Goal

Simulate an arbitrary initial circumstance and see what happens

Constants

$k = 100$

$l_0 = 1$

$m = 1$

$g = 9.8$

Duration: 20s

Framerate: 25fps

Initial Values

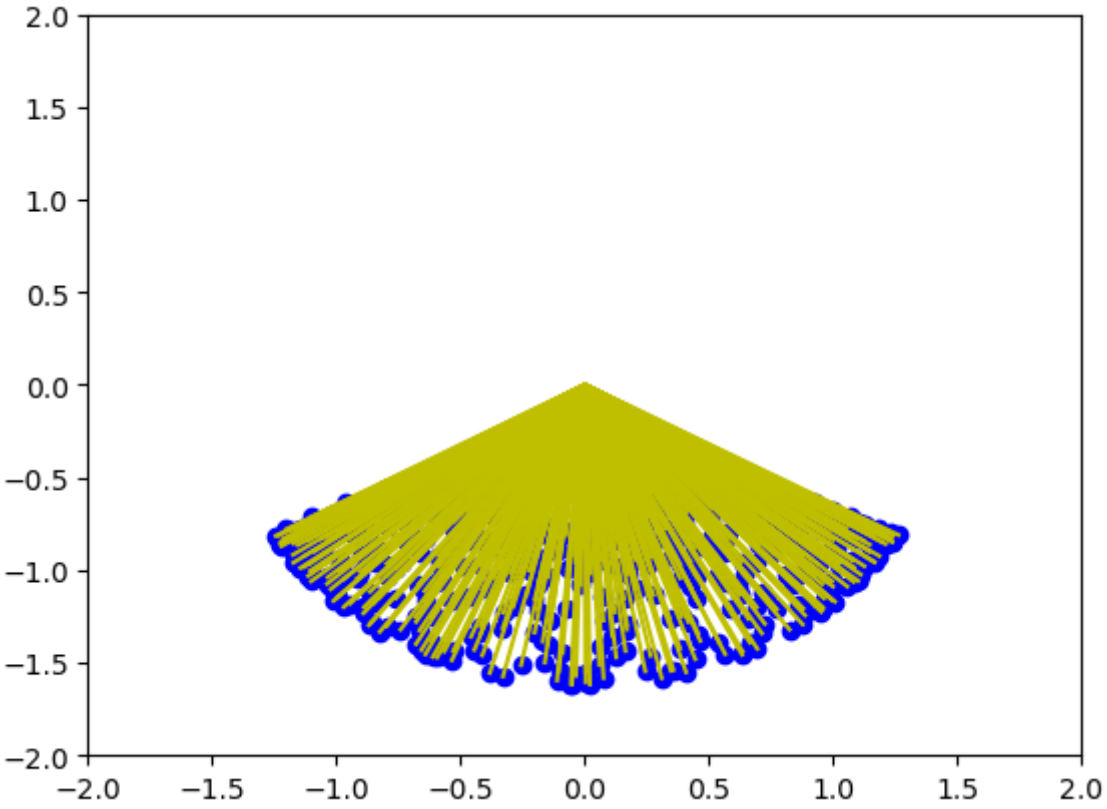
$l = 1.5$

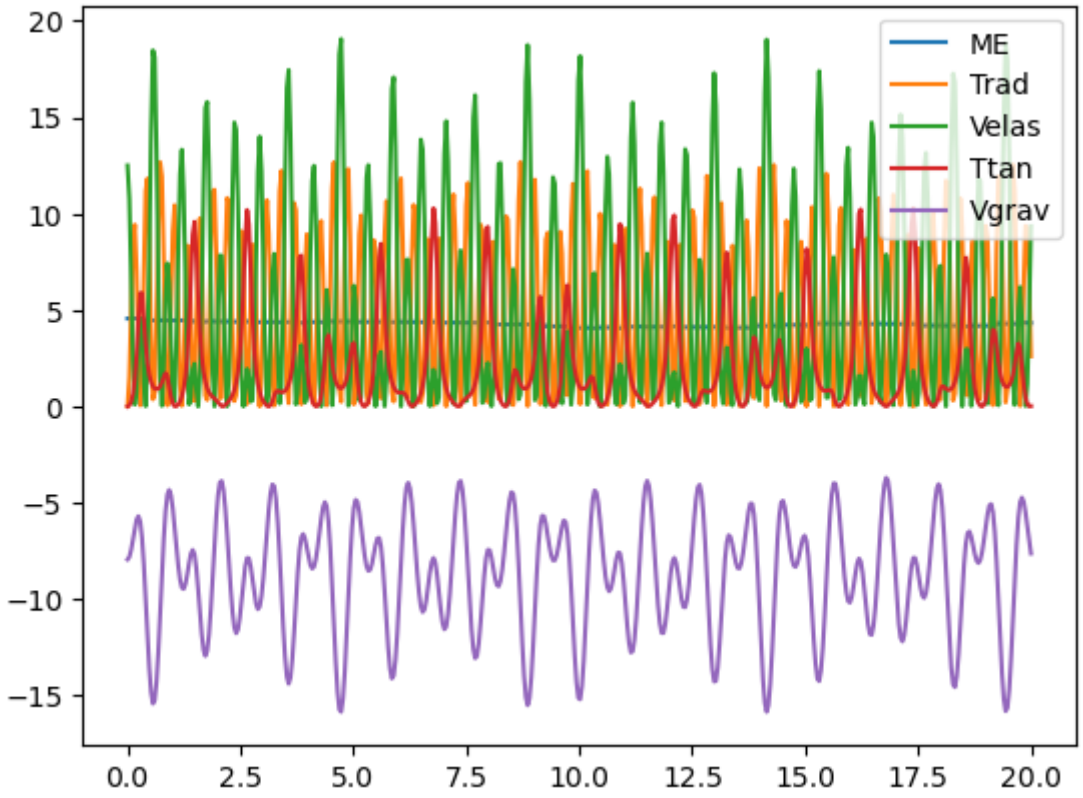
$\dot{l} = 0$

$\theta = 1$

$\dot{\theta} = 0$

Results





In which ME stands for mechanical energy, Trad stands for radical kinetic energy, Ttan stands for tangential kinetic energy, Velas stands for elastic potential energy, Vgrav stands for gravitational potential energy.

The theoretical mechanic energy is 4.557556103738345 J

The average calculated mechanical energy is 4.276182907948614 J

The Mean Relative Error of mechanical energy is 0.06178445173677574

the standard error of mechanical energy is 0.026885377277962422

Therefore the calculated energy is close enough to the theoretical energy, meaning the energy of this system conserves and the simulation has a high accuracy.