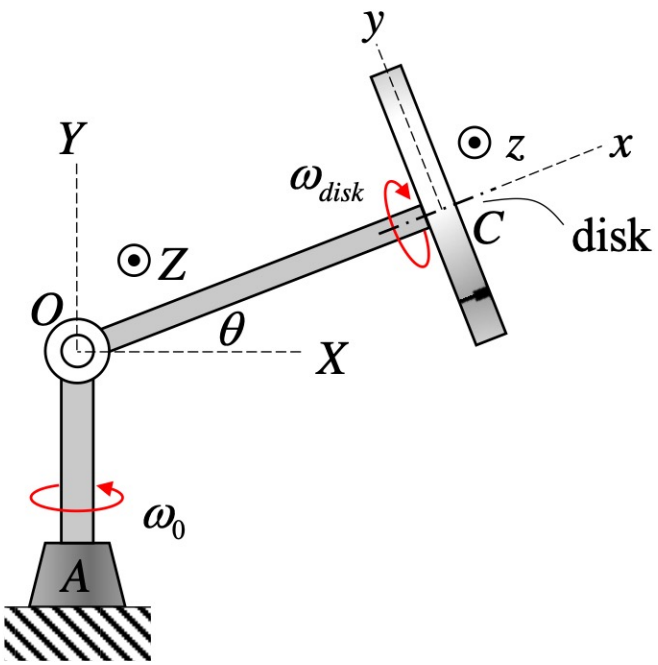
Homework H.3.F

Given: A disk and shaft OC are mounted in a clevis that rotates about a fixed vertical axis at a rate of ω_0. The shaft and disk rotate with respect to the clevis with a rate of ω_{disk} in the direction shown below, with the angle θ held constant. The XYZ coordinate system is fixed with the Y-axis aligned with the fixed rotation axis of the clevis. The xyz coordinate system is attached to the disk with the x-axis aligned with OC for all time. For the position shown below, the z- and Z-axes are aligned.

Find: For the position shown:

(a) Determine the angular velocity of the disk. Write your answer as a vector in terms of its xyz components.

(b) Determine the angular acceleration of the disk. Write your answer as a vector in terms of its xyz components.



Use the following parameters in your analysis: $\theta = 36.87°$, $\omega_0 = 4$ rad/s = constant and $\omega_{disk} = 6$ rad/s = constant.