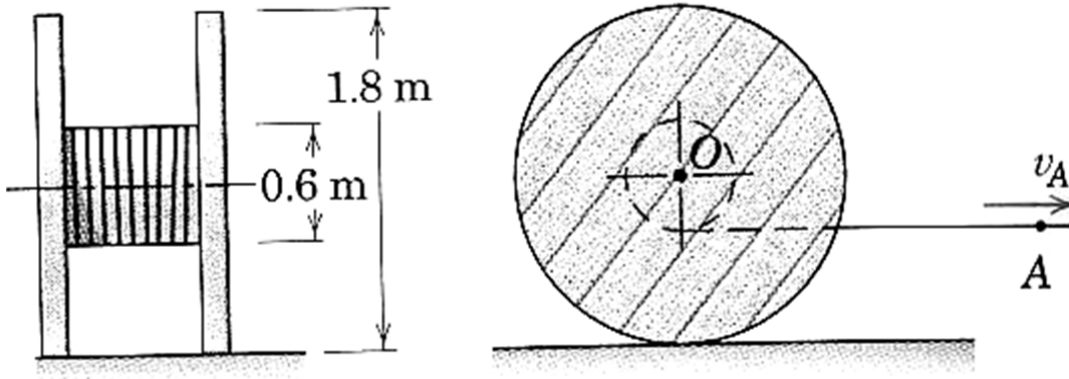


2.003/1.053 Dynamics and Controls I
Spring 2007
Problem Set 4

Issued on Monday, March 5th
Due in lecture on Monday, March 12th

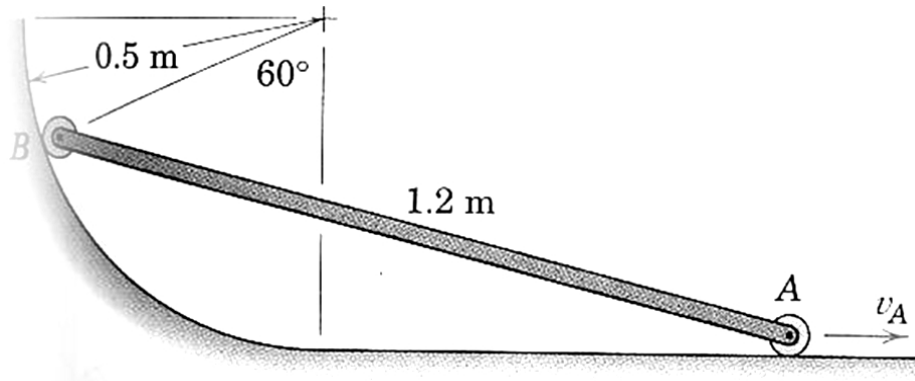
1 Cable reel

The telephone-cable reel rolls without slipping on the horizontal surface. If point A on the cable has a velocity $v_A = 0.8$ m/s to the right, compute the velocity of the center O and the angular velocity ω of the reel. (Be careful not to make the mistake of assuming that the reel rolls to the left.)



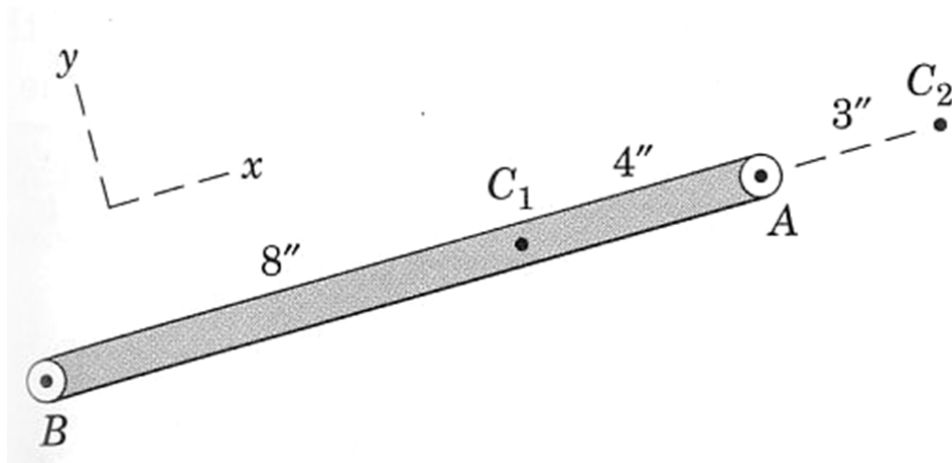
2 Sliding bar

At the instant represented, the velocity of point A of the 1.2-m bar is 3 m/s to the right. Determine the speed v_B of point B and the angular velocity ω of the bar. The diameter of the small end wheels may be neglected.



3 Instant centers

The bar AB has a clockwise angular velocity of 5 rad/s . Construct and determine the vector velocity of each end if the instantaneous center of zero velocity is (a) at C_1 and (b) at C_2 .



4 Plunger and roller

The motion of the roller A against its restraining spring is controlled by the downward motion of the plunger E . For an interval of motion the velocity of E is $v = 0.2$ m/s. Determine the velocity of A when θ becomes 90° . Use the method of instant centers.

