

Write the following text on the front cover of your homework assignment and sign it. If the text is missing, 20 points will be subtracted from your homework grade.

Honor Pledge for Graded Assignments

"I affirm that I have not given or received any unauthorized help on this assignment, and that this work is my own."

Signature _____

Problem 1 (25 points)

Show that none of the principal moments of inertia can exceed the sum of the other two.

Problem 2 (25 points)

A uniform rod of length b stands vertically upright on a rough floor and then tips over. What is the rod's angular velocity when it hits the floor?

Problem 3 (25 points)

Find the frequency of small oscillations for a thin homogeneous plate if the motion takes place in the plane of the plate and if the plate has the shape of an equilateral triangle and is suspended

1. from the midpoint of one side.
2. from one apex.

Problem 4 (25 points)

A physical or compound pendulum is a rigid body, shown in Fig. 1, oscillates due to its own weight about a horizontal axis that does not pass through the center of mass of the body.

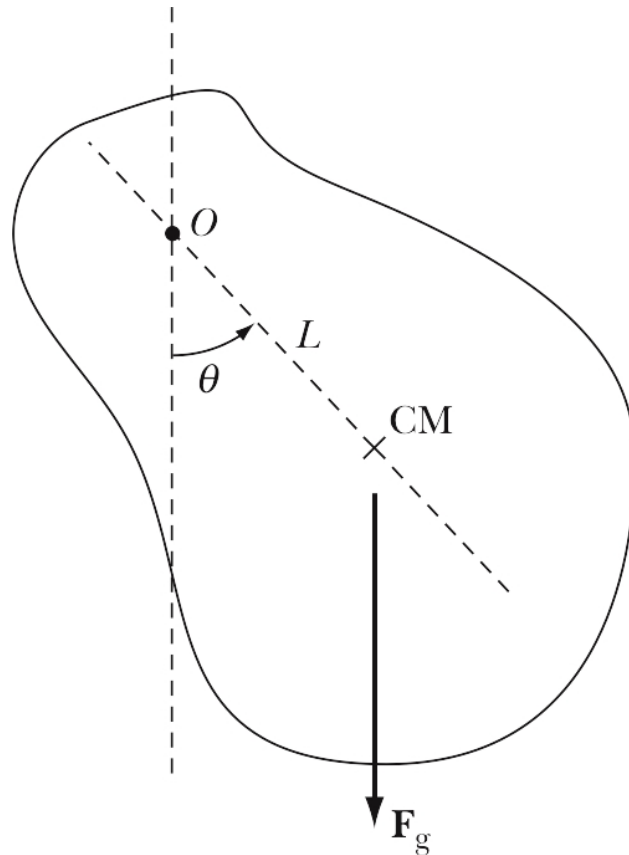


Figure 1: A physical pendulum.

Assume the pendulum of mass M is released from rest from an angle θ_0 . Determine the angular velocity ω as function of the angle θ .

Note: do not assume that the angles are small.