Spring 2011

MATH 7390-2: Stochastic Analysis

Time: MWF 9:40–10:30

Room: Lockett 111

Prerequisite

Math 7311 (Real Analysis I) or equivalent

Textbooks

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 BookSurge Publishing, 2006)
3. Kuo, H.-H.: White Noise Distribution Theory, CRC Press, 1996.

Coverage

This course covers three related topics in stochastic analysis: (1) stochastic integration, (2) abstract Wiener space, (3) white noise theory. We will study the basic material for these topics and investigate their relationships. We will also address some recent developments which lead to current research.

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, potential theory on Hilbert space.
3. White noise theory: Theory of generalized functions, Minlos theorem, white noise, white noise functionals, characterization theorem, Hitsuda-Skorokhod integral, Feynman integral.

Grading

The grade will be determined by homework (45%), presentation (20%), and the final exam (35%) with the tentative scale: A 90%; B 80%; C 70%

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