



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

M. E. Taylor Analysis and PDE Seminar

Wednesday, November 13th
3:30 - 4:30 p.m.
Phillips Hall 385

Topics in quantitative finance and the application of Markov Decision Processes

Paul Smith (Kaizen Technologies)

Abstract. Quantitative hedge funds seek to apply scientific, mathematical, and statistical methods to the investment process so as to maximize risk-adjusted returns under certain constraints. In this talk, we begin with a brief overview of three major necessary components to consider in any such process: (1) "alpha research", (2) portfolio construction, and (3) order execution. After laying the groundwork, we introduce an optimization problem for a stochastic system motivated by the goal of maximizing portfolio return in the presence of transaction costs given a predictive signal. We present results in a constrained setting of AR(1) signals with restricted cross-correlation structure and portfolio controls. Key to the result is establishing a suitable expected survival time, which relies upon an approximation argument and a priori bounds to establish a contraction mapping. Finally, we discuss extensions of this result, viewing the problem as a certain average cost Markov Decision Problem. This is ongoing joint work with Chutian Ma.