FINA 7397 Financial Engineering

This course studies the fundamentals of innovations in quantitative finance. I view this course as consisting of three basic interlocking conceptual "rings": valuation theory, numerical methods, and statistical/econometric methods. This course will examine each in detail. We will explore the major valuation techniques- PDE techniques and martingale methods in a variety of different contexts including equity option, currency option, fixed income derivative, exotic derivative, and stochastic volatility models. This analysis will be built on an extended introduction to basic stochastic calculus. We will also implement PDE and martingale models using numerical methods- PDE solvers and Monte Carlo tenchniques. We will also investigate how to utilize basic statistical and econometric techniques to evaluate and validate models.