

ADVANCED PHYSICS CLUB

SEPTEMBER 29, 2019

TODAY'S MEETING

Today we discussed the following problems on kinematics.

1. Athletes run one behind another as one line of length l with velocity v . Towards them runs the coach with velocity $u < v$. Each athlete upon coming up to the coach instantly turns around and starts running in the opposite direction with the same speed v . What will the length of the line of athletes be after they all turn around?
2. Two long sticks intersect at an angle 2α and move in the same plane, each moving perpendicularly to itself with a velocity v . Find the velocity of their intersection point.
3. A billiard table has length a and width b . A ball is launched from the middle of the side b . At what angle to side b should the ball be launched in order to return exactly to the initial point after several collisions?

HOMEWORK

1. It's raining and the rain drops are falling down vertically with velocity u . On the ground a round ball (say, a soccer ball) is rolling horizontally with velocity v . How many times more rain drops will fall on this ball compared to the same one, lying still, during the same amount of time? Would the answer be different, if the ball wasn't round (say, a football)?
- *2. A car is moving away from a long wall with velocity v at an angle α to the wall. At the moment when the distance to the wall is l the driver pushes the car horn for a short time. What distance will the car have traveled by the time the driver hears an echo? The speed of sound in the air is c .

FOR THE NEXT MEETING

The next club's meeting is at 2:40pm, room P-122, on Sunday, **October 6**. We continue to work on kinematics.

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=ay2019

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

For the next meeting you might find the following links useful.

Description of motion:

<http://hyperphysics.phy-astr.gsu.edu/hbase/mot.html>

Velocity and acceleration:

<http://hyperphysics.phy-astr.gsu.edu/hbase/mot.html#motcon>

Trajectories:

<http://230nsc1.phy-astr.gsu.edu/hbase/traj.html>