HW3

Due on canvas, M 05.30.25 by 11:59am

1. Let the potential energy be defined as

$$V(x_1, \cdots, x_d) = -\sum_{i=1}^{d} x_{i-1} x_i \quad \text{for } x \in \{\pm 1\}^d, \tag{1}$$

where $x_0 = x_d$. Let $T = 1$ be the temperature, and consider the corresponding Gibbs measure. Generate N samples from it. Fit a discrete diffusion model for $d = 16, 32, 64, 128$. Use fully connected neural-nets and convolutional neural-nets.

   (a) Compare the sample mean and covariance obtained from the discrete diffusion model with those from the SDE simulation. Use different values of N. Do you see the error decay as $1/\sqrt{N}$?