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Wuchen Li*, 586 Eagles Rest Drive, Chapin, SC 29036. *High order MCMC methods via Transport information geometry.*

In AI and computational statistics, the MCMC method is a classical model-free method for sampling target distributions. A fact is that the optimal transport first-order method (gradient flow) forms the MCMC scheme, known as Langevin dynamics. A natural question arises: Can we propose high order optimization techniques for MCMC methods? We positively answer this question by considering second-order optimization methods combining optimal transport and information geometry, known as transport information geometry. Here we introduce a theoretical framework for Newton's flows in probability space with the Wasserstein-2 metric. Several numerical examples are provided to demonstrate the effectiveness of the proposed Newton's method. (Received September 10, 2020)