Goal

Simulate when the second string is vertical and the frist 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

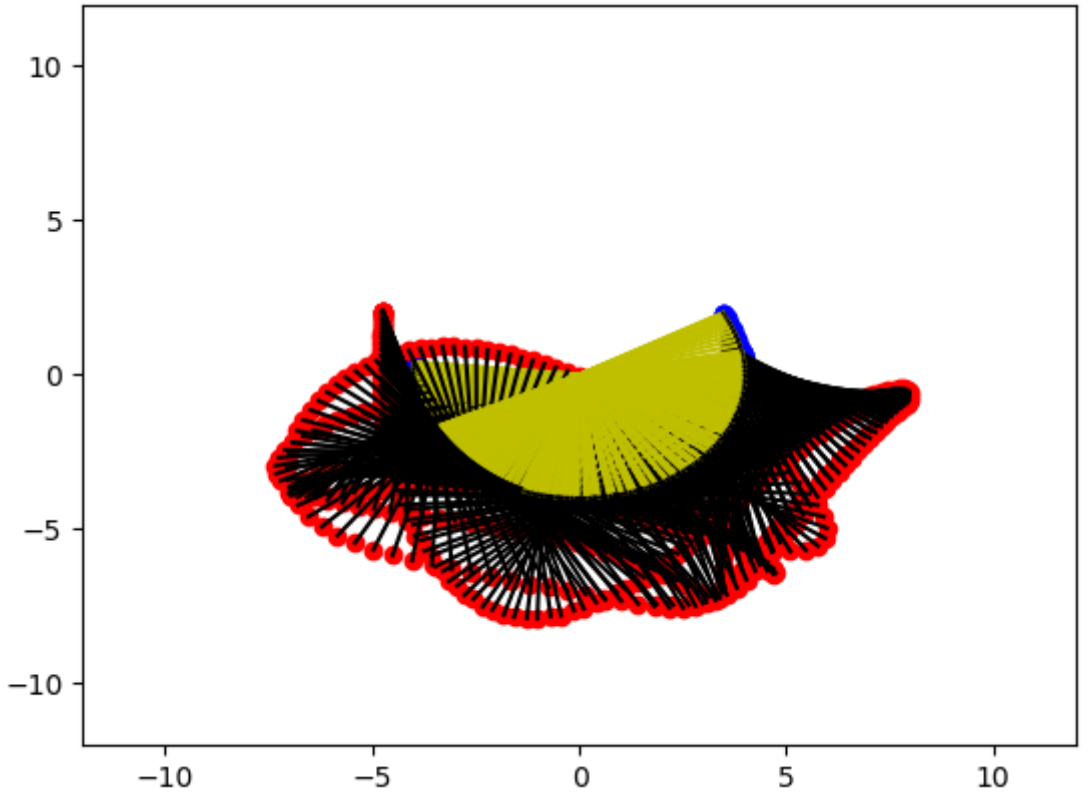
$\theta_1 = 2\pi/3$

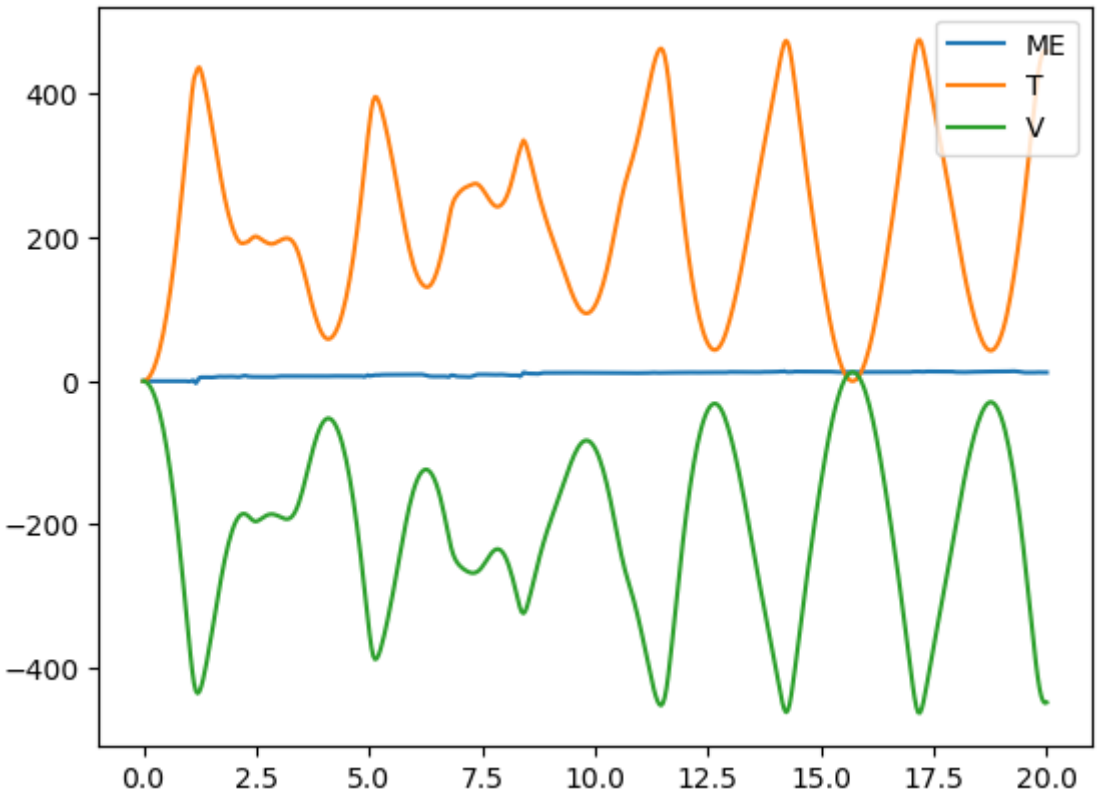
$\theta_2 = 0$

$\dot{\theta_1} = 0$

$\dot{\theta_2} = 0$

Results





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

The theoretical mechanic energy is $-5.6843418860808 02e-14$ J

The average calculated mechanical energy is 9.791957446798166 J

The Root Mean Square Error of mechanical energy is 10.442064977519793

the standard deviation of mechanical energy is 0.20280400195767787

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.