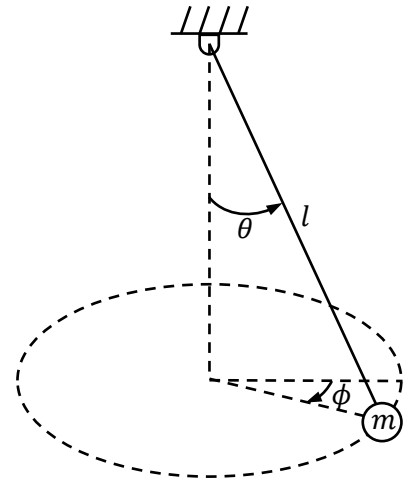---

1. For the spherical pendulum shown, use Lagrange's method to find (1) the equations of motion in terms of θ and ϕ, and (2) the tension in the cable. You may use the constraint relaxation method or the method of Lagrange multipliers.

2. Complete Problem 11.35 from the text, but do not assume Ω is constant. Instead, let ϕ be the angle of rotation of the vertical shaft and arm. The arm of length a is welded to the vertical shaft, and the arm of length L is free to swing without friction about B. Assume the vertical shaft is slender, and the arm of length a is slender and of mass m. Find the equations of motion in terms of ϕ and θ.