Goal

Simulate a rigid spring, test if the system regress to a simple pendulum

Constants

$k = 1000000$

$l_0 = 1$

$m = 1$

$g = 9.8$

Duration: 20s

Framerate: 25fps

Initial Values

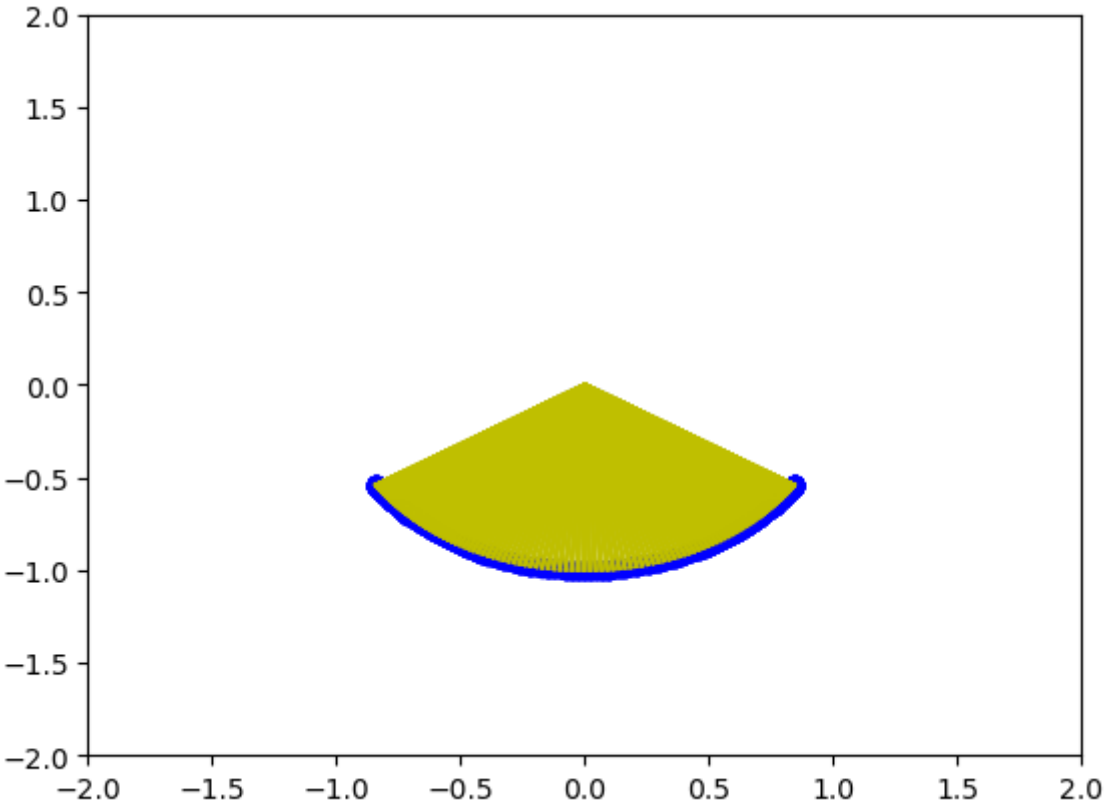
$l = 1$

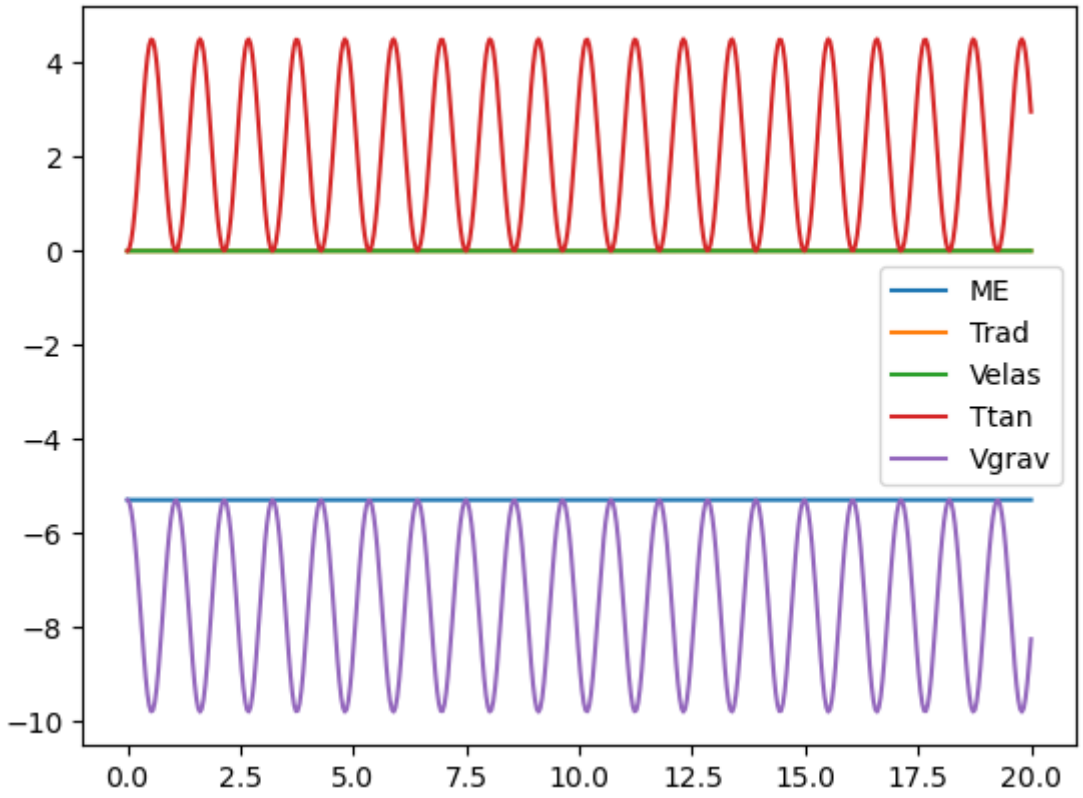
$\dot{l} = 0$

$\theta = 1$

$\dot{\theta} = 0$

Results





In which ME stands for mechanical energy, T_{rad} stands for radical kinetic energy, T_{tan} stands for tangential kinetic energy, V_{elas} stands for elastic potential energy, V_{grav} stands for gravitational potential energy.

The theoretical mechanic energy is -5.29496259750777$ J

The average calculated mechanical energy is -5.294566261432506 J

The Root Mean Square Error of mechanical energy is
0.0006054924267830725

the standard deviation of mechanical energy is
$5.1269542692886235e-05$

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