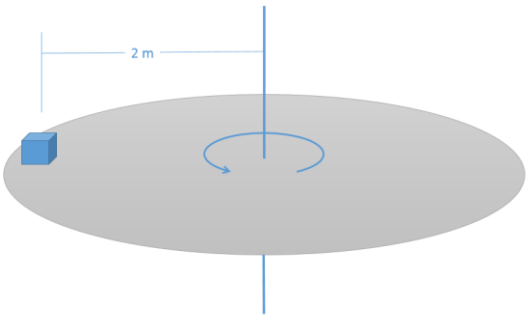
Chapter 12 Homework Problems

Problem 12.1

A 1 kg block sits on a rotating table as shown below. If the static coefficient of friction is assumed to be .4, what is the maximum angular velocity ($\dot{\theta}$) that can be achieved before the block begins to slip?

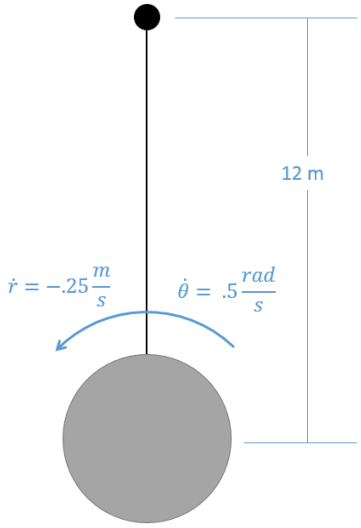



(Solution: $\dot{\theta} = 1.4\frac{rad}{s}$)

Problem 12.2

A 5 kg instrument is held via a cable to a space station. The instrument and space station are both rotating at a rate of .5 rad/s when the space station begins retracting the cable at a constant rate of .25 m/s.

a) What is the tension in the cable at this instant?
b) What will the angular acceleration of the cable be ($\ddot{\theta}$)?
   (Hint: there are no forces in the theta direction)




(Solution: T = 15 N, $\ddot{\theta} = .0208\frac{rad}{s^2}$)