Physics 422 – Fall 2010

Homework #10, due at beginning of class Friday Dec 3.

1. [5 pts] A mass $M$ slides on a frictionless horizontal track. A uniform rod of mass $m$ and length $a$ hangs below it as a pendulum. Find the normal modes and describe them.

2. [5 pts] Three equal masses have total kinetic energy

$$T = \frac{1}{2} M (\dot{x}_1^2 + \dot{x}_2^2 + \dot{x}_3^2) .$$

The potential energy is

$$V = \frac{1}{2} \left[ K_a(x_1^2 + x_3^2) + K_b x_2^2 + K_c (x_1 + x_3) x_2 \right] .$$

Find the normal modes if $K_c = \sqrt{2K_a K_b}$.

3. [5 pts] Marion & Thornton problem 12.16