

Problem Set 4

Due February 11, 1999

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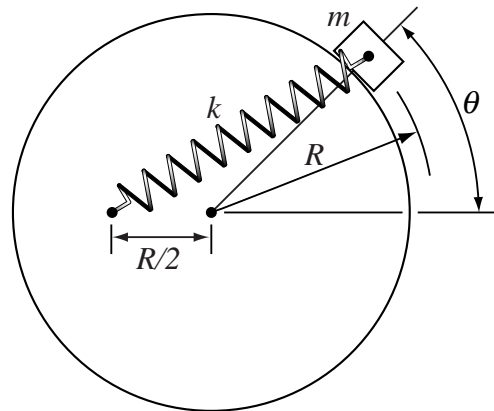
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Problem 1

Express the minimum and maximum safe speeds with respect to skidding of a car traveling on a banked road, in terms of the radius r of the curve, the banking angle θ , and the friction angle ϕ_s between the tires and the pavement.

Problem 2

A mass m is constrained to the surface of a disk of radius R by a spring with spring constant k and unstretched length $R/2$ as shown on the right. Write the equation of motion of the mass if the disk is in the horizontal plane, the coefficient of kinetic friction between the disk and the mass is μ_k , and the mass is given an initial velocity v_0 (in the positive θ direction) when $\theta = 0$.



Problem 3

Block A has mass m , block B has mass $3m$ and they are released from rest. Assuming the cords are long enough, determine the speed of each block 3 seconds after release and the tension in each of the two cables.

