

Your solutions should include your source codes (without *.exe files), results, and discussions, all in a gzipped tar file. Please send your homework from your NTU email account to twchiu@phys.ntu.edu.tw before 24:00 of the due date.

1. Monte Carlo integration in 10 dimensions

In the problem 2 of the Problem Set 3, for $N = 2^{16}$, to estimate the error of the mean by

- (a) Measuring the integrated autocorrelation time,
 - (b) The binning method,
- for the following 2 different algorithms respectively.
- I. Simple sampling.
 - II. Importance sampling with Metropolis algorithm.

2. The Jackknife Method

Show that using the jackknife method on the primary observable is equivalent to the usual estimate of the error of the mean.

3. Binning with the Jackknife

For the 10-dimensional integral I in the problem 2 of the Problem Set 3, use $N = 2^{10}$, and estimate the mean and the error of the mean of the secondary observable $f(I) = \exp(-I)$ by binning with the Jackknife method.