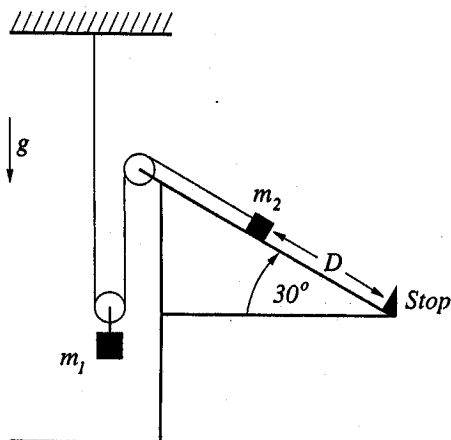


FP 9

Problem 4



Two masses are connected by a string as shown. m_2 slides without friction on a fixed incline at an angle of 30° with respect to the horizontal. Neglect the mass and friction of the pulleys, and the mass of the string.

- (2 points) Find the ratio of the masses m_2/m_1 such that the masses will remain stationary, if they are initially at rest.
- (1 point) If the mass m_2 moves a small distance ΔD_2 along the incline, find the distance ΔD_1 that the mass m_1 moves.
- (3 points) If $m_2 = 2m_1$, and the masses are initially at rest as shown, find the acceleration of m_2 .
- (3 points) If m_2 slides a distance D down the incline before encountering the stop at the bottom, what are the speeds of m_2 and m_1 just before encountering the stop.
- (1 point) When the moments of inertia of the pulleys are taken into account, do the speeds of the masses in part (d) increase, decrease, or remain the same?