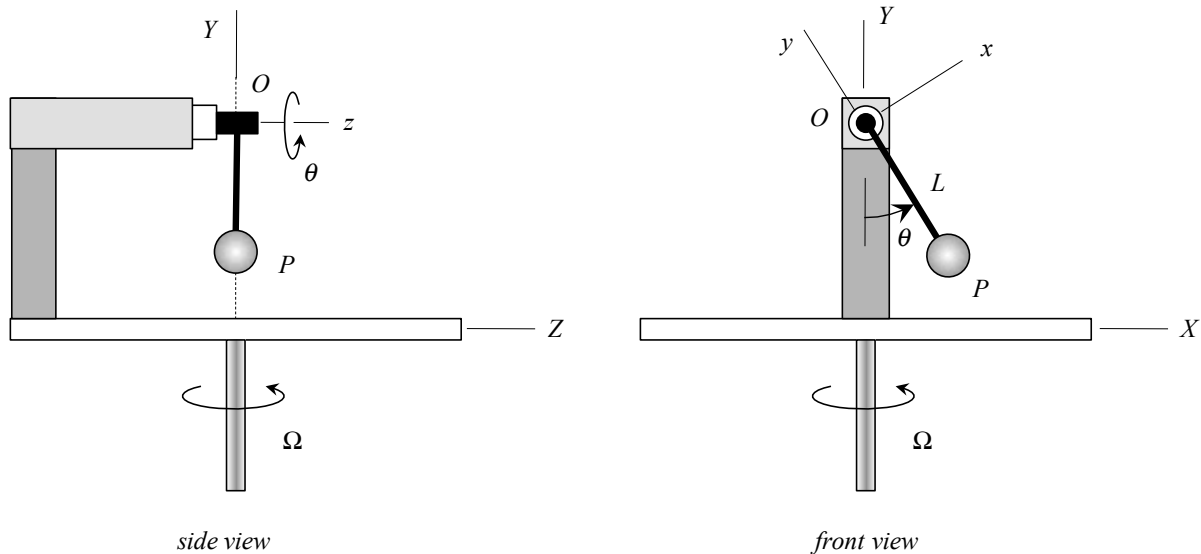


Homework H.3.J

Given: A turntable is rotating at a constant rate of Ω about a fixed vertical axis. An arm attached to the turntable supports a horizontal shaft about which the pendulum OP rotates. Point O is directly about the vertical shaft about which the turntable rotates. The angle between OP and the vertical is known by the following function of time: $\theta(t) = \theta_0 \sin bt$, where θ_0 and b are constants. A set of xyz axis are attached to OP with the y -axis aligned with OP (as shown in the figure) and the z -axis aligned with the rotation axis of the pendulum about the support arm.

Find: For this problem:

- Determine the angular velocity and angular acceleration of the pendulum OP.
- Determine the acceleration of P.



Use the following parameters in your analysis: $t = 0$ s, $\theta_0 = 0.5$ rad, $b = 4$ s⁻¹, $L = 2$ ft, and $\Omega = 3$ rad/s.