1 Introduction

2 Monte Carlo

3 Wolff Algorithm

4 Helium-4

5 XY-model

6 Histrogram extrapolation

Histogram extrapolation is a method to extract more data from a run. Averages are calculated as

$$< A >_{\beta_0} = \frac{\sum_x A e^{-\beta_0 H_x}}{\sum_x e^{-\beta_0 H_x}} \tag{1}$$

To get the average of A at some different temperature, say β_1, we can do

$$< A >_{\beta_1} = \frac{\sum_x A e^{-\beta_1 H_x}}{\sum_x e^{-\beta_1 H_x}} = \tag{2}$$

$$= \frac{\sum_x A e^{-(\beta_1 - \beta_0) H_x} e^{\beta_0 H_x}}{\sum_x e^3} \tag{3}$$