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Toward reduction of autocorrelation in HMC by machine learning

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Recent development of machine learning (ML), especially deep learning is remarkable. It has been applied to image recognition, image generation and so on with very good precision. From a mathematical point of view, images are just real matrices, so it would be a natural idea to replace this matrices with the configurations of the physical system created by numerical simulation and see what happens. In this talk, I will review our attempt to reduce autocorrelation of Hamiltonian Monte Carlo (HMC) algorithm. In addition, I would like to discuss a possibility of using recent sophisticated generative models like VAE, GAN to improve HMC. (work in collaboration with A. Tomiya, arXiv:1712.03893)

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