

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=ay2020

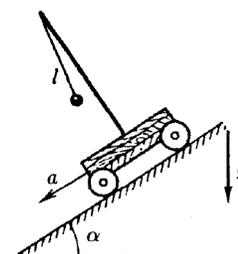
The practical information about the club and contacts can be found on the same web page.

TODAY'S MEETING

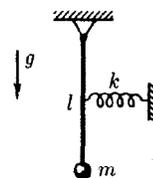
Today's homework continues the topic of oscillations.

HOMEWORK

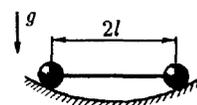
1. A physical pendulum is a pendulum with non-negligible size. Such a pendulum could be characterized by its mass m , by the moment of inertia relative to the suspension point I and by the distance from the suspension point to the center of mass of the pendulum l . Provided with these parameters and g , find period of small oscillations of the physical pendulum.
2. A heavy cart is moving with acceleration a downwards on an inclined plane making angle α with the horizon. Find the period of oscillations of a pendulum of length l mounted on the cart.



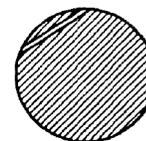
3. A pendulum is made out of a ball of mass m attached to the end of a light rod with length l . How would frequency of oscillations of the pendulum change if a spring with spring constant k is attached horizontally to the center of the rod? The figure shows equilibrium position.



4. Two pointlike bodies of the same mass are connected by a light rod and placed to a spherical bowl. Find frequency of small oscillations with motion in the direction a) perpendicular to the plane of the figure ; b*) parallel to this plane.



- *5. Imagine there is a straight tunnel dug through the Earth between some two points. What time would it take a train with the engine shut off to travel from one end to the other? Neglect any friction and any possible effects due to Earth's rotation, assume the Earth's density to be constant. Earth's radius is 6400 km.



FOR THE NEXT MEETING

IMPORTANT: The next club's meeting is at 3:00pm, via Zoom, on Sunday, **February 28**.