DIFFERENTIAL EQUATIONS, PYTHON EXERCISE 7

(1) The equations of motion of a pair of coupled pendulums with masses m_1 and m_2 and the same length L are

$$\frac{d^2\theta_1}{dt^2} + \frac{g}{L}\sin\theta_1 + \frac{k}{m_1}(\sin\theta_1 - \sin\theta_2) = 0,$$

$$\frac{d^2\theta_2}{dt^2} + \frac{g}{L}\sin\theta_2 + \frac{k}{m_2}(\sin\theta_2 - \sin\theta_1) = 0.$$

Here k is the stiffness constant of the connecting spring. You can see a picture of coupled pendulums on the Pendulum Wikipedia Page. Also note that the equations of motion given above deploy a mild approximation. The exact equations of motion are given, for example, here.

Set up a numerical solver to solve this system of coupled DE's and then use the resulting solutions to produce an annimation of the coupled pendulums. Choose the parameter values so that your coupled pendulums exhibit maximally diverting behaviour.