Financial Mathematics Reading Group 2013

Seminars are listed in reverse chronological order, most recent first.

Tuesday 10 December - Cheng Li (LSE)
Asymptotic Glosten Milgrom Equilibrium

This paper studies the Glosten Milgrom model whose risky asset value admits an arbitrary discrete distribution. Contrast to existing results on insider's models, the insider's optimal strategy in this model, if exists, is not of feedback type. Therefore a weak formulation of equilibrium is proposed. In this weak formulation, the inconspicuous trade theorem still holds, but the optimality for the insider's strategy is not enforced. However, the insider can employ some feedback strategy whose associated expected profit is close to the optimal value, when the order size is small. Moreover this discrepancy converges to zero when the order size diminishes. The existence of such a weak equilibrium is established, in which the insider's strategy converges to the Kyle optimal strategy when the order size goes to zero.

Tuesday 3 December - Youyou Zhang (LSE)
On Hitting Times and Last Passage Times, Maximum and the time it is achieved for Brownian Excursion

We study functionals of Brownian excursion, including first hitting time, last passage time, maximum and the time it is achieved. Informally Brownian excursion is defined as a standard Brownian motion, starting and ending at 0 and staying positive in between. Using conditional martingales we relate excursion to Brownian motion and BES(3) process. We give three proofs of the first hitting time of Brownian excursion using elementary arguments from probability theory and emphasize the nature of excursions. We show that Brownian excursion is reversible relying on Pitman's Bessel bridge representation. Our focus lies in reversing the process and deriving the last passage time. As a consequence we derive the law of the maximum of Brownian excursion and extend this result to the joint law of maximum and the time it is achieved.

Tuesday 26 November - Junwei Xu (LSE)
Optimal Liquidation in the Almgren and Chriss Model with Random Shocks

We consider an optimal liquidation problem of a single asset in the Almgren and Chriss model with infinite time horizon. The unaffected asset price is described by a Levy process. Any trading strategies with long positions are not considered. We maximise the expected exponential utility of final cash position over a set of admissible trading strategies. We reduce the optimisation problem to be over a set

of deterministic admissible strategies. Then by solving an HJB equation, the optimal liquidation strategy is derived.

Tuesday 5 November - Yavor Stoev (LSE)
Equilibrium with derivative market disbalance
Abstract unavailable

Tuesday 29 October - Mathieu Dubois (LSE)
Continuous-time portfolio selection in presence of estimation risk: A sparse plug-in strategy approach

We consider an investor who faces parameter uncertainty in a continuous-time financial market. We model the investor's preference by a power utility function leading to constant relative risk aversion. We show that the loss in expected utility is large when using a simple plug-in strategy for unknown parameters. We also show that the loss due to estimation depends crucially on the coefficient of relative risk aversion. We provide theoretical results that show the trade-off between holding a well-diversified portfolio and a portfolio that is robust against estimation errors. To reduce the effect of estimation, we constrain the weights of the risky assets with an L_1-norm leading to a sparse portfolio. We provide analytical results that show how the sparsity of the constrained portfolio depends on the coefficient of relative risk aversion. Based on a simulation study, we demonstrate the existence of an optimal bound on the L_1-norm, for each level of relative risk aversion.

Tuesday 22 October - Driss Benkirane and Kristian Lokka (RoundShield Partners)
Cemeteries – An illiquid asset class with optionality value

RoundShield Partners is a European asset-backed special situations investment fund. Using one of their current investments as a case study, they will step through transaction origination, structuring, optionality and return optimisation in private illiquid markets.

Tuesday 15 October - Thomas Bernhardt (LSE)
Filtering Problems with Cox-Jump-Processes

Filtering problems are often solved by constructions of certain measure changes.

Such attempts were already fruitful, dealing with general jump-processes but they involve strong integrability assumptions.

In this presentation, we will firstly show that for a specific class of jump-processes, namely the Cox-processes, one can morally disregard any kind of assumption.

Secondly, we will apply it to an easy filtering problem, including an Ornstein-Uhlenbeck type process.

Finally, an explicit formula will be presented (up to calculating integrals).

Wednesday 13 March - Tom Bates (LSE)
Title and abstract unavailable

Wednesday 6 March - Yavor Stoev (LSE)
On the problems of statistical sequential analysis for some Gaussian processes

We study the sequential testing and quickest disorder detection problems with linear and exponential delay penalty costs for certain observable Gaussian processes. The method of proof consists of the embedding of the initial sequential analysis problems into the associated time-inhomogeneous optimal stopping problems for one-dimensional diffusion processes and the analysis of the equivalent parabolic free-boundary problems. We derive explicit estimates for the Bayesian risk functions and optimal stopping boundaries for the weighted likelihood ratios and study the asymptotic behavior of the boundaries under large time values. We illustrate our results in a fractional Brownian motion setting.