
Nonlinear stochastic ordinary and partial differential equations: regularity properties and numerical approximations

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Abstract

In this talk we present a few recent results on regularity properties and numerical approximations for stochastic ordinary and partial differential equations with non-globally monotone nonlinearities. In particular, we establish strong convergence rates for Cox-Ingersoll-Ross (CIR) processes, stochastic Duffing-van der Pol oscillators, stochastic Lorenz equations, and Cahn-Hilliard-Cook equations. CIR processes are widely used in the financial engineering industry to estimate prices of financial derivatives. We also present a calibration result for CIR processes and stocks from the S & P 500 (Standard & Poor's 500) stock market index. The talk is based on joint works with Martin Hairer, Martin Hutzenthaler, Thomas Mueller-Gronbach, Marco Noll, and Larisa Yaroslavl'tseva. More details on this topic can also be found at [<https://www.math.ethz.ch/sam/research/projects.html?details=33>].

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