Introduction to Mathematical Finance (STOR 890, Spring 2011)

• TTH 12:30-1:45, Hanes 130

• Website: www.stat.unc.edu/faculty/cji/890-11.htm

• Instructor: Chuanshu Ji, Hanes 301, 962-3917, cji@email.unc.edu

• Office hours: by appointment

• Grader: none

• Grading policy:
  ○ For P: regular class attendance, completion of homework assignments;
  ○ For H: same as above, plus taking the midterm and the final exams.

• Midterm Exam: Tu. 3/1, in class; Final Exam: 3 hours to be scheduled; Both exams are closed-book, one sheet of notes (double-sided) is allowed for the midterm and two sheets of notes for the final.

• This course provides students with a necessary background in financial economics (return and risk, risk premium, equity and fixed-income derivatives, asset pricing and hedging, value at risk, market microstructure), related mathematical models (Black-Scholes theory and its extensions, tree models and jump-diffusion models, sequential trade models, strategic trade models), and statistical inference procedures (volatility modeling including ARCH/GARCH and stochastic volatility, likelihood methods and Markov chain Monte Carlo strategies).

• About stochastic calculus: Nowadays stochastic calculus becomes a crucial requirement for quantitative analysts (referred to as “quants” or “strategists”) on Wall Street. However, it is unrealistic to give a comprehensive and rigorous treatment to stochastic calculus in this course. We plan to adopt the following compromise: most materials, e.g. those in the discrete-time setting, will be taught without the need for stochastic calculus; additional lectures and assignments will be given for the part of continuous-time finance. Even in this part, we can only discuss how to apply stochastic calculus correctly and give some heuristic arguments for why should it work. Rigorous justification will be left to the references and other courses in stochastic calculus. Basic elements in stochastic calculus will be presented with illustration of their applications in finance, including Brownian motion and its properties, Ito’s stochastic integrals, Girsanov transformation and Ito’s formula, stochastic differential equations, etc.

• Lecture notes will be distributed and supplemented by references.