

# Runge-Kutta methods for stochastic differential equations

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In the modeling of many applications, e.g., in chemical reaction systems and electrical circuits, taking stochastic effects into account often leads to stochastic differential equations (SDEs) of the form

$$X(t) = x_0 + \int_{t_0}^t g_0(X(s))ds + \sum_{l=1}^m \int_{t_0}^t g_l(X(s)) \star dW_l(s).$$

An important class of derivative free approximation methods for solutions of SDEs are stochastic Runge-Kutta (SRK) methods.

In this talk we give an introduction to SDEs and SRK methods and present an efficient second order Runge-Kutta method for the weak approximation of Itô stochastic differential equations. The content of this talk is joint work with Andreas Rößler<sup>1</sup>.

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