



**KENNESAW STATE  
UNIVERSITY**  
COLLEGE OF SCIENCE AND MATHEMATICS  
*Department of Mathematics*

## 2018 – 2019 Analysis and Applied Math Seminar

### Friday, September 7, 2018

SPEAKER: Eric Stachura, Kennesaw State University

TITLE: *“Boundary Value Problems for the Anisotropic Maxwell Equations in Lipschitz Domains”*

ABSTRACT: [Link to pdf abstract](#)

### Friday, November 16, 2018

SPEAKER: Min Wang, Kennesaw State University

TITLE: *“A fractional differential equation model for bike share systems”*

ABSTRACT: In this talk, a fractional differential equation model is developed to describe the bike share station inventory based on data analysis of historical data of bike share systems in Philadelphia and Atlanta. The analytic solution of the model and a related control problem are investigated as well.

### Friday, November 30, 2018

SPEAKER: Bo Yang, Kennesaw State University

TITLE: *“Developments in Higher Order Maximum Principles”*

ABSTRACT: We first give a survey of some classical results on higher order maximum principles that are from the literature, and discuss different techniques for obtaining these principles. Then we look at several particular classes of boundary value problems and study in detail the maximum principles for these problems.

### Friday, February 8, 2019

SPEAKER: Yu Chen, University of Graz, Austria

TITLE: *“Push or Pull? Performance-Pay, Incentives, and Information”*

ABSTRACT: We study a principal-agent model wherein the agent is better informed of the prospects of the project, and the project requires both an observable and unobservable input (with both moral hazard and adverse selection). We use the functional analysis and system of differential equations as our analytical tools and characterize the optimal contracts, and explore the trade-offs between high and low-powered incentive schemes. We discuss the implications for push and pull programs used to encourage R&D activity, but our results are relevant in other contexts.

Keywords: Pay for Performance, Moral Hazard, Adverse Selection, Observable Action, Principal-Agent Problem

This talk is appropriate for the students with serious interest in applied research in game theory and economics.

### Thursday, March 14, 2019

SPEAKER: Ruihua Liu, University of Dayton

TITLE: *“Portfolio Optimization with Regime-Switching”*

ABSTRACT: Regime-switching models have drawn considerable attention in recent years in mathematical finance due to their capability of capturing the changes of macroeconomic conditions by allowing model parameters (e.g. stock volatility and interest rate) to depend on market regimes. In this setup, asset prices are dictated by a number of stochastic differential equations coupled by a finite-state Markov chain, which represents randomly changing economical factors. Model parameters are assumed to depend on the

Markov chain and are allowed to take different values in different regimes. As a result, both continuous dynamics and discrete events are present in the regime-switching models.

In this talk we present our recent results on portfolio optimization using regime-switching models for both stock price and interest rate. Two portfolio optimization problems (a portfolio of stock and savings account and a portfolio of mixed stock, bond and savings account) are considered and closed-form solutions are obtained for a regime-switching power utility function. A class of stochastic optimal control problems with Markovian regime-switching is formulated for which a verification theorem is provided. Numerical results are provided to illustrate the impact of regime-switching on the optimal investment decisions. We also mention some recent and ongoing work in this direction.

This talk is based on the joint work with Cheng Ye and Dan Ren.

**Friday, March 22, 2019**

SPEAKER: Tuwaner Lamar, Morehouse College

TITLE: *“Beam Equation from ODE to PDE”*

ABSTRACT: A study of a beam equation is conducted starting with the one-dimensional ordinary differential equation (ODE) model and progressing to the time dependent partial differential equation (PDE) model. Analysis of exact solution along with theory of existence and uniqueness of solutions are presented.

**Friday, April 12, 2019**

SPEAKER: Yu Liang, Department of Computer Science and Engineering, University of Tennessee at Chattanooga

TITLE: *“VIGOR — A Virtual, Individualized and Generative Orchestrator for Rehabilitation”*

ABSTRACT: [Link to pdf abstract](#)