



Kolloquium des Instituts für Mathematik

Wir laden ein zu dem Vortrag

The Euler Maruyama Scheme for SDEs with Additive Noise and Irregular Drift

Prof. Dr. Andreas Neuenkirch
(Universität Mannheim)

This talk will consist of two parts. In the first part we will give a general introduction into computational problems for stochastic differential equations.

In the second part, we study the strong convergence order of the Euler-Maruyama scheme for scalar stochastic differential equations with additive noise and irregular drift. We build on the approach given in Hoang-Long Ngo, Dai Taguchi, On the Euler-Maruyama approximation for one-dimensional stochastic differential equations with irregular coefficients, IMA Journal of Numerical Analysis, 37(4), 2017, pp 1864-1883, and provide a general framework for the error analysis by reducing it to a weighted quadrature problem for irregular functions of Brownian motion.

Assuming Sobolev-Slobodeckij-type regularity of order $\kappa \in (0, 1)$ for the non-smooth part of the drift, our analysis of the quadrature problem yields the convergence order $\min\{3/4, (1 + \kappa)/2\} - \epsilon$ for the equidistant Euler-Maruyama scheme (for arbitrarily small $\epsilon > 0$). The cut-off of the convergence order at $3/4$ can be overcome by using a suitable non-equidistant discretization, which yields the strong convergence order of $(1 + \kappa)/2 - \epsilon$ for the corresponding Euler-Maruyama scheme.

The second part is based on a joint work with Michaela Szoelgyenyi from the University of Klagenfurt.

Ort: Seminarraum Mathematik R2 (Banach)
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