平成25年度第12回情報数理学セミナー

日時 ： 平成２５年１２月5日（木）　１５：３０～１８：００

場所 ： 吹田キャンパス 情報棟Ａ１０９室

博士学位論文公聴会

講師 ： 藤原稔久 (システム数理学講座)

講演題目 ： 不確実的事象下における動的プロジェクトスケジューリングに関する研究

アブストラクト ：　プロジェクト管理においては，プロジェクトの実行段階で発生する不確実的事象にうまく対処しつつ，スケジュールの実行可能性を維持していくことが肝要である．

本論文は，このような動的なプロジェクトスケジュールに対し Critical Path Method を拡張したスケジュール修正手法を提案する．プロジェクトに遅延が発生した場合，提案手法およびそれと既存手法の両者を組み合わせた手法を用い作業時間の短縮を図ることによりプロジェクト期日を遵守する．数値実験を通し，提案手法を用いたスケジュール修正手法の有用性を示す．

講師 ： Paul Salvador Inventado (知能アーキテクチャ講座)

講演題目 ： Sidekick: A tool for facilitating self-reflection and self-evaluation in student-initiated learning scenarios

アブストラクト ： Students engage in many learning activities outside of class such as doing homework, conducting research or simply investigating an interesting topic. Learning on one's own is not trivial because apart from the learning task itself, students also need to identify what activities to perform, to decide how long to engage in them, to evaluate their progress, to revise their current learning strategy if needed and to avoid distractions aside from others. In this research, we designed and implemented a learning support tool called Sidekick, which uses a retrospective approach to help students analyze and evaluate their own behavior. It uses reinforcement learning to automatically derive a personalized learning policy based on the student's previous learning sessions, and used this policy to help students identify the best action to take in a given situation. Students who used the software reported that they discovered aspects of their behavior that they were previously unaware of, identified actions which they felt were either helpful or not helpful to learning, and used their reflections from previous learning sessions to manage their behavior.

講師 ： Nguyen Thi Hoai Linh　(非線形数理講座)

講演題目 ： Numerical study on some stochastic models in biology

アブストラクト ： Knowing the mechanisms of various biological systems is one of vital problems. Direct researches on these systems often take a lot of time and experiments cost immensely. Sometimes it is even unfeasible. Other way in getting desired information about biological systems is constructing mathematical models which describe the systems then studying the models by using mathematical tools. In addition, we know that real biological systems are always subject to environment noises and incompletely understood information, so they will be well-modeled by stochastic models which embrace complex variations in the dynamics. This dissertation is devoted to a numerical study on stochastic models for some biological systems. More precisely, we study two problems as follows.

The first one is a Stochastic Forest Model. In 1975, Antonovsky et al. introduced a deterministic, mono-species ecosystem model with two age classes of trees: the young and the old ones. It is seen that the asymptotic behavior of the solutions depends strongly on the magnitude of the mortality of old trees. Therefore, on the basis of that model, we incorporate a noise factor to the mortality rate of old aged class. That results in a stochastic forest model. We are concerned with the long time behavior of solutions which characterizes the stable existence or decline of the forest. After proving the existence and uniqueness of global positive solutions, we show some sufficient conditions for sustainability of the forest. Obtained results may provide us some information on the nature of real forest systems.

The second one is a Fish Schooling Model. This study is divided into two parts. First, we propose a stochastic differential equations which describes fish schooling and give some quantitative investiga-

tions. We in fact introduce a mathematical definition for schooling. Then we study how some parameters, e.g. group size, noise, contribute to the geometrical structure of the school. In particular, we show that if the magnitude of noise is larger than a certain threshold, then the fish can no longer form a school. Secondly, we are interested in problems of avoiding obstacles and finding food resources. We find four behavior patterns of school while avoiding obstacles. This result shows that the fish school has its firmness in a certain sense. We also find that the fish acquire foraging advantages by forming school.