Report On Using MCMC Method To Find Hamiltonian And Thermalizaion of Berry-Keating And Damped Harmonic Oscillator

Preliminaries

Hamiltonian of Berry-Keating

$$H = \frac{1}{2}(xp + px) \tag{1}$$

We're using MCMC method to evaluate Hamiltonian and Thermalization of Berry-Keating.

Methodology

Markov Chain Monte Carlo (MCMC) is a random sampling method to visit x with a probability proportional to some given distribution say, $\pi(x)$. To use MCMC in simulation we first simplify the Hamiltonian Monte Carlo code in a block manner. Then we calculate and plot $< H >$ graphs of Berry-Keating Hamiltonian. But first simplify code using header files. Those codes are giiven below

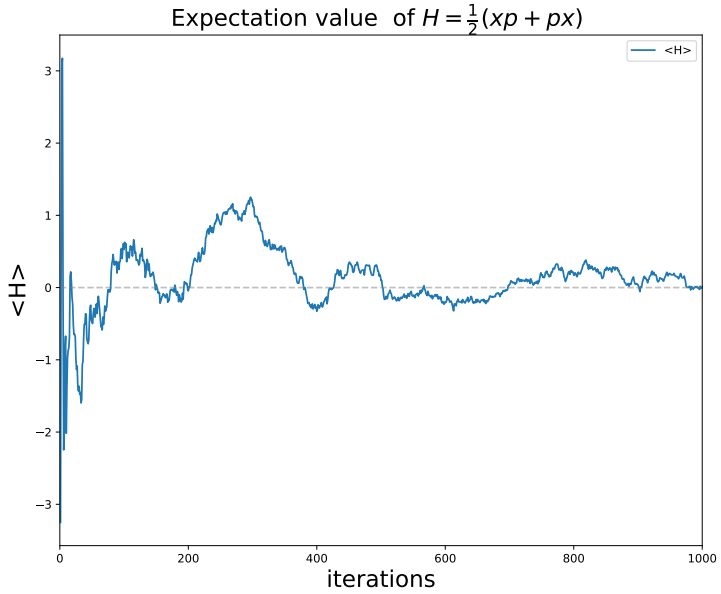

Figure 1: Graph of Expectation value of Berry-Keating

Again evaluating $< H >$ using probability function where

$$< H >= Tr(\frac{\hat{H} * exp(-\beta \hat{H})}{Tr(exp(-\beta \hat{H}))}) \tag{2}$$

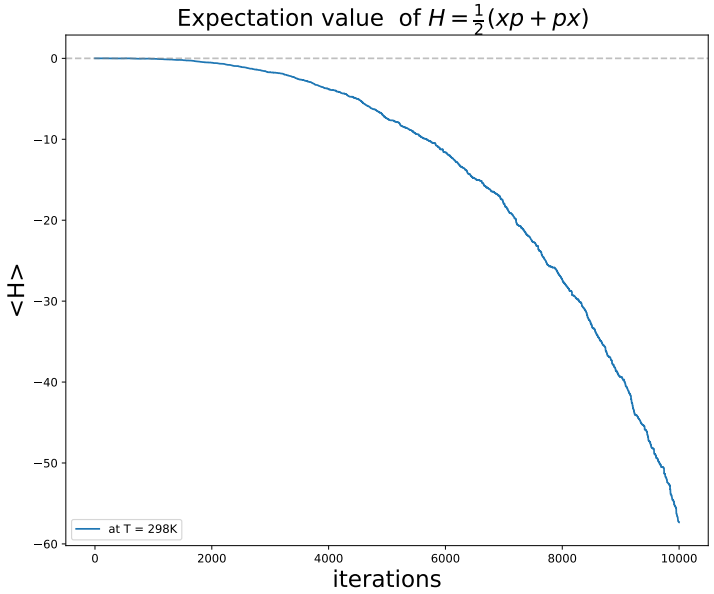

Figure 2: Graph of Expectation value of Berry-Keating