

USEFUL RESOURCES

The updates, homework assignments, and useful links for APC can be found on SchoolNova's web page:

[https://schoolnova.org/nova/classinfo?class\\_id=adv\\_phy\\_club&sem\\_id=ay2023](https://schoolnova.org/nova/classinfo?class_id=adv_phy_club&sem_id=ay2023)

The practical information about the club and contacts can be found on the same web page.

TODAY'S MEETING

Today we discussed most of the problems of the previous assignment. Two problems are reassigned.

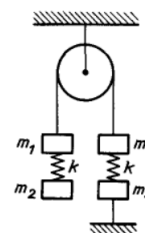
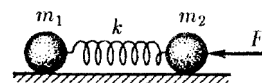
REASSIGNED HOMEWORK

- 7 A square curtain is hanging down vertically, attached by its top side to a horizontal rod. Then the bottom side of the curtain is elevated to the same level as the top side, so that the curtain gets folded in two. Find how the force acting on the rod depends on time after the elevated end of the curtain is let go. Assume that the curtain is thin and soft. The size of the curtain is  $1.5 \text{ m} \times 1.5 \text{ m}$ , its mass is 3 kg.
- 8 A ball of radius  $R$  rests on a smooth surface of a cart. The cart starts moving with speed  $v_0$ . Find the horizontal component of the velocity of the ball when it hits the floor.

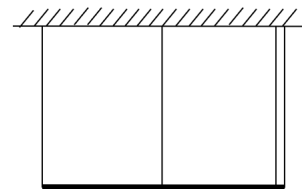
HOMEWORK

We continue with Newton's laws. This assignment is mostly on strings and springs.

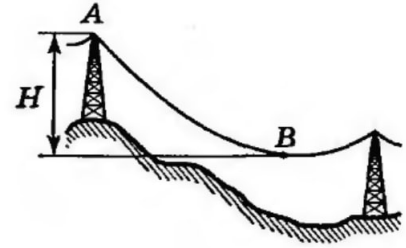
1. Two bodies with masses  $m_1$  and  $m_2$  are connected with a spring with spring constant  $k$ . A constant force  $F$  acts upon  $m_2$  in the direction of  $m_1$ . Find deformation of the spring if there are no other external forces and oscillations have already stopped. What would accelerations of bodies be immediately after one stops applying the force  $F$ ?
2. The system shown on the figure is initially in equilibrium. Find the accelerations of all the blocks after the string holding the block  $m_4$  from below is suddenly cut (in equilibrium this string has some tension).



3. A rubber cord has mass  $m$  and elasticity constant  $k$ . It is hung by one end. Find the total elongation of the cord.
4. A uniform beam is attached to the ceiling with a few similar ropes of the same length. One rope is attached to an end of the beam and two ropes are attached to the other end. One more rope is attached to the center of the beam. What are the ratios of tension forces in all of the ropes?



- \*5. A power line in the mountains has two supports at different heights. The total mass of the wire between the supports is  $m$  and its total length is  $L$ . Vertical distance between the lowest point of the wire  $B$  and the attachment point to the higher support  $A$  is  $H$ . The length of segment  $AB$  of the wire is  $l$ . Find the maximal tension force in the wire.



FOR THE NEXT MEETING

**IMPORTANT:** The next club's meeting is at 3:30pm, via Zoom, on Sunday, **November 19**.