

Efficient strategy of MCMC in high-dimensional and its application to diffusion process

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Abstract

The purpose of this talk is to introduce a new Markov chain Monte Carlo method and exhibit its efficiency by simulation and high-dimensional asymptotic theory. Key fact is that our algorithm has a reversible proposal transition kernel, which is designed to have a heavy-tailed invariant probability distribution. The high-dimensional asymptotic theory is studied for a class of heavy-tailed target probability distribution. As the number of dimension of the state space goes to infinity, we will show that our algorithm has a much better convergence rate than that of the preconditioned Crank Nicolson (pCN) algorithm and the random-walk Metropolis (RWM) algorithm. We also show that our algorithm is at least as good as the pCN algorithm and better than the RWM algorithm for light-tailed target probability distribution. We apply it to Bayesian inference for discretely observed diffusion process.