UNIVERSITÄT SALZBURG

Fachbereich Mathematik
Hellbrunnerstraße 34
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Gastvortrag

Donnerstag, 17. Dezember 2015
15.00 Uhr
Hörsaal 414

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Numerical treatment of SDEs with discontinuous drift

Abstract:

When solving certain stochastic optimization problems, e.g., in mathematical finance, the optimal control policy sometimes turns out to be of threshold type, meaning that the control depends on the state of the controlled process in a discontinuous way. The stochastic differential equations (SDEs) modeling the underlying process then typically have discontinuous drift and degenerate diffusion parameter. This motivates the study of a more general class of such SDEs.
We prove an existence and uniqueness result and present a numerical algorithm, both based on certain transformations of the state space. The transform is different from an earlier one by Zvonkin and Veretennikov in that the drift is not removed entirely, but is merely ``made continuous".
As a consequence the transform becomes useful for the construction of a numerical method. The resulting scheme is proven to converge with strong order 1/2. This is the first result of that kind for such a general class of SDEs.
We will first present the one-dimensional case and subsequently show how the ideas can be generalized to higher dimensions. Thereby we find a nice geometrical interpretation of our weakened non-degeneracy condition.

Einladender: Volker Ziegler