

Equilibrium fluctuations and population size

The simulations are carried out assuming mutation but no selections.

$u_1 \rightarrow$ Rate at which A mutates to B

$u_2 \rightarrow$ Rate at which B mutates to A

The simulation is carried out multiple times using different values of population size N . The timestep at which the system has equilibrated is chosen to be 2000, which is in fact the total number of generations over which the population is made to evolve in each trial of the generation. The plot of variance of the equilibrium frequency of type 1 (the type with large equilibrated frequency) is plotted against N^{-1} and the data is fitted to a linear fit.

As observed in the plot below, the data fits perfectly well to the linear fit suggesting that fluctuations arising due to finite size of the population is inversely proportional to population size (N).

The fitting was carried out using *polyfit*, a command which takes in the data and order of the polynomial to which the data is to be fitted as input and returns the coefficients of the fit. A linear fit is nothing but a polynomial fit of degree 1.

linear fit parameter, Slope = 0.18906682097616143

linear fit parameter, Intercept = 1.544424967708545e-05

