Homework 7: Central forces

Due: Tuesday March 26, 13:00

Policy: Collaboration is allowed, but every student is required to hand in his/her own version of the solutions. Please include your name and student number on the solutions.

Problem 1. (K. & K. 10.4) For what values of n are circular orbits stable with the potential energy $U(r) = -A/r^n$, where $A > 0$?

Problem 2. A Tesla Roadster was launched on February 6 2018 in an orbit around the sun. The aphelion is at a distance of 2.61 AU from the center of the sun, while the Perihelion is at a distance of 0.98 AU from the sun. An AU=149.6×10^9 m and is the approximate distance between the earth and the sun.

1. Determine the velocity of the Tesla Roadster in the aphelion and perihelion.

2. Determine the period of revolution T of the Tesla Roadster.

Some useful constants:
Astronomical Unit (AU): 149.6 10^9 m
Mass Sun: 1.989 10^{30} kg
Gravitational constant: 6.674 10^{-11} m^3 kg^{-1} s^{-2}