Computational Physics Problem Set 3

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GitHub: https://github.com/jferrante25/physga-2000

1 Problem 1

Using the explicit computation with loops, the computation seems to rise as N^3. With the dot() method, however, the computation size is smaller and rises more gradually.
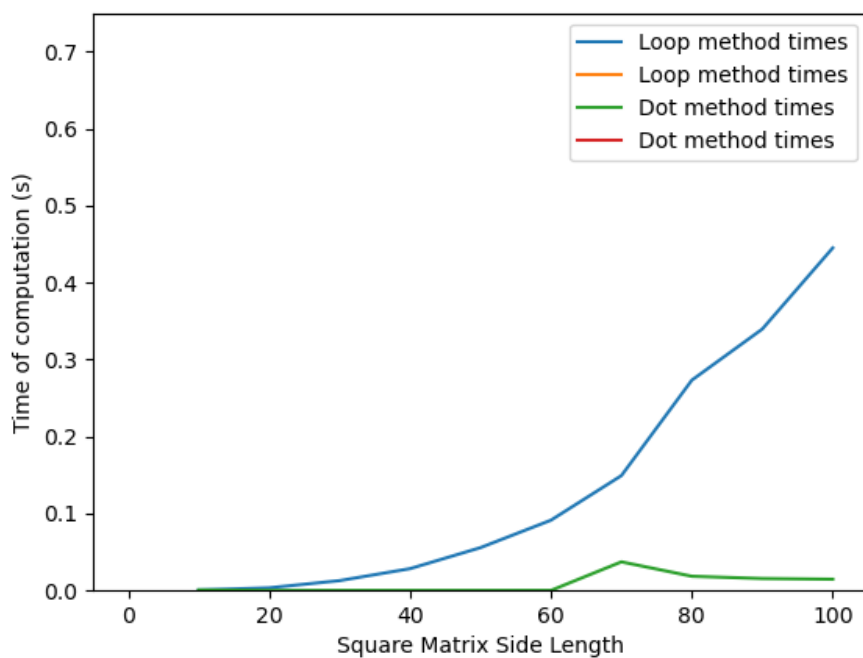

Figure 1: Plot comparing computation size for N x N matrices for explicit and dot() method

2 Problem 2 (Newman 10.2)

Code is given on GitHub. The lines representing Ti and Pb numbers are not visible in Figure 2 because they remain small compared to the numbers of Bi atoms, but are shown separately in Figure 3.

3 Problem 3 (Newman 10.4)

Code is given on GitHub. Plot is shown in Figure 4.

4 Problem 4

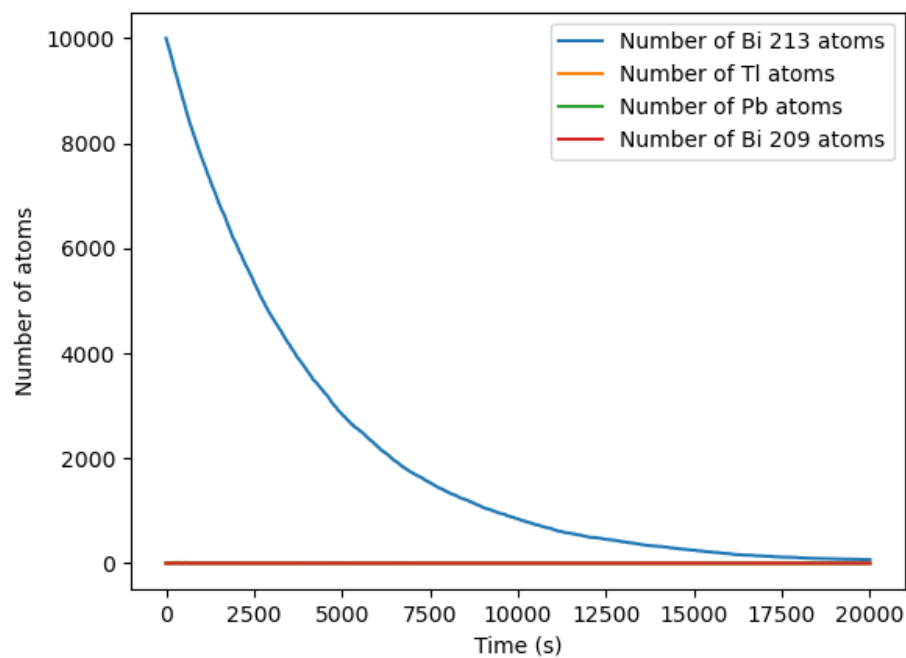As seen in Figure 5, the distribution is roughly Gaussian for a large n.

