Spring 2014

MATH 7366-1: Stochastic Analysis

Time: Tuesday and Thursday 9:00–10:20

Room: Lockett 135

Prerequisite

Math 7311 (Real Analysis I) or equivalent

Textbook

Kuo, H.-H.: Introduction to Stochastic Integration. Universitext, Springer, 2006.

References

1. Kuo, H.-H.: Gaussian Measures in Banach Spaces. Lecture Notes in Math., Vol. 463, Springer, 1975. (Reprinted by BookSurge Publishing, 2006)
2. Kuo, H.-H.: White Noise Distribution Theory, CRC Press, 1996.

Coverage

This course will mainly cover the theory of stochastic integration. In addition, we will outline two related fields: (1) abstract Wiener space and (2) white noise theory. At the same time, we will discuss some problems in the current research of stochastic analysis. The following topics will be studied in this course:

1. Stochastic integration: Brownian motion, Wiener integral, Itô integral, Itô's formula, Lévy theorem, Girsanov theorem, multiple Wiener-Itô integrals, stochastic differential equations, applications to mathematical finance and the Black-Scholes model.
2. Abstract Wiener space: Gasuss measures, measurable norms, Gross-Sazonov theorem, transformation formula, Gaussian processes, heat equation.
3. White noise theory: Theory of generalized functions, Minlos theorem, white noise functionals, characterization theorems, Hitsuda-Skorokhod integral.

Grading

The grade will be determined by homework (40%), presentation (20%), and the final exam (40%) with the tentative scale: A 90%; B 80%; C 70%

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