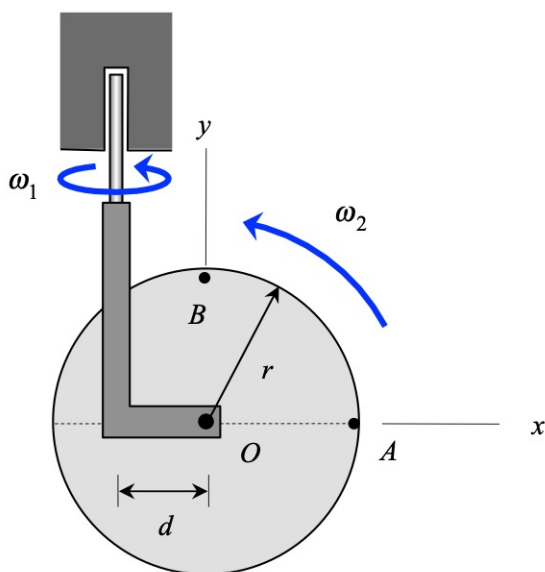


Homework H.3.G

Given: A caster wheel is supported by an L-shaped bracket. The bracket is rotating about a fixed vertical axis with a constant rate of ω_1 . The wheel rotates with respect to the bracket with a constant rate of ω_2 .

Find: For this problem, determine:

1. The angular velocity and angular acceleration of the wheel. Write your answers as vectors.
2. The acceleration of point A on the wheel at the instant shown when A is immediately to the right of the center O of the wheel.
3. The acceleration of point B on the wheel at the instant shown when B is immediately above the center O of the wheel.

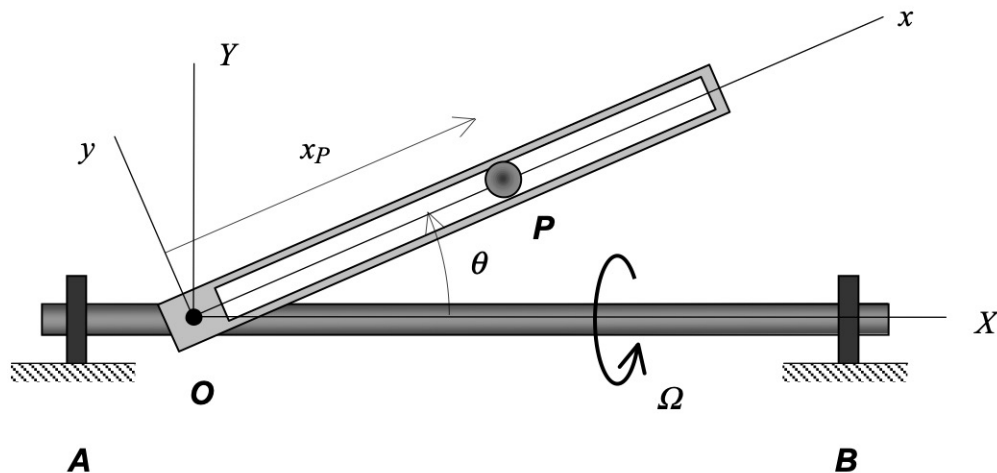


Use the following parameters in your analysis: $\omega_1 = 2 \text{ rad/s}$, $\omega_2 = 5 \text{ rad/s}$, $r = 200 \text{ mm}$ and $d = 100 \text{ mm}$.

Homework H.3.H

Given: Shaft AB rotates about a fixed axis with a constant rotational speed of Ω . A tube is hinged on shaft AB with the angle θ between the tube and shaft increasing at a constant rate of $\dot{\theta}$. Particle P moves within the tube at a constant rate of \dot{x}_P relative to the tube. The XYZ coordinate system is fixed with the X -axis aligned with the fixed rotation axis of the shaft AB. The xyz coordinate system is attached to the tube with the x -axis aligned with the tube for all time. For the position shown below, the z - and Z -axes are aligned.

Find: For the position shown, determine the angular velocity and angular acceleration of the tube. Write your answers as vectors in terms of their xyz components.



Use the following parameters in your analysis: $\Omega = 3 \text{ rad/s}$, $\theta = 60^\circ$, $\dot{\theta} = -4 \text{ rad/s}$, $x_P = 2 \text{ m}$ and $\dot{x}_P = 0$.