ADVANCED PHYSICS CLUB

NOVEMBER 9, 2025

Useful resources

The updates, homework assignments, and useful links for APC can be found on SchoolNova's web page:
`https://schoolnova.org/classinfo?class_id=2252&sem_id=74`
The practical information about the club and contacts can be found on the same web page.

Today's meeting

Today we solved several problems on kinematics. One remaining problems is reassigned. Our next topic is Newton's laws.

Reassigned Homework

1. A boat is pulled with a rope in such a way that the rope is always under tension. The boat moves with velocity v which makes an angle α with the piece of the rope attached to it. With what speed is the free end of the rope pulled at this moment?

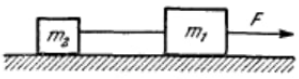
New Homework

1. A train is moving with speed v_0 on a straight, horizontal track. Suddenly, a third of the cars are detached and after some time the speed of detached cars has decreased by half. Find the speed of the rest of the train at this moment assuming that the traction force didn't change. Friction force is proportional to the weight and does not depend on speed.

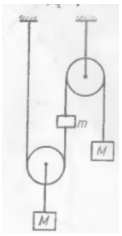
2. Problem 20 from the 2020 F=ma exam B that can be found at the following link:
`https://www.aapt.org/Common/upload/2020-Fma-Exam-B.pdf`

3. Problem 8 from the 2019 F=ma exam B that can be found at the following link:
`https://www.aapt.org/physicsteam/2020/upload/2019_Fma_B.pdf`

4. Two blocks, connected by a thread, are placed on a smooth horizontal surface. Masses of the blocks are m_1 and m_2. The thread breaks under tension larger than a critical one T_{cr}. With what maximal force F can the block m_1 be pulled so the thread does not break?



5. Find the acceleration of the movable pulley in the system shown on the figure. Assume that pulleys are ropes are massless, there is no friction and the ropes are unstretchable.



***6.** 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.

For the next meeting

IMPORTANT: The next club's meeting is at 2:40 pm, in-person, on Sunday, **November 16**.