

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=ay2021](https://schoolnova.org/nova/classinfo?class_id=adv_phy_club&sem_id=ay2021)

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

TODAY'S MEETING

Today we started discussing kinematics with talking about uniform motion. We continue with more problems on kinematics - from simple to more complicated, now on motion with acceleration.

This time again the homework is split in two parts: a simpler part 1 and a more complicated part 2. Solutions of part 1 will be discussed on the next meeting as usual. As for the solutions of part 2 we may not have time to discuss them all. We encourage you to discuss the problems in the Discord channel. Problems marked with a star are in general more difficult than the ones not marked.

HOMEWORK PART 1

1. When entering a rough part of the road, every car reduces its' velocity from  $v_1$  to  $v_2$ . What the minimal distance between the cars should be to avoid collisions? The length of each car is  $l$ .
2. A body moves with constant speed  $v_0$  during time  $t_0$ . After that it begins accelerating uniformly, so that at time  $2t_0$  its' speed is  $2v_0$ . Find distance traveled by the body at time  $t > t_0$ .
3. A speedometer on an old car looks like shown on the figure. The scale is 18 cm long and measures speed from 0 to 180 km/h. Find speed of the speed-indicator arrow when car is moving with acceleration  $2\text{m/s}^2$ .

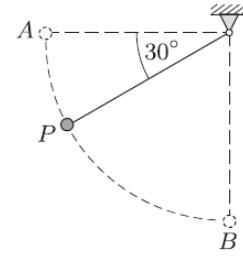


4. After leaving its' source, a particle moves with a constant velocity. After having traveled distance  $L$  it decelerates with a constant acceleration  $a$  until it finally stops. For which initial velocity the overall time of its motion is minimal?
5. A body starts moving from some point A and first moves with a constant acceleration for time  $t_0$ , and then with a constant deceleration with the same absolute value. After what time since the beginning of the motion it will return to the point A?
6. From the same point with the time interval  $\Delta t$  two balls are thrown upwards with the same velocity  $v$ . What is the time from throwing the second ball until they collide? Free fall acceleration  $g$  is given.

HOMEWORK PART 2

- \*7. Train departure is scheduled at 12:00. It's exactly 12:00 on your watch, but the second to the last carriage already starts moving past you, and it goes past you completely in 10 s. The last carriage goes past you in 8 s. The train has departed on time and is moving with a constant acceleration. For how much does your watch fall behind?

- \*8. A simple pendulum is released from rest with its string horizontal. Which of the two arcs,  $AP$  and  $PB$  as defined in the figure, will its bob cover in a shorter time?



FOR THE NEXT MEETING

**IMPORTANT:** The next club's meeting is at 4:00pm, via Zoom, on Sunday, **October 31**.