THE UNIVERSITY   **OF HONG KONG**

Department of Mathematics

NMAA Postgraduate Student Seminars

September 11, 2012 (Tuesday), 2:00 – 5:00pm
Rm 210, Run Run Shaw Bldg., HKU

Ms. Jia-wen GU

On Modeling the Economic Default Times with Application to Recovery Rate

Abstract: Empirical researches have shown that there is generally a significant difference between a firm's economic default time and its recorded default time. This difference has a significant impact on bonds' recovery rates and pricing. This talk presents a reduced form credit risk model to characterize the difference between the economic and recorded default time, and by using this formulation, we propose a new pricing formula for the bonds. The simplified model, compared with the previous proposed structured model, do as much a better job in clarifying the fundamental mechanism of firms default process.

Ms. Hao JIANG

Inference and Completion of Boolean Network from Given Singleton Attractors

Abstract: Attractors characterizing long-run behavior of Boolean networks are critical, the determination of which constitutes a principal direction in system analysis. System synthesis as another aspect can be formulated as Boolean Network construction possessing a number of properties. Because of the illposedness of the inverse problem, few research has been done in this area. We propose a polynomial algorithm for constructing Boolean Network given any set of singleton attractors. In the case of unique singleton attractor and pair of singleton attractors, linear time algorithm is proposed. If the constraints given are more restrict where the topology of the Boolean network is given, together with the given set of singleton attractors, it is not plausible to develop efficient algorithm (polynomial algorithm) in general. We show that this problem is co-NP hard.

Ms. Yushan QIU

Knowledge Discovery for Pancreatic Cancer Using Inductive Logic Programming

Abstract: Pancreatic cancer is an exceptionally devastating disease with surgery as the only treatment. Five-year survival rate even after tumor resection therapy remains between 10 to 20%. Thus, the prediction of the pancreatic cancer before surgery can improve the patient survival rate significantly. We try to find the relationship between pancreatic cancer and the related factors. Specifically, we focus on predicting the (1) lymph nodal metastasis and (2) tumor differentiation in pancreatic cancer. Once we predict the lymph nodal metastasis and tumor differentiation, then we may design effective and custom-designed therapeutic strategies for the patients. The early studies have indicated several determinants of the pancreatic cancer. And Burnside proposed using ILP to identify the relationship between mammography and the related factors. So we may apply ILP to predict the tumor differentiation and lymph nodal metastasis in pancreatic cancer.

Ms. Na SONG

Asset Allocation under Regime-Switching Models

Abstract: We discuss an optimal asset allocation problem in a wide class of discrete-time regime-switching models including the hidden Markovian regime-switching (HMRS) model, the interactive hidden Markovian regime-switching (IHMRS) model and the self-exciting threshold autoregressive (SETAR) model. In the optimal asset allocation problem, the object of the investor is to select an optimal portfolio strategy so as to maximize the expected utility of wealth over a finite investment horizon. We solve the optimal portfolio problem using a dynamic programming approach in a discrete-time set up. Numerical results are provided to illustrate the practical implementation of the models and the impacts of different types of regime switching on optimal portfolio strategies.

Ms. Dong-Mei ZHU

Convergence of Powers for a Fuzzy Matrix with Max-Min and Max-Product Operations

Abstract: Fuzzy matrices have been proposed to represent fuzzy relations on finite universes. Since 1977, when Thomason showed that powers of a max-min fuzzy matrix either converge or oscillate with a finite period, conditions for limiting behavior of powers of a fuzzy matrix have been widely studied. The limiting behavior of a fuzzy matrix depends on the algebraic operations employed. In this talk, the powers of a fuzzy matrix with max-min and max-product operations will be considered and sufficient conditions for the ergodicity of fuzzy Markov chains under these two operations will be given. Then a new definition of higher-order fuzzy Markov chain will be proposed.

All are welcome