

(蒙地卡羅方法於金融工程之應用)

This course introduces Monte Carlo methods to solve computational problems arising from modern finance. The mathematics behind Monte Carlo methods and finance are reviewed. The course contents include:

- (1) Review: Elementary Probability Theory
- (2) Simulation of Random Variables
- (3) Simulation of Stochastic Processes; Ito's Calculus
- (4) Black-Scholes-Merton Theory of Derivatives Pricing and Hedging
- (5) American Options Pricing: Least Square Method
- (6) Pricing Exotic Options
- (7) Quasi-Monte Carlo
- (8) Variance Reduction: Control Variate
- (9) Variance Reduction: Importance Sampling
- (10) Greeks Computation
- (11) Some Generalizations



Grading: Assignments 40%, Course Project 30%, Exams(midterm and final) 30%.

Course Schedule: see course website.

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Class Time: T 2-4

Classroom Location: 台積館 733

Textbooks:

1. P. Glasserman, Monte Carlo Methods for Financial Engineering, Springer-Verlag, New York, 2003.
2. P. Jackel, "Monte Carlo Methods in Finance," John Wiley & Sons Ltd. 2002.

References:

1. C. Lemieux, Monte Carlo and Quasi-Monte Carlo Sampling. Springer, 2009.
2. H. T. Huynh, V. S. Lai, and I. Soumare, Stochastic Simulation and Applications in Finance with Matlab Programs. Wiley, 2008.
3. J. A. Bucklew, Introduction to Rare Event Simulation. Springer, 2004.