ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

Invitation to the Doctoral Seminar

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"High order methods for strong approximation of SDEs with a discontinuous drift coefficient"

HS 2 | Monday, 20 June 2022 | 10:00 a.m.

Abstract

In recent years, a number of results has been proven in the literature for strong approximation of 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 satisfies piecewise regularity conditions and the diffusion coefficient is Lipschitz continuous and non-degenerate at the discontinuity points of the drift coefficient. In particular, for such SDEs, the classical L_p-error rate $1/2$ has been recently proven in the literature for Euler-type schemes.

In this talk we discuss higher order methods for strong approximation of scalar SDEs of that type. We present a Milstein-type scheme that achieves an L_p-error rate $3/4$ for approximation of the solution at the final time point in terms of the number of evaluations of the driving Brownian motion. We furthermore show that the L_p-error rate $3/4$ can not be improved in general for such SDEs by no numerical method based on evaluations of the driving Brownian motion at fixed time points and, finally, we present a numerical method based on sequential evaluations of the driving Brownian motion, which achieves an L_p-error rate of at least 1 in terms of the average number

of evaluations of the driving Brownian motion.
The talk is based on joint work with Thomas Müller-Gronbach (University of Passau).

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