

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

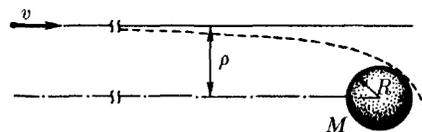
The practical information about the club and contacts can be found on the same web page.

TODAY'S MEETING

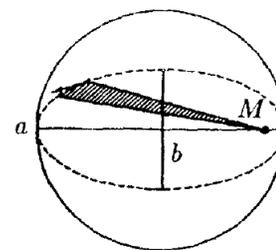
Today's homework concludes our discussion of mechanics with gravity and Kepler laws.

HOMEWORK

1. Find the mass of the Sun knowing that Earth's orbit is circular with the radius $R = 1.5 \cdot 10^8$ km and period of Earth's rotation around the Sun is one year.
2. The two stars in a binary system have mass m_1 and m_2 . The distance between the stars is constant and is equal to R . Find the period of the system's revolution around its center of mass.
3. A rocket at the surface of a planet is provided with the speed exceeding the escape velocity v_e of this planet by 0.5%. When the rocket gets very far away from the planet it has speed v_f . What is the ratio $\frac{v_f}{v_e}$?
4. If the Earth suddenly stopped its' orbital motion, how long would it take it to fall on the Sun? Express your answer in years.
- *5. A space probe approaches a planet of mass M and radius R from far away with a relative speed v . At what impact parameter ρ (for its definition see the figure) the space probe will fly the closest to the planet without crashing?



- *6. A satellite is moving around a planet of mass M in an elliptical orbit with semi-major axis a and semi-minor axis b . Find the area "swept" in unit time by the radius-vector drawn from the planet to the satellite. Find the orbital period of this satellite.



FOR THE NEXT MEETING

IMPORTANT: The next club's meeting is at 3:00pm, via Zoom, on Sunday, **March 13**.