

TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

Room 617 Wachman Hall

Wednesday, 18 April 2018, 4:00 p.m.

Coupling and Convergence for Hamiltonian Monte Carlo

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Abstract. A new coupling of two copies of the Hamiltonian Monte Carlo (HMC) algorithm is introduced. This coupling is used to obtain contraction rates for HMC in a Wasserstein distance. These rates imply that the rate at which HMC converges to equilibrium is kinetic, which is better than the diffusive rate characteristic of sampling algorithms like random walk Metropolis or MALA. Sufficient conditions for this kinetic rate reveal potential limitations on HMC, particularly when the target distribution is multimodal. Numerical verification of this coupling is provided on multimodal and highly non-log-concave target distributions. (Joint work with Andreas Eberle and Raphael Zimmer from the University of Bonn, Germany.)