Syllabus
MAIT 679M / AMSC 698M , Spring 2008
Special Topics in Applied Mathematics: Introduction to Financial Mathematics

1. Introduction to Financial Derivatives
   • Market components: money market, underlying asset, derivative
   • Basic hypotheses: no-arbitrage, efficient market, stochastic volatility
   • Program outline

2. The binomial No-Arbitrage Pricing Model:
   • One Period Binomial Model
   • Multiperiod Binomial Model

3. Path Dependent Security Derivatives
   • Path-independent theory of American Derivatives
   • Stopping Time
   • Path-dependent American Derivatives

4. Stochastic Processes
   • Random Walk
   • Brownian Motion

5. Stochastic Calculus
   • Ito’s Integral and Stochastic Calculus
   • Black-Scholes Equation
   • Risk-Neutral Measure and Girsanov’s Theorem

6. Time Series Analysis and Modeling:
   • AR, MA, ARMA Processes
   • PCA and ICA

Textbooks:

Additional Reading Material:
5. Options Markets, John C. Cox, Mark Rubinstein, Prentice Hall 1985