Numerical Mathematics and Applied Analysis Group Seminar (NMAA)

May 17, 2010 (Monday)
Rm 309, Run Run Shaw Bldg., HKU

Ms. SONG Na

Department of Mathematics, HKU

Option Valuation under a Multivariate Markov Chain Model

2:00 – 2:25pm

Abstract: In this talk, we develop an option valuation model in the context of a discrete-time multivariate Markov chain model using the Esscher transform. The multivariate Markov chain provides a flexible way to incorporate the dependency of the underlying asset price processes and price multi-state options written on several dependent underlying assets. In our model, the price of an individual asset can take finitely many values. The market described by our model is incomplete in general, hence there are more than one equivalent martingale pricing measures. We adopt conditional Esscher transform to determine an equivalent martingale measure for option valuation. We also document consequences for option prices of the dependency of the underlying asset prices described by the multivariate Markov chain model.

Ms. HUANG Ximin

Department of Mathematics, HKU

Quantity Discount Contract for Supply Chain Coordination with False Failure Returns

2:30 – 2:55pm

Abstract: Consumer return attracts more and more academic attention due to its rapidly expanding size, and a large portion of it falls into the category of false failure return, which refers to returns without functional defect. In this talk, we exclusively consider profit results from exerting costly effort to reduce false failure return in a reverse supply chain consisting of a retailer and a supplier. The supply chain as a whole has strong incentive to reduce false failure returns because it can avoid much re-processing cost associated. But typically, retailers enjoy a full credit provided by suppliers in case of returns, and hence they may not have sufficient incentives to exert enough effort for supply chain profit maximization. In some scenarios they may even have the motivation to actually encourage such returns. We suggest using a coordination contract to resolve such profit conflicts. The contract we propose is a quantity discount contract specifying a payment to the retailer with an amount exponentially decreasing in the number of false failure returns. We give explicit forms of such contracts given different assumptions about distribution of the number of returns and we also prove that such contract is capable of increasing both retailer's and supplier's profit simultaneously. Besides, when the contract is used together with other forward supply chain coordination contracts in a closed-loop chain, it is shown that it can act to deter retailer's potential incentive to encourage false failure returns. Moreover, some modifications of the contract may lead to easy allocation of incremental profit within the supply chain.

All are welcome