Spring 2009

MATH 7390-2: Stochastic Analysis

Time: MWF 9:40–10:30

Room: Lockett 130

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

Coverage

I will explain the basic knowledge in the following three connected areas with a comprehensive outline leading to the current research in stochastic anslysis:

1. A brief review of the Ito theory of stochastic integration, if necessary, and a basic discussion of its application to finance such as option pricing and the Black-Scholes model.
2. Infinite dimensional analysis: We will study Gaussian measures on infinite dimensional spaces and introduce the concept of abstract Wiener space. Other topics such as dichotomy of Gaussian measures, transformation of measures, and potential theory on Hilbert space will be discussed.
3. White noise theory: We will motivate the mathematical concept of white noise and introduce the concept of generalized Brownian functionals. The basic theory of white noise and its application to stochastic integration and Feynman integral will be described.

Grading

The grade will be determined by homework (40%), presentation (25%), and the final exam (35%) with the tentative scale: A 90%; B 80%; C 70%

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