QF 5140
Continuous-Time Finance

（連續時間財務）

This course provides a probabilistic way in depth to establish no arbitrage asset pricing theory under several financial markets and contingent claims. We focus on financial interpretations of mathematical modeling for risky asset dynamics. Beyond the classical Black-Scholes model, Levy processes, stochastic volatility models and so on will be addressed on their pricing and hedging theories.

Instructor: Chuan-Hsiang Han (韓傳祥)
Department of Quantitative Finance, NTHU
Office: Room 756 TSMC BLD(台積館)
Office Hours: 2 - 4 pm Tuesday, 2 - 4 pm Wednesday, or by appointment
Phone: 03-5742224
Email: chhan@mx.nthu.edu.tw
URL: http://mx.nthu.edu.tw/~chhan

Class Time: T2T3T4
Classroom Location: 台積館 735

Prerequisities: **QF5003 Stochastic Financial Theory**

Textbooks:

1. Steven E. Shreve, “Stochastic Calculus for Finance II: continuous-Time Models,” Springer-Verlag, 2003.
2. 韓傳祥, “隨機金融計算” 新陸書局, 2012.

Course Contents:

1. Stochastic differential equations for finance (the Markov property, interest rate models, multi-dimensional Feynman-Kac theorems, SDE discretization schemes)
2. Pricing some exotic options (knock-out barrier options, lookback options, Asian options, control variate method, dimension reduction PDEs)

3. American derivative securities (stopping times, American put and call options, free boundary problems, least-squares and duality methods)
4. Change of numeraire (numeraire, foreign and domestic risk-neutral measures, forward measures, importance sampling)
5. Term structure models (affine-yield models, Heath- Jarrow-Morton model, forward LIBOR model)
6. Introduction to Levy processes (Poisson process, compound Poisson process, jump processes and their Integrals, stochastic calculus for jump processes, change of measure, pricing and hedging a European Call in a Jump model, PIDE)

Grading:

Assignments 40%, Exams(midterm and final) 40%, Course Project 20%.