On the Optimal Transition Rate Matrix of Markov Process

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Abstract: Asymptotic variance has been a commonly used criterion to evaluate the performance of Markov chain Monte Carlo (MCMC). Many researches are devoted to comparison and improvement of MCMC algorithms with respect to asymptotic variance. The asymptotic variance depends on the statistics to estimate. For the average-case analysis, Chen et al. (2012) obtained the asymptotic variance and the structure of the optimal transition matrix for discrete-time Markov chains. In this paper, we will present the result for continuous-time Markov chains. The structure of the optimal transition rate matrix for the continuous case is not the same as the optimal transition matrix for the discrete case. The asymptotic variance of the continuous Markov chain is lower.

References

[1] T.-L. Chen, W.-K. Chen, C.-R. Hwang, and H.-M. Pai (2012). On the optimal transition matrix for markov chain monte carlo sampling, *SIAM Journal on Control and Optimization*, **50**, 2743–2762.