L^2 ISFA Lyon and DSA-HEC Lausanne

Wednesday, January 21st 2020

AT I.S.F.A.
Amphi G1

- 9 h 30 — OPENING ADDRESS

- **10 h 00** — **Véronique BLUM & Pierre THEROND** (ISFA)
  New developments in language issues in accounting regulation: likelihood terms and the certainty of uncertainty
- **10 h 45** — Discussion by Tachfine EL ALAMI, Romain GAUCHON & Yahia SALHI (ISFA)

- **11 h 00** — Phd talk #1: **Jose ARAUJO-ACUNA** (UNIL)
  Tempered Pareto-type modeling using Weibull distributions
- **11 h 20** — Q&A's by ISFA PhD students

- **11 h 30** — Networking Time

- 12 h 00 — LUNCH BREAK – **Room 3203**

- **13 h 30** — **Denys POMMERET** (Université Aix Marseille)
  Two-samples comparison of mixture components
- **14 h 15** — Discussion by Martin BLADT (UNIL)

- **14 h 30** — Post-doc talk #2: **Patrick LAUB** (ISFA)
  Phase-Type Models in Life Insurance: Fitting and Valuation of Equity-Linked Benefits
- **14 h 50** — Q&A's by UNIL PhD students

- **15 h 00** — Phd talk #3: **Konrad KRYSTECKI** (UNIL)
  Double finite-time ruin probability for correlated Brownian motions
- **15 h 20** — Q&A's by ISFA PhD students

- **15 h 30** — Phd talk #4: **Maximilien BAUDRY** (ISFA)
  RadialStyle: An Efficient Algorithm to Leverage Multiple Datasets for Predictive Modelling
- **15 h 50** — Q&A's by UNIL PhD students

- **16H00** — SHORT DRINK

- **16H30** — DEPARTURE

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ABSTRACTS

Véronique BLUM & Pierre THEROND: New developments in language issues in accounting regulation: likelihood terms and the certainty of uncertainty

Abstract: The present study explores the triangular links between language, financial reporting and uncertainty and compares the interpretations of likelihood terms as used in international accounting standards in two languages, French and English. A novelty of our work as compared to previous studies is that our samples are not distinct; we hold constant the individual characteristics by surveying twice the same participants. This allows the assessment of the variability of terms' interpretations and judgement consistency. We show that the translations of likelihood terms within the same individuals display variability in point and range estimation causing differences in interpretations likely to hamper the comparability targeted by international standards. But such variability could also be induced by the ambiguity of the terms themselves. With a one-language control sample, in another double-test, we demonstrate that variability persists within languages. Our findings suggest that unstable interpretations of uncertainty expressions exist both across and within languages. Such contribution is of importance to standard setters if they aim at enhancing the comparability, and ensuring the neutrality, of accounting as an input into the decision-making process.

Jose ARAUJO-ACUNA: Tempered Pareto-type modeling using Weibull distributions

Abstract: In several applications of heavy tail modeling, the assumed Pareto behavior is tempered ultimately at the largest data. For instance, in insurance applications claim payments are influenced by claim management so that claims are subject to a higher level of inspection at highest damage levels leading to lighter tails than apparent from modal claims. Inspired by applications in geophysics and finance, Meerschaert et al. (2012) studied parameter estimation for exponential tempering of a simple Pareto distribution. Raschke (2019) discussed applications in insurance using Weibull tempering.
In this talk we generalize the results of these recent papers to tempering of a Pareto-type distribution with a Weibull distribution in a peaks-over-threshold approach. This requires to modulate the tempering parameters as a function of the chosen threshold. We use a pseudo maximum likelihood approach to estimate the model parameters, and consider estimation of return periods of extreme levels. We illustrate the approach with simulation experiments, provide basic asymptotic results and apply the methods to several insurance data sets.
This is joint work with H. Albrecher and J. Beirlant.

Denys POMMERET: Two-samples comparison of mixture components

Abstract: We consider two-component mixture distributions, when one component is known. In insurance this situation can be encountered in mortality models, where the whole mortality rate is well known as a gold standard, and where a subpopulation contains unknown marginal features that we want to compare. When two populations are drawn from such models, we propose a test to compare the second unknown component, that is to test the equality of their marginal density. The behavior of the test is first observed through a lot of different simulation schemes. Then, illustrations are given with two real cases. First on mortality datasets, and results show that the test remains robust in critical situations where the unknown component only represents a few percent of the global population. Second on galaxy velocities datasets where we compare stars mixed with the Milky Way.
This is joint work with Xavier Milhaud, Denys Pommeret, Yahia Salhi, and Pierre Vandekerkhove

Patrick LAUB: Phase-Type Models in Life Insurance: Fitting and Valuation of Equity-Linked Benefits

Abstract: Phase-type (PH) distributions are defined as distributions of lifetimes of finite continuous-time Markov processes. Their traditional applications are in queueing, insurance risk, and reliability, but more recently, also in finance and, though to a lesser extent, to life and health insurance. The advantage is that PH distributions form a dense class and that problems having explicit solutions for exponential distributions typically become computationally tractable under PH assumptions. The fitting of PH distributions to human lifetimes is considered, and some new software is developed. The pricing of life insurance products such as guaranteed minimum death benefit and high-water benefit is treated for the case where the lifetime distribution is approximated by a PH distribution and the underlying asset price process is described by a jump diffusion with PH jumps. The expressions are typically explicit in terms of matrix-exponentials involving two matrices closely related to the Wiener-Hopf factorization, for which recently, a Lévy process version has been developed for a PH horizon. The computational power of the method of the approach is illustrated via a number of numerical examples.

Konrad KRYSTECKI: Double finite-time ruin probability for correlated Brownian motions

Abstract: We focus on deriving the asymptotics of suprema of correlated Brownian motions with drift on a finite time interval, i.e. we analyze the probability

$$P\Big(\sup_{s\in[0,1]} W_1(s) - c_1 s > u,\ \sup_{t\in[0,1]} W_2(t) - c_2 t > au\Big)$$

as $u\to\infty$. We derive the exact asymptotics of the probability above and study the influence of the dependence between a and the correlation of $W1$ and W_2 on the results.

Maximilien BAUDRY: RadialStyle: An Efficient Algorithm to Leverage Multiple Datasets for Predictive Modelling

Abstract: Modern machine learning methods usually require a large amount of data to be efficient. Such an amount of data may not be always available in a single dataset, which means that the information is stored in multiple distinct datasets. This context introduces what we call the structural incompleteness, which refers to the fact that two distinct datasets may not share the same attributes nor have the same distribution for common attributes. We propose a method that combines multiple datasets and addresses the problem of structural incompleteness by performing a style transfer through a latent representation of each dataset. We show that our approach outperforms the state-of-the-art method to leverage the predictive information from multiple datasets.