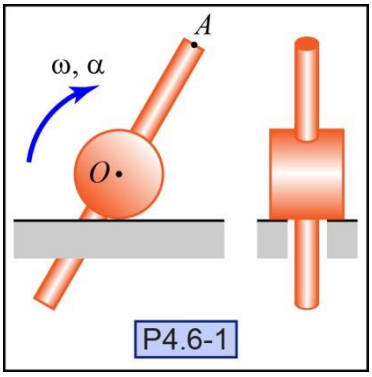
P4.6-1) The wheel with a rigidly attached bar shown, rolls without slip. Determine the velocity and acceleration of the wheel center (Point O) and the end of the bar (Point A) when the bar is parallel to the rolling surface. The radius of the wheel is 0.25 meters and the total length of the bar from end to end is 1 meter. At the instant the bar is horizontal, the angular velocity and angular acceleration directions are clockwise and have values of 4 rad/s and 5 rad/s^2, respectively.



Given:

Find:

Solution:

Figure

Draw a figure of the wheel in the position indicated in the problem statement. Include a coordinate system.

Wheel center

Calculate the velocity and acceleration of the wheel's center.

$\mathbf{v}_o$ = _____

$\mathbf{a}_o$ = _____

Velocity

Use the relative velocity equation to determine the velocity of point A.

$\mathbf{v}_A$ = _____

Acceleration

Use the relative acceleration equation to determine the acceleration of point A.

$\mathbf{a}_A$ = _____