數学学院学术交流展

2023 MATHEMATICS

ACADEMIC EXCHANGE EXHIBITION OF MATHEMATICS COLLEGE

Exponential contraction for the McKean-Vlasov type Langevin dynamics with Levy noises

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【摘要】 By the probabilistic coupling approach which combines a new refined basic coupling with the synchronous coupling for Levy processes, we obtain explicit exponential contraction rates in the standard L^1-Wasserstein distance of the following Langevin dynamics $(X_t, Y_t)_{\{t\geq 0\}}$ of McKean-Vlasov type on R^{2d} :

$$\begin{cases} dX_t = Y_t dt, \\ dY_t = (b(X_t) + \int_{R^d} \tilde{b}(X_t, z)\mu_t^X(dz) - \gamma Y_t)dt + dL_t, \quad \mu_t^X = Law(X_t), \end{cases}$$

where $\gamma > 0$, $b: R^d \to R^d$ and $\tilde{b}: R^{2d} \to R^d$ are two globally Lipschitz continuous functions, and $(L_t)_{\{t\geq 0\}}$ is an R^d-valued pure jump Levy process. The proof is also based on a novel distance function, which is designed according to the distance of the marginals associated with the constructed coupling process.

2023.6.19 16: 30-17: 30

会场：文萃楼G124

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