ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

Invitation to the Doctoral Seminar

Christopher Rauhögger, M.Sc.
Universität Passau

"On the performance of the Euler-Maruyama scheme for multidimensional SDEs with discontinuous drift coefficient"

N.2.35 | Wednesday, 11 January 2023 | 11:15 a.m.

Abstract

In recent years, a number of results have been proven in the literature for strong approximation of d-dimensional stochastic differential equations (SDEs) with a drift coefficient that may have discontinuities in space. In many of these results it is assumed that the drift coefficient is piecewise Lipschitz continuous, i.e. that there exists a hypersurface $\Theta \subseteq \mathbb{R}^d$ such that the drift coefficient is Lipschitz continuous with respect to the intrinsic metric on $\mathbb{R}^d \setminus \Theta$, while the diffusion coefficient is Lipschitz and non-degenerate close to Θ.

In particular, the performance of the Euler-Maruyama scheme was studied for such d-dimensional systems of SDEs. For $d = 1$ it was recently proven that the Euler-Maruyama scheme achieves an L_p-error rate of order at least $1/2$, just like in the case of Lipschitz continuous coefficients. For general $d \in \mathbb{N}$ only an L_2-error rate of order at least $1/4$ was known until recently. In this talk we show that for any $d \in \mathbb{N}$ an L_p-error rate of order at least $1/2-$ is achieved. We also illustrate our results with numerical examples.

The talk is based on joint work with Thomas Müller-Gronbach (University of Passau) and Larisa Yaroslavtseva (University of Graz).

Michaela Szölgyenyi and the Department of Statistics look forward to seeing you at the talk!