ENPM 808M
Homework#1
September 3, 2015
WSL

1. a. Consider the block sliding on a wedge from Lecture #1. Suppose the block has mass m_1 and the block has mass m_2. The angle of the block is α as in the lecture. When m_1 slides down and to the left, the wedge, m_2 slides to the right. Find formulae for the acceleration of m_1 and m_2 in the absence of friction.
   b. Create a SimMechanics simulation of this system when $m_1 = 2, m_2 = 5, \text{and } \alpha = 30 \text{ degrees}$. The masses are in kilograms.

2. A 5 kilogram weight hangs from a springs such stiffness that the spring stretches $\delta = 1\ cm$ under the weight.
   a. Calculate the stiffness of the spring.
   b. Calculate the natural frequency of the up and down oscillations of the weight if it starts at some length other than stretched by $\delta = 1\ cm$.
   c. Write a formula for the frequency in terms of δ alone, in which neither the mass m nor the spring constant k appears.
   d. Create a Simscape simulation of this system.
   e. Create a SimMechanics simulation of this system.
3. A wheel has initial angular velocity 500 rpm and is being slowed down at a rate of 2 rpm per second. How many rotations does the wheel make before it comes to a stop?