

USEFUL RESOURCES

The updates, homework assignments, and useful links for APC can be found on SchoolNova's web page:
http://schoolnova.org/nova/classinfo?class_id=adv_phy_club&sem_id=ay2022

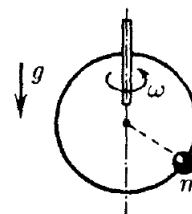
The practical information about the club and contacts can be found on the same web page.

TODAY'S MEETING

Today we started solving problems on Newton's laws. Most of the problems are reassigned, a few new problems are added as well.

REASSIGNED HOMEWORK

- Two bodies of masses m_1 and m_2 are connected by a thread which withstands tension up to T . Bodies are acted upon by forces $F_1 = \alpha t$ and $F_2 = 2\alpha t$, where α is a constant coefficient and t is time. Find the time when the thread will be torn.
- A small bead can move freely along a vertical smooth circle of radius R . The circle is rotating with angular speed ω around a vertical axis going through the center of the circle. Where is the equilibrium point of the bead? Is this equilibrium stable?



- *3. 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 is 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 .
- *4. A constant force starts acting on a body which initially was moving with speed v_0 . After time Δt speed of the body is decreased by half. After one more time interval Δt speed of the body is a quarter of initial speed. Find speed of the body after time $3\Delta t$ since the moment when the force was first applied.

NEW HOMEWORK

- N springs with constants k_1, k_2, \dots, k_N are connected in a series from the ceiling. What effective spring can replace them (in the sense of having the same total stretch when a mass is hung at the bottom)? What if they are connected in parallel (they all have the same equilibrium length and support a long rod which is always kept horizontal)?
- 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.
- 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?

FOR THE NEXT MEETING

IMPORTANT: The next club's meeting is at 3:30pm, via Zoom, on Sunday, **December 4**.