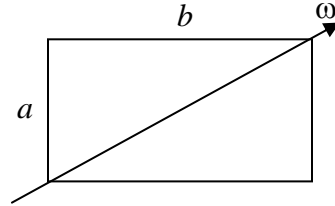


Problem Set 10 due Wednesday, December 13 at 5 PM

1. Problem 11:10
2. Consider a thin rectangular plate with mass m and sides a and b . The plate rotates with a constant angular velocity ω around its diagonal. Calculate the torque that has to be applied to the plate to keep it spinning with constant angular velocity. Indicate the direction of the torque relative to the plate. Consider what happens when $a = b$.



3. A bicyclist moving with velocity v is rounding a curve with radius R . The mass of the bicyclist plus the bicycle frame is equal to M and the mass of each bicycle wheel is equal to m . The radius of the wheel is a and you can assume that all mass of the wheel is concentrated around the rim. The center of mass of the bicycle + bicyclist is at a height h . By what angle does the bicycle lean into the curve?

The following problem should be worked out independently:

4. Two strings of equal length ($=L/2$) and different mass densities (ρ_1 and ρ_2) are attached to each other and stretched between two fixed walls with tension τ . What are the frequencies of the normal modes of the system?

