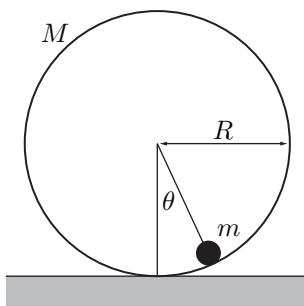


M06M.1 - Point Mass in a Sphere

Problem

A point mass m slides without friction inside of a hollow sphere of mass M and radius R , that rolls without slipping over a horizontal surface.



- Find the Lagrangian of this system. Assume that the velocities of the point mass and the sphere are always in the plane of the paper.
- Consider small amplitude oscillations about the equilibrium position. Express the oscillation frequency in terms of m, M, R and the gravitational constant g .