

Sampling through Exploration Exploitation

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We develop an explore-exploit Markov chain Monte Carlo algorithm (Ex2MCMC) that combines multiple global proposals and mobile moves. The proposed method is massively parallelizable and extremely computationally efficient. We prove the V -uniform geometric ergodicity of Ex2MCMC under realistic conditions and compute explicit bounds on the mixing rate showing the improvement due to multiple global moves. We show that Ex2MCMC allows fine-tuning of exploitation (local moves) and exploration (global moves) via a novel approach to propose dependent global moves. Finally, we develop an adaptive scheme, FEx2MCMC, that learns the distribution of global moves through normalizing flows.

We illustrate the efficiency of Ex2MCMC and its adaptive versions in many classical sampling benchmarks. We also show that these algorithms improve the quality of sampling GANs as energy-based models.

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