University of California, Berkeley
Physics 105 Fall 2006 Section 2 (*Strovink*)

ASSIGNMENT 8

Reading:
SCCM 9.1-9.2, 9.4-9.8, 10.1
Taylor 9.1-9.10, 10.1-10.7

1. Taylor Problem 9.31.

2. Taylor Problem 9.34.

3. At the North Pole there is a hockey arena with frictionless ice, formed by flooding a rink with water that freezes slowly, so that each patch of ice is perpendicular to a plumb bob hung immediately above it.

(**a.**)
If a puck is shot slowly enough to stay in the rink, prove that a fan in the stands will see it traveling in a circle, making *two* revolutions per day.

(**b.**)
As viewed not in the frame of the arena, but instead in the inertial reference frame of the fixed stars, can the puck remain stationary while the earth rotates underneath it? If you answer "no", what force would make the puck move? If you answer "yes", how many revolutions per day would the fan see?

4. Consider a thin door of width w, height $2w$, and mass m. In the body frame, its two hinges, one at the top and one at the bottom, lie on the z axis, and the door itself lies in the xz plane. About the space z' axis, which coincides with the body z axis, the door rotates with angular freqency ω.

In the body axes, calculate the door's (vector) angular momentum about its lower hinge.

5. Taylor Problem 10.28.

6. Taylor Problem 10.33.

7. Taylor Problem 10.38.