

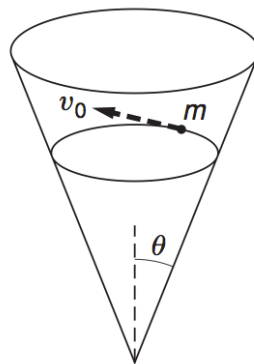
Homework 5: Newton's Laws

Due: Tuesday October 16, 16:00

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. A space station circles around the earth. The astronauts (and everything else in the space station) are weightless. Is a coordinate system fixed to the space station an inertial system? Motivate your answer.

Problem 2. (K & K, Ex. 2.6) A particle of mass m slides without friction on the inside of a cone. The axis of the cone is vertical, and gravity is directed downward. The apex half-angle of the cone is θ , as shown. The path of the particle happens to be a circle in a horizontal plane. The speed of the particle v_0 . Draw a force diagram and find the radius of the circular path in terms of v_0 , g and θ .



Problem 3. (K. & K. Ex. 3.5) A mass m is connected to a vertical revolving axle by two strings of length ℓ , each making an angle of 45° with the axle, as shown. Both the axle and mass are revolving with angular velocity ω . Gravity is directed downward.

1. Draw a force diagram for m .
2. Find the tension in the upper string, T_{up} , and the lower strings, T_{low} .

