

8<sup>ème</sup> SEMINAIRE ACTUARIAT – FINANCE  
ISFA Lyon & IRA LE MANS  
Vendredi 8 décembre 2017  
IRA Le Mans, salle de conférence

9h00 – 9h30 : ACCUEIL – CAFÉ

9h30 – 10h10 : Stéphane LOISEL (ISFA, Université Lyon 1)  
*On discrete Schur-constant vectors with applications*

10h10 – 10h50 : François LANGOT (IRA, Le Mans Université)  
*On Nonlinearities in Unemployment*

10h50 – 11h15 : PAUSE CAFÉ

11h15 – 11h55 : Romain GAUCHON (ISFA, Université Lyon 1)  
*Policyholders clustering by using health consumption for targeting prevention programs*

12h00 – 13h45 : DÉJEUNER (Restaurant l'Assiette)

14h00 – 14h40 : Christian ROBERT ((ISFA, Université Lyon 1)  
*Infill asymptotics for extreme value estimators of the integral of the index function in  $C[0,1]$*

14h40 – 15h20 : Huyen N'guyen (IRA, Le Mans Université)  
*Dynamic Risk-Taking Behavior of Mutual Funds*

15h20 – 16h00 : Alexandre BROUSTE (IRA, Le Mans Université)  
*Estimation in fractional Gaussian noise at high-frequency*

16h00 – 16h30 : Clôture de la journée & CAFÉ

Durée de la communication : 40mn (35mn d'exposé + 5 mn de discussion)

## ABSTRACTS

### **Alexandre BROUSTE (IRA, Le Mans Université)**

Title : *Estimation in fractional Gaussian noise at high-frequency*

Abstract : Asymptotic efficiency of the sequence of maximum likelihood estimators is considered in the statistical experiment implying the fractional Gaussian noise observed at high-frequency. Likelihood ratio hypothesis tests are also studied with an application to oil price modeling.

### **Romain GAUCHON (ISFA, Université Lyon 1)**

Title : *Policyholders clustering by using health consumption for targeting prevention programs*

Abstract : Prevention is a burning topic for insurers. Nevertheless, beginning a prevention program asks a lot of practical questions. One of them is the necessity to target the action. How can we offer a prevention service only to those who will benefit most of the effect ? To answer this question, we have to take into account the limited amount of data available about the policyholders for an insurer. We will present a practical way to cluster the policyholders of a health insurance company into interpretable risk classes. Using these classes, we will be able to offer adapted prevention programs. Our results have been obtained on a real database, coming from an additional health insurance company.

### **François LANGOT (IRA, Le Mans Université)**

Title: *On Nonlinearities in Unemployment*

Abstract: This paper proposes an extended version of the DMP model to explain the dynamics of the US labor market. We take into account occasionally binding constraints and integrate worker heterogeneity, endogenous firing costs and a minimum wage. At each period, aggregate dynamics of unemployment combine heterogeneous reactions, specific to each labor market segment which can be in four different regimes: in the first, it is optimal to hire; in the second it is optimal to do nothing; in the third it is optimal to fire workers; and the last one it is optimal to close the firm. Combining global methods to solve the model and particle filtering to estimate the structural parameters, take advantage of the information on nonlinearities that are contained in the data. We also show that our model can explain the dynamics of the Beveridge curve, despite the presence of endogenous separations, as well as a large part of the wage inequalities and their movements over the business cycle. Beyond its ability to explain unemployment and wage fluctuations, we also show that our extension of the basic DMP model allows us to match the measured impact of a minimum wage increase on employment and wage inequalities. To go beyond existing studies, we show that this policy evaluation depends on the business cycle episode. The talk is based on joint work with Stéphane Adjemian & Frédéric Karamé (Le Mans Université).

### **Stéphane LOISEL (ISFA, Université Lyon 1)**

Title: *On discrete Schur-constant vectors with applications*

Abstract: This talk is concerned with Schur-constant survival models for discrete random variables. Our main purpose is to prove that the associated partial sum process is a non-homogeneous Markov chain. This is shown in different cases as the random variables take values in the set of nonnegative integers or in the set of integers smaller than  $\$m \geq 1\$$ . The property of Schur-constancy is also compared for these cases. We also present a few additional results on Schur-constant vectors.

**Huyen N'guyen (IRA, Le Mans Université)**

Title : *Dynamic Risk-Taking Behavior of Mutual Funds*

Abstract : We study the risk-taking behavior of different strategies of US domestic equity mutual funds (DEMF), as a group, over the business cycle. Following Racicot and Théoret (2016), we apply the Kalman filter to estimate the time-varying exposures of 6 DEMF indexes to various sources of risk over the period 1994-2015. Our results show that for all strategies, risk coefficients vary strongly over time, implying that these DEMF portfolios are actively managed and not simply buy-and-hold ones. Market risk exposures of DEMF strategies were quite different before 2000 and became more or more similar after. Since 2008, all DEMF strategies have concomitantly reduced market risk, making DEMF a potential source of systemic risk for the financial system. This talk is based on joint work with Frederic Karame (IRA, Le Mans).

**Christian ROBERT (ISFA, Université Lyon 1)**

Title: *Infill asymptotics for extreme value estimators of the integral of the index function in  $C[0,1]$*

Abstract : We consider a max-stable process with a positive extreme value index function and we assume that its spectral process is a continuous exponential martingale. The goal of this paper is to provide estimators for the integral of the extreme value index function over  $[0,t]$ ,  $0 \leq t \leq 1$ . In a first setting, we assume that both processes, the max-stable process and its associated spectral process, are regularly sampled on  $[0,1]$  at high frequency  $1/n$ , with  $n$  going to zero. In a second setting, we consider iid random elements in  $C[0,1]$  that belong to the domain of attraction of the max-stable process and assume that these processes as well as the spectral process are also regularly sampled at rate  $1/n$ . We show that the rate of convergence of the estimators reaches the parametric rate in the first setting, as it is usually the case in the integrated functionals estimation, but is faster in the second setting. In both cases, we obtain biased central limit theorems without hope of suitable bias corrections.

Organisation :

Anis MATOUSSI, Professeur, Directeur de l'IRA, Responsable du Master Actuariat, Le Mans Université

Christian ROBERT, Professeur, Directeur du laboratoire SAF, ISFA Lyon, Université Lyon 1