

PHY422/820: Classical Mechanics

FS 2020

Exam Preparation

December 1, 2020

Problem P19 – Oscillating Hoop with a Pendulum

A massless hoop of Radius R is free to rotate about its center in a vertical plane. A mass m is attached at one point, and a pendulum of length $\sqrt{2}R$ and mass m at another point that is 90° away (see figure). Let α be the angle of the hoop relative to the position shown, and denote by θ the angle of the pendulum with respect to the vertical axis. Find the normal modes of small oscillations.