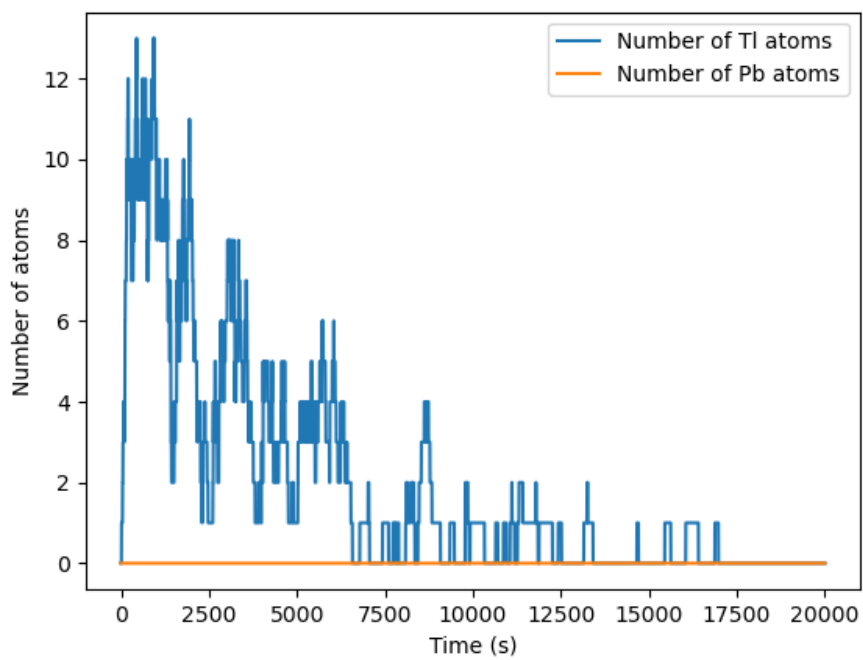Figure 2: Plot of number of Bi 213, Tl, Pb, and Bi 209 atoms remaining at time t
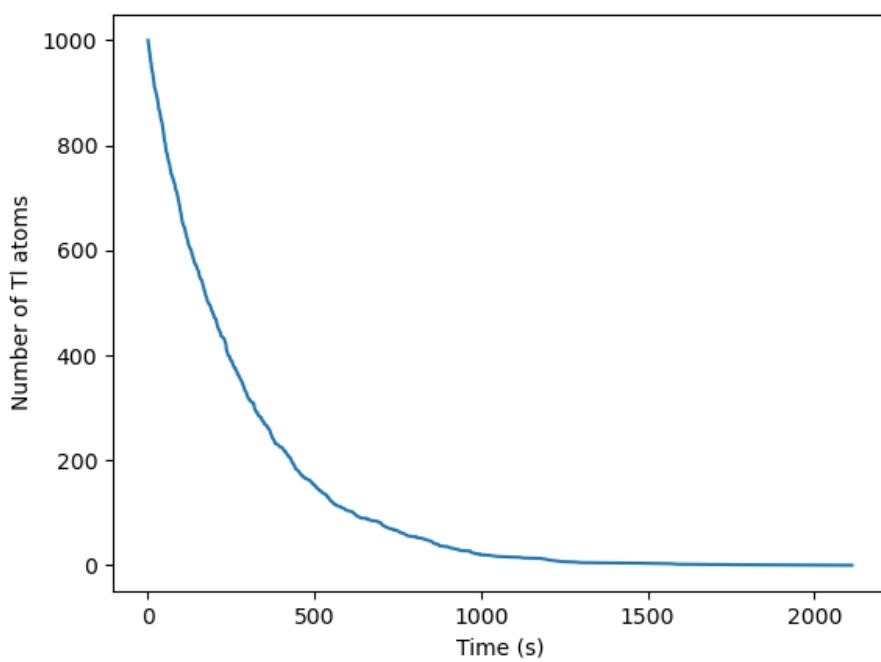
Figure 3: Plot of only remaining Tl and Pb at time t
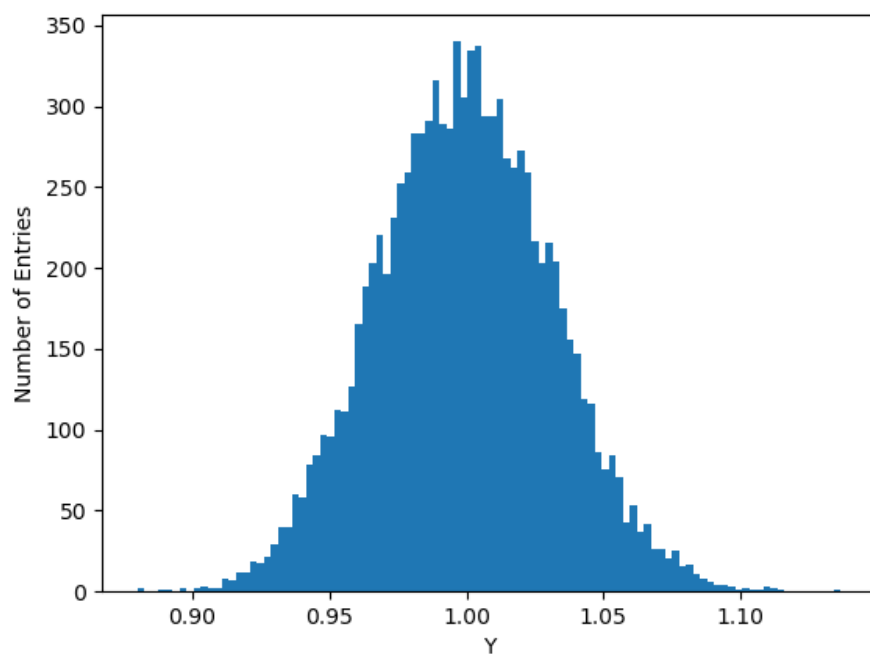
Figure 4: Plot of number of Tl atoms remaining at time t

Figure 5:   Plot of variate y using N = 1000