

STRONG RATE OF CONVERGENCE FOR THE EULER-MARUYAMA APPROXIMATION OF SDES WITH IRREGULAR DRIFT COEFFICIENTS

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ABSTRACT. In this talk, we consider a numerical approximation of the stochastic differential equation (SDE)

$$X_t = x_0 + \int_0^t b(s, X_s) ds + L_t, \quad x_0 \in \mathbb{R}^d, \quad t \in [0, T],$$

where $b : [0, T] \times \mathbb{R}^d \rightarrow \mathbb{R}^d$ is the drift coefficient and the noise $L = (L_t)_{0 \leq t \leq T}$ is a d -dimensional Lévy process. In general, convergence of numerical methods are studied under the classical assumption that the coefficient of the SDE is globally Lipschitz continuous. However, this assumption is not always satisfied for SDEs used in practice, this makes the global Lipschitz based idea not immediately applicable. We assume that the drift b is Hölder continuous in both time and space variables. We provide the rate of convergence for the Euler-Maruyama approximation when L is a Wiener process or a truncated symmetric α -stable process with $\alpha \in (1, 2)$. Our technique is based on the regularity of the solution to the associated Kolmogorov equation. Traditionally, the Kolmogorov equation is used to study the weak convergence rate for the Euler-Maruyama approximation which is for example very important in financial applications.

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