

Math 590
A special topics on

TERM 122

Introduction to Stochastic Differential equations

and

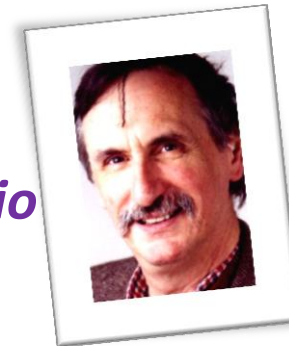
applications to mathematical Finance



By :



Boubaker Smii & Sergio Albeverio



❖ Course Description:

Probability spaces, random variables, probability distributions, Characteristic functions, stochastic processes, Brownian motion, Itô integral, Itô formula, SDEs, Applications of stochastic Calculus in Finance, The Black-Scholes Option Pricing Formula.

❖ Prerequisite:

Students must preferably have attended some elementary probability or measure theory course, but in case that did not happen, it is enough for them to attend the first four weeks lectures to understand the others sections of this course.

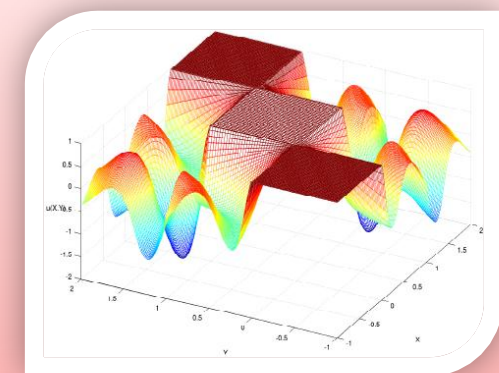
During this course you will explore the fundamental concepts and fascinating applications of stochastic differential equations as well as the applications of stochastic calculus in mathematical Finance. Applications to practical situations in environmental and petroleum engineering will be also discussed. For example, estimation of pollution levels in air, water and oil, as well as the characterization of petroleum reservoir, are appropriately handled in a probabilistic context and in many cases they are modeled by stochastic differential equations.

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$$dX_t = \mu(X_t, t) dt + \sigma(X_t, t) dB_t$$

