ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

Numerical Methods for Stochastic Differential Equations and Dynamical Systems

Verena Schwarz | Universität Klagenfurt

Chaired by Gunter Spöck | Department of Statistics

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ABSTRACT

Stochastic differential equations are formal equations which describe the behaviour of certain random processes over time by its dynamics and include random noise. The SDEs considered in this thesis contain two sorts of random noise: the Brownian motion as a continuous noise, and the Poisson process as a noise including jumps. They have various applications, for example they are used for modelling energy markets. There the additional difficulty appears that the drift coefficient is supposed to have discontinuities. Since in that situation the calculation of an explicit solution is rarely possible, numerical approximation schemes are developed to calculate the solutions approximately. The well-known Euler-Maruyama scheme has already been explored for these SDEs and the convergence error has been determined. In this thesis other approximation schemes as a quasi-Milstein scheme will be investigated with the goal to obtain a better rate of convergence. Furthermore, lower bounds for a class of approximation algorithms will be explored in order to find a sharp convergence rate.

We hope to see you there!