Spring 2007

MATH 7390-1: Stochastic Analysis

Time: MWF 10:40–11:30

Room: Lockett 240

Prerequisite

Math 7311 (Real Analysis I) or equivalent

Textbooks

The first book is the main textbook, while the other two books are more for mathematics graduate students.

1. Kuo, H.-H.: Introduction to Stochastic Integration. Universitext, Springer, 2006.
2. Kuo, H.-H.: Gaussian Measures in Banach Spaces. Lecture Notes in Math., Vol. 463, Springer, 1975. (Reprinted by SurgeBook, 2006)
3. Kuo, H.-H.: White Noise Distribution Theory, CRC Press, 1996.

Coverage

This course consists of three parts: (1) stochastic integration, (2) abstract Wiener space, and (3) white noise theory. We will emphasize on the first part and its applications to finance. The second and third parts will prepare mathematics graduate students for doing research on infinite dimensional analysis.

Subjects to be covered in this course include the following items:

1. Brownian motion, the Itô integral, Itô's formula, Girsanov theorem, stochastic differential equations, arbitrage and option pricing, Black-Scholes model;
2. abstract Wiener space, Gaussian processes, dichotomy of Gaussian measures, transformation of measures;
3. Gel'fand triple, white noise generalized functions, characterization theorems, operators on white noise functions.

Grading

The grade will be determined by homework (50%), presentation (15%), and the final exam (35%) with the tentative scale: A 90%; B 80%; C 70%

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