Contributed Session Abstracts
Finance and Actuarial Science

CLAPEM XV, Dec 2-6, Yucatan, Mexico.

Speaker 1- Marcos Escobar-Anel (Western University, Canada)

Title: “Recent advances in constrained portfolio optimization with applications to banking and insurance”.

Abstract: Regulatory risk constraints as in the European Solvency II standard formula for insurance companies may lead to wealth-dependent constraints on the investment strategy. We develop a solution approach for portfolio optimization problems in continuous time with wealth dependent constraint sets by showing that this problem can, under sufficient conditions, be reduced to a related problem with constraints independent of wealth and a different utility function. The related problem is then covered by known convex duality results and can be solved in closed-form. We apply these results to Solvency II constraint sets and find that even for an investor with HARA utility who inherently reduces risk in times of distress, the constraints help preventing the investor from taking too much risk in an optimistic market. Furthermore, we measure significant loss in utility and reduction in risk caused by the constraints, we also evaluate the trade-off between these two effects.

Speaker 2- Hussein Nasralah (Worcester Polytechnic Institute, USA)

Title: "Portfolio optimization for small time horizons"

Abstract:

We study the problem of portfolio optimization in a stochastic volatility model. Under mild assumptions on the investor's utility function, we exhibit a closed-form formula for a close-to-optimal trading strategy, with the approximate optimality valid for small time horizons. A heuristic extension of this small time result to larger finite horizons will then be discussed.

Speaker 3- Anne MacKay (**Université du Québec** à **Montréal, Canada)**

Title: Simulating Heston using explicit weak solutions.

Abstract:

In this presentation, I discuss new simulation algorithms for the Heston model, which are based on recent results on explicit local solutions of Itô diffusions. Therein, it is shown that the Heston model presents an explicit weak solution that can be used for simulating volatilities and option prices. Most often, efficient simulation is done under an artificial reference probability and then converted to the real probability with the appropriate likelihood. The resulting simulation algorithm can therefore be seen as the analog of a weighted particle filter. It is then natural to introduce some type of resampling to improve the performance of the simulation algorithm. Here we focus on new branching algorithms, which have the advantage of preserving the historical property of the particle system. Through numerical results, we illustrate the increased performance and accuracy due to branching. We also compare the resulting simulation algorithm to popular Heston simulation methods.

This is joint work with Michael Kouritzin (University of Alberta).

Speaker 4- Jean-Francois Begin (Simon Fraser University, Canada)

Talk: Economic scenario generator and parameter uncertainty: a Bayesian framework.

Abstract:
In this presentation, we study parameter uncertainty and its actuarial implications in the context of economic scenario generators. To account for this additional source of uncertainty in a consistent manner, we cast Wilkie's four-factor framework into a Bayesian model. The posterior distribution of the model parameters is estimated using Markov chain Monte Carlo methods and is used to perform Bayesian predictions on the future values of the inflation rate, the dividend yield, the dividend index return, and the long-term interest rate. According to US data, parameter uncertainty has a significant impact on the dispersion of the four economic variables of Wilkie's framework. The impact of such parameter uncertainty is then assessed for a portfolio of annuities: the right tail of the loss distribution is significantly heavier when parameters are assumed random and when this uncertainty is estimated in a consistent manner. The risk measures on the loss variable computed with parameter uncertainty are at least 12% larger than their deterministic counterparts.