Lagrangian Lecture 1 Problems

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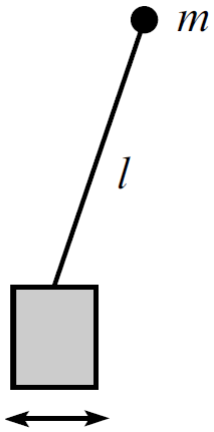
1 Inverted Pendulum

The box oscillates with the function $x(t) = A\cos(\omega t)$. The pendulum is a rigid rod. Solve for the equation of motion of the mass m. Note that if the frequency ω is high enough the pendulum will not tip over.



2 Sliding Blocks

Two block slide as shown in the picture frictionlessly. They always remain in contact and the box with mass m cannot tip over (don't worry about torque). Solve for the equation of motion of both boxes.