ADVANCED PHYSICS CLUB

NOVEMBER 10, 2019

Today's meeting

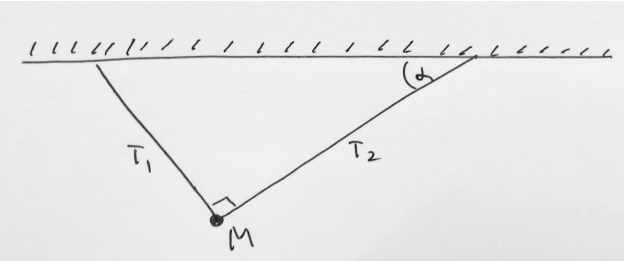
Today we discussed homework problems from the last meeting. Then we talked about conditions for static equilibrium in mechanical systems and considered the following problem:

1. A chain of mass m is hung by its ends in such a way that it makes angle α with the horizon near the ends. Find the tension in the chain at the lowest point and near the ends.

Homework problems

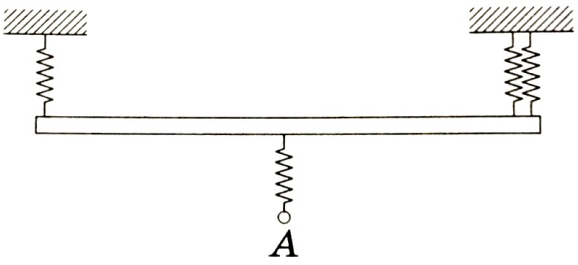
Try to apply the conditions for equilibrium to solve the following problems.

1. A weight of the mass M is suspended on two strings as shown in the picture (the angle at the vertex M is the right one). Find the ratio of tensions in strings T_1/T_2.



2. Heavy rod is bent at the right angle in its' middle point. Then it is hung from one of its' ends. What is the angle between the vertical direction and the upper half of the rod?

***3.** A rigid thin rod is lying on a smooth horizontal surface. Four identical springs are attached to the rod as shown in the picture. Initially, all springs are orthogonal to the rod and have nonzero but very small tension. A point A of the middle spring is moved along the direction of the spring by 1 cm. Find the tension of all springs in the new equilibrium position. The stiffness of springs is $k = 100$ N/cm.



***4.** The distance between the two vertical walls is l. A rod inserted obliquely between the walls does not fall. The coefficient of friction between the walls and the rod is μ. What could the length of the rod be?