THE UNIVERSITY   **OF HONG KONG**

Department of Mathematics

Numerical Mathematics and Applied Analysis Group Seminar (NMAA)

Student Seminar on
Quantitative Finance : Models and Computational Methods

May 28, 2012 (Monday), 2:30 – 4:30pm
Rm 210, Run Run Shaw Bldg., HKU

Ms. Jia-wen GU
Department of Mathematics, HKU

On Reduced Form Intensity-based Model with Trigger Events

Abstract: Corporate defaults may be triggered by some major market news or events such as financial crises or collapses of major banks or financial institutions. With a view to develop a more realistic model for credit risk analysis, we introduce a new type of reduced-form intensity-based model that can incorporate the impacts of both observable "trigger" events and economic environment on corporate defaults. The key idea of the model is to augment a Cox process with trigger events. Both single-default and multiple-default cases are considered in this paper. In the former case, a simple expression for the distribution of the default time is obtained. Applications of the proposed model to price defaultable bonds and multi-name Credit Default Swaps (CDSs) are provided.

Ms. Na SONG
Department of Mathematics, HKU

Optimal Submission Problem in a Limit Order Book with VaR Constraints

Abstract: We consider the optimal bid and ask quotes selection problem subject to a value-at-Risk (VaR) constraint when the arrival of the buy and sell orders are governed by a Poisson process. In a high frequency trading framework, the stock dealer have some strategies to maximize his terminal wealth. There are two risk sources for the agent: (1) the inventory risk due to the diffusion nature of the stock's price; (2) transactions risk due to a Poisson arrival of market buy and sell orders. We formulate the problem as a constrained utility maximization problem over a finite time horizon. By considering the normal distribution as the approximation to the Poisson distribution, the dynamic programming principle is applicable here. To solve the problem we derive a Hamilton-Jacobi-Bellman (HJB) equation and we propose a successive approximation algorithm for solving the HJB equations numerically for the optimal bid and ask quotes selection problem.

Ms. Dong-Mei ZHU
Department of Mathematics, HKU

Filtering Hidden Markov Models with Feedback Effect
and their Applications for Forecasting Oil Prices

Abstract: We introduce a filtered Hidden Markov Model (HMM) incorporating feedback effect of the observation process. Simulated examples are given to show the accuracy of the estimated model parameters. We also provide a detailed implementation of the model by using a dataset of crude oil price for the period 1986-2011. In the model, the mean and the variance of log-returns of commodity prices are modulated by a Markov chain with finite state space. The analysis of one-day ahead forecasts is presented and is compared with the regular HMM. The results indicate that HMM with feedback effect performs very well in prediction.

All are welcome