The Multiple-Try Metropolis and its Variations

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Abstract

Markov chain Monte Carlo (MCMC) has been extensively applied in many complicated computational problems to sample from an arbitrary distribution. The fundamental idea is to generate a Markov chain whose invariant distribution is the target distribution. The traditional Metropolis-Hastings algorithm (MH) based on local search may suffer from slow converging problem since the sampler may get stuck in a local mode. To overcome this difficulty, Jun S. Liu et al. proposed Multiple-try Metropolis (MTM) in 2001. This project will prove the validity of MTM and implement the algorithm and its variations including Conjugate-Gradient Monte Carlo (CGMC) and Langevin-within-MTM on artificial data and real dataset. Comparisons are made to show the superiority of the algorithm over traditional MH algorithms.

1 Introduction

1.1

1.2

2 The algorithm and its variations

3 Implementation

4 Optimization and high performance computing

5 Experimental results and comparisons

6 Conclusions

References

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