Ian Blackstone

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Double pendulum Python simulation

My project will be modeling a double pendulum using Python animation modules. This system consists of two masses connected by a rigid rod, and the first mass is connected with another rigid rod to a surface above it. This system is interesting because while the setup seems simple the movement of the system is chaotic. The equations of motion for the double pendulum are easiest derived by taking the Lagrangian of the system. Doing so gives us these equations of motion:

These equations will be rearranged to input to the system in as clean a way as possible. If this form of the equations of motion prove too unwieldy to use for this purpose and alternate form can be derived to give an ODE that will be efficiently solvable numerically. This solution to this system will be done using the 4th order Runge-Kutta method and animated using the matplotlib.animation Python class. The equations will be solved in real time and a plot updated showing the state of the two pendulums to display the chaotic motion of the system.