主　論　文　要　旨

論文題名

Approximation and stability of solutions of SDEs driven by symmetric stable processes with non-Lipschitz coefficients.

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主論文要旨

In the present paper, we investigate some essential properties of solutions of stochastic differential equations driven by symmetric α stable processes (SαS SDEs), such as convergence of approximation and stability of solutions. All through our study, we focus on the case of one-dimensional symmetric α ($1<\alpha<2$) stable SDEs with non-Lipschitz coefficients.

Firstly, we study Euler-Maruyama approximation in the pathwise sense. Euler-Maruyama approximation is a key tool in the theory of stochastic differential equations as well as Picard approximation is. We show that Euler-Maruyama approximation is convergent under Komatsu condition for coefficients. Komatsu condition is the counterpart of Yamada-Watanabe condition in the case of Brownian SDEs. The main result of this part corresponds to the main result stated in Yamada (2004) for Brownian SDEs. Euler-Maruyama approximation in this paper implies naturally the existence of strong solutions for SαS SDEs.

Secondly, we investigate stability problems in the pathwise sense. Stability problems in law sense for martingale problem solutions of SDEs driven by jump processes have been discussed by many authors. In this paper, the stability of solutions for SαS SDEs in the pathwise sense under Komatsu condition and Belfadli-Ouknine condition is proved, respectively. Belfadli-Ouknine condition can be seen as the counterpart of Nakao-Le Gall condition in the Brownian SDEs.

Finally, we consider Euler-Maruyama approximations for SαS SDEs and discuss their rate of strong convergence by numerical simulations. We also study the relationship between the convergence rate and the index α of symmetric stable process and/or the exponent γ of the Hölder continuity of the diffusion coefficient.