

PHYS 505: Classical Mechanics (graduate) - Fall 2015
Homework #4, due Wednesday October 28, in class

Motion in a central field.

1. Problem 3.10 in Goldstein.
2. Problem 3.11 in Goldstein.
3. A comet moves around the Sun in an ellipse. At certain time it is measured that it has speed v , while its distance from the Sun is r and the direction of the motion makes an angle ϕ with the radius vector from the Sun. Find the eccentricity of the orbit.
4. A particle spirals in a spherically symmetric potential as $r = \alpha\theta^2$, where α is a constant. Determine the potential. *Hint: reading chapter 3.5 in Goldstein might be helpful.*
5. Consider a hard particle of mass m and radius r scattering from an infinitely heavy hard sphere of radius R . Find the differential and total cross sections.