

# Goal

Simulate when the first string is vertical and the second is a degree up.

## Constants

$$l_1 = 4$$

$$l_2 = 4$$

$$m_1 = 4$$

$$m_2 = 4$$

$$g = 9.8$$

Duration: 20s

Framerate: 25fps

## Initial Values

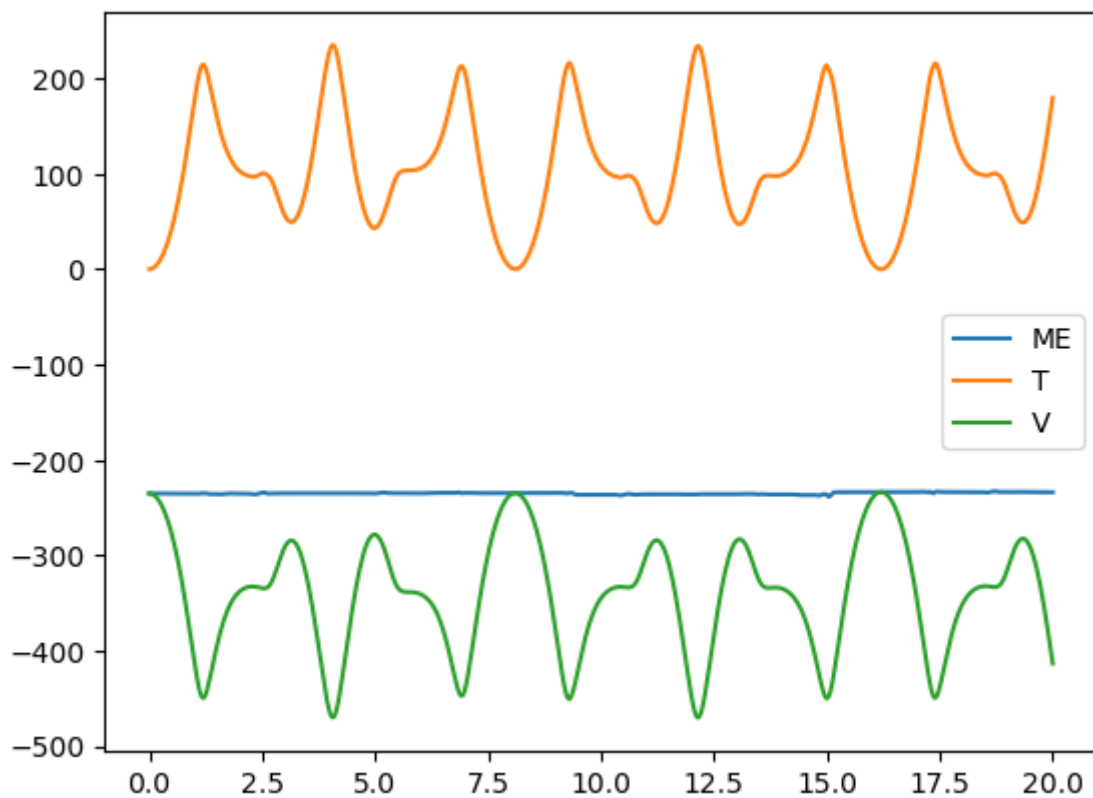
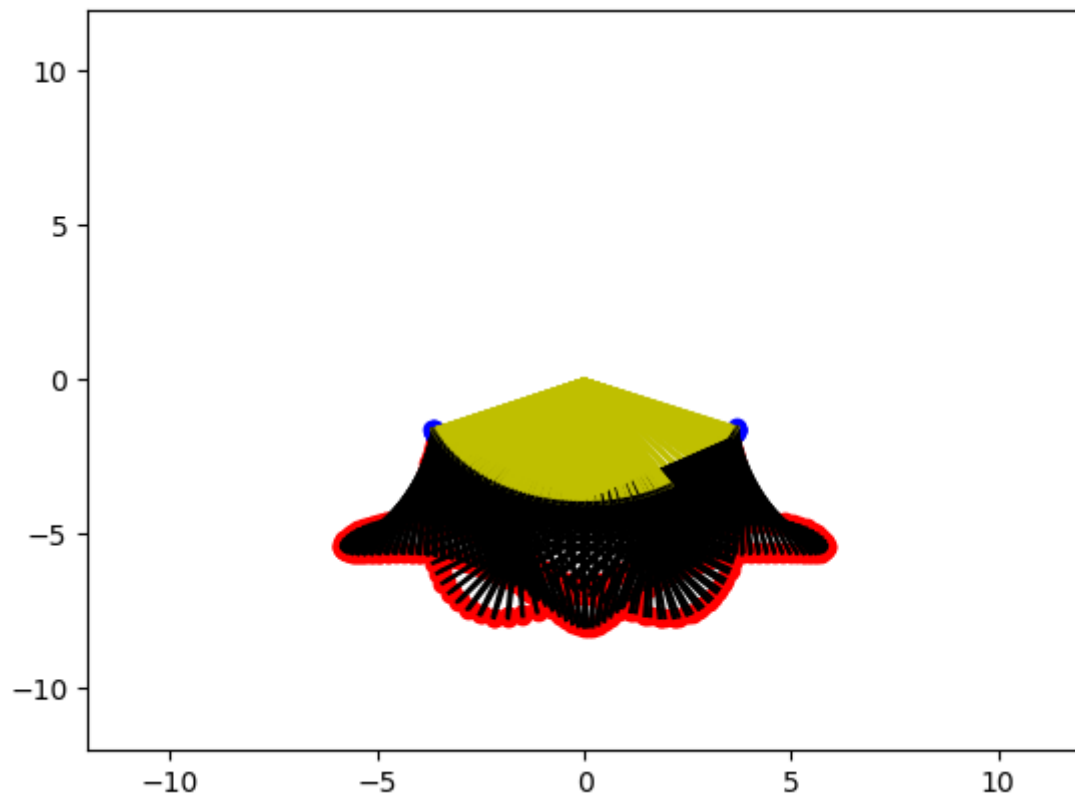
$$\theta_1 = 0$$

$$\theta_2 = 2\pi/3$$

$$\dot{\theta}_1 = 0$$

$$\dot{\theta}_2 = 0$$

## Results



In which  $ME$  stands for mechanical energy,  $T$  stands for kinetic energy,  $V$  stands for potential energy

The theoretical mechanic energy is  $-235.20000000000005 \text{ J}$

The average calculated mechanical energy is  $-235.02156001076722 \text{ J}$

The Root Mean Square Error of mechanical energy is

1.0002247864495433

the standard deviation of mechanical energy is 0.0025309203425212742

Therefore the calculated energy stays close to the theoretical energy, meaning the energy of this system converges to the theoretical value. The simulation has a high accuracy and a high preciseness.