

An Exponential Stochastic Runge-Kutta Type Method of Order up to 1.5 for SPDEs of Nemytskii-type

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We propose a numerical scheme that is free of derivatives and achieves an order of temporal convergence of up to $1.5 - \varepsilon$ for some $\varepsilon > 0$. The proposed scheme is tailored to stochastic partial differential equations of Nemytskii-type and is given as a family of exponential stochastic Runge-Kutta type schemes. It is based on the exponential Wagner-Platen type scheme introduced in [1] but involves lower computational cost as no derivatives have to be computed. In this talk, we introduce and discuss the scheme and its convergence properties. Moreover, we look at some examples and illustrate our findings with simulations. This is joint work with Ricarda Mißfeldt and Andreas Rößler.

[1] S. Becker, A. Jentzen, A. and P. E. Kloeden. An exponential Wagner-Platen type scheme for SPDEs. *SIAM J. Numer. Anal.*, 2016