GRADUATE COLLOQUIUM

Wednesdays, 13-15 (FIM Tea to follow)

Hermann Weyl Zimmer (HG G43, ETH Zentrum)

Speaker: **Ana-Maria Matache**

Title: **Beyond Black-Scholes: Fast Deterministic Pricing of Options**

Date: Wednesday, January 14th

Abstract: Since the seminal paper of F. Black and M. Scholes in 1973, the pricing of options by means of partial differential equations has become standard practice in quantitative finance, either by means of explicit solution formulas or by numerical methods. In this lecture we start with basic definitions of derivative securities and explain the idea of arbitrage pricing (a) in the case of a single period model, and (b) in the context of the Black and Scholes model. We sketch the derivation of the B-S partial differential equation for pricing European Vanillas and explain what are the corresponding initial boundary value problems in case of exotic options like Asian, Barriers or American contracts. In recent years, awareness of the shortcomings of the Black-Scholes

model has increased and more general models for the stochastic dynamics of the risky asset have been proposed: we will discuss here stochastic volatility models and models in which the log returns are described by a Levy type process. The generalized Black-Scholes equations will be derived and their numerical solution will be addressed.

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