

Homework H.6.A

Given: Collar A (having a mass of m) is able to slide along a smooth, fixed horizontal rod, with springs of stiffnesses $2k$ and k attached between the left and right ends of the collar, respectively, and ground, as shown in the figure below. A homogeneous disk (of mass m and radius R) is pinned to collar A at its center O . The disk is able to roll without slipping on a rough, horizontal surface. Let θ measure the rotation of the disk, with $\theta = 0$ when the two springs are unstretched.

Find: For this problem, derive the dynamical equation of motion for the system in terms of the coordinate θ .

