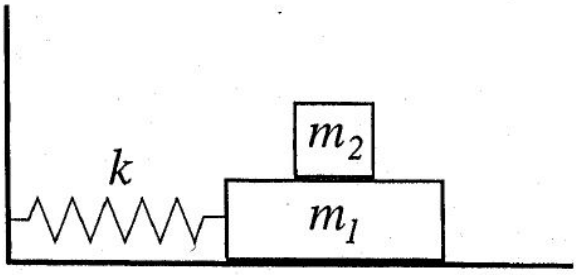
FP10



A large block of mass m_1 executes horizontal simple harmonic motion as it slides across a frictionless surface under the action of a spring constant k. A block of mass m_2 rests upon m_1. The coefficient of friction between the two blocks is μ. Assume that m_2 does not slip relative to m_1.

a) (3 points) Draw the free body diagrams for m_1 and m_2 at a time when the spring is stretched a distance x beyond equilibrium to the right.

b) (2 points) Write down the horizontal and vertical equations of motion for blocks m_1 and m_2.

c) (2 points) What is the angular frequncy of oscillation, ω, of the system?

d) (3 points) What is the maximum amplitude of oscillation, A, that the system can have if m_2 is not to slip relative to m_1? (Write your answer in terms of ω.)