Report for Exercise 11

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1 Task 1

For this task, I implemented algorithms both for the 1d and 2d event driven molecular dynamics. I used them to create simulations which can be seen in "1d-animation.mov" and "2d-animation.mov".

2 Taks 2

In figure 1, I plotted the total energy of the 1-dimensional event driven molecular system with restitution coefficient $e = 1$ over time. Indeed the energy stays constant which shows that it is conserved as expected.

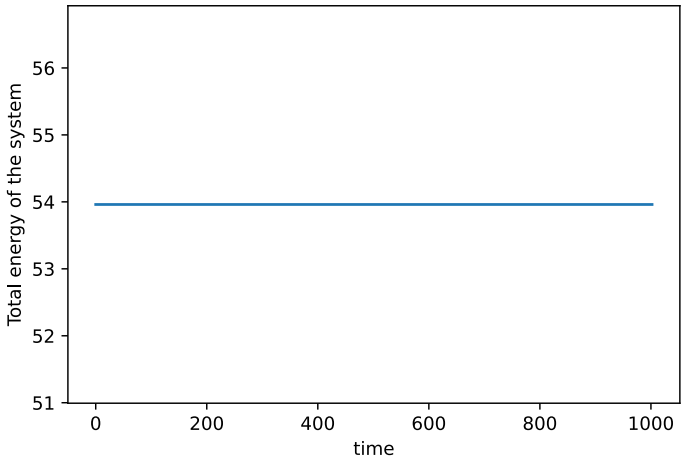

Figure 1: Total energy of the system over time.

In figure 2 one can again see the total energy of the system plotted over time, but now with a restitution coefficient $e = 0.9$. The total energy now decays exponentially to 0.

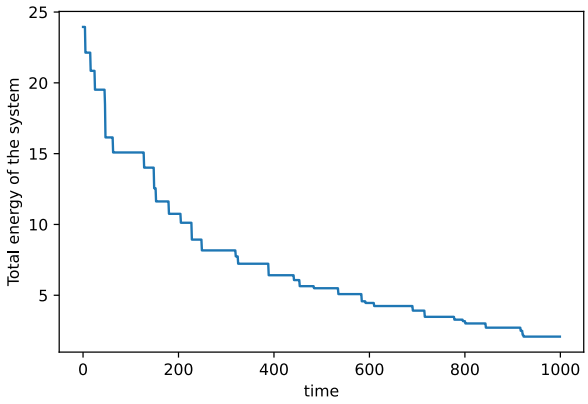

Figure 2: Total energy of the system over time with damping.

In figure 3 one can see the effective restitution coefficient e_{eff} plotted for different numbers of particles. One can see that it decays exponentially to 0. Therefore, $N_c = 30$ is a reasonable choice.

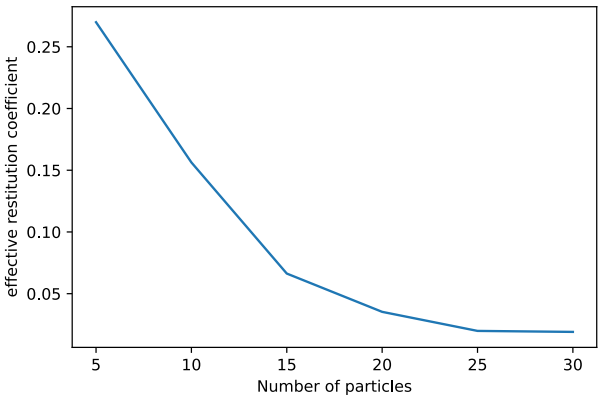

Figure 3: Effective restitution coefficient e_{eff} for different numbers of particles.