symposium on Risk Assessment

Place: BLDG 14 Room 201, Yagami campus, Keio University

For the time table and abstracts, please see the following website:

http://www.math.keio.ac.jp/~mminami/KeioSymposium_on_RA.html

Title: "Bernoulli and tail-dependence compatibility"

Abstract: Based on a practical example from stress testing within a solvency study of an insurance company, in this talk I will present a so-called inverse-dependence problem. By this I mean a general class of problems where a specific dependence structure between the various components of a vector of risks is given; based on this information, one has to characterize the risk vectors exhibiting this dependence structure, if at all such vectors exist. In particular for the current example, given a symmetric dxd matrix with [0,1] entries, can this matrix result as the lower (or upper) asymptotic tail-dependence coefficient matrix of a d-dimensional risk vector? A full solution of this problem is given. It is shown that this problem is closely related to the determination of matrices of second order cross-moments of general Bernoulli vectors.