Financial Mathematics

Chair: Michael Kouritzin (University of Alberta)
Organizer: Rafal Kulik (University of Ottawa)

DON MCLEISH, University of Waterloo
Martingales, Likelihood, and Monte Carlo Methods for Continuous Time Models in Finance

We will discuss modelling continuous time processes using products and finite approximations to product integrals. These define a Radon-Nikodym derivative with respect to a base measure or process, chosen for its ease of simulation. Since Radon-Nikodym derivatives such as that of Girsanov are necessarily martingales, a related question is when such products form martingales. The goal is a general computational, likelihood-friendly framework for the construction and simulation of models for continuous-time processes, and parameter estimation. Examples of stochastic volatility models and jump diffusions are given. Parts of this talk are based on joint work with Carole Bernard and Zhenyu Cui.

CODY HYNDMAN, Concordia University
A Convolution Method for Numerical Solution of Backward Stochastic Differential Equations

We propose a new method for the numerical solution of backward stochastic differential equations (BSDEs) which finds its roots in Fourier analysis. The method consists of an Euler time discretization of the BSDE with certain conditional expectations expressed in terms of Fourier transforms and computed using the fast Fourier transform (FFT). The problem of error control is addressed, we consider the extension of the method to reflected BSDEs, and some numerical examples are considered from finance demonstrating the performance of the method.

TAHIR CHOULLI, University of Alberta
Stochastic Hellinger Distance: A Statistical Tool for a Financial Economics Problem

Consider an agent possessing non-tradable asset and investing in stock market. Her goal is to find optimal portfolio and optimal time to liquidate all her assets. This problem can be solved if we understand how optimal portfolio depends on horizon. Our approach relies on extending Hellinger distance to positive martingales. This extension allows us identifying agents/investors whose optimal portfolio is horizon-unbiased. Our results contributed independently with other researchers to the birth of Forward Utilities. An advanced extension of Hellinger distance leads to Minimal Hellinger Deflator which is related to the Non-arbitrage theory.