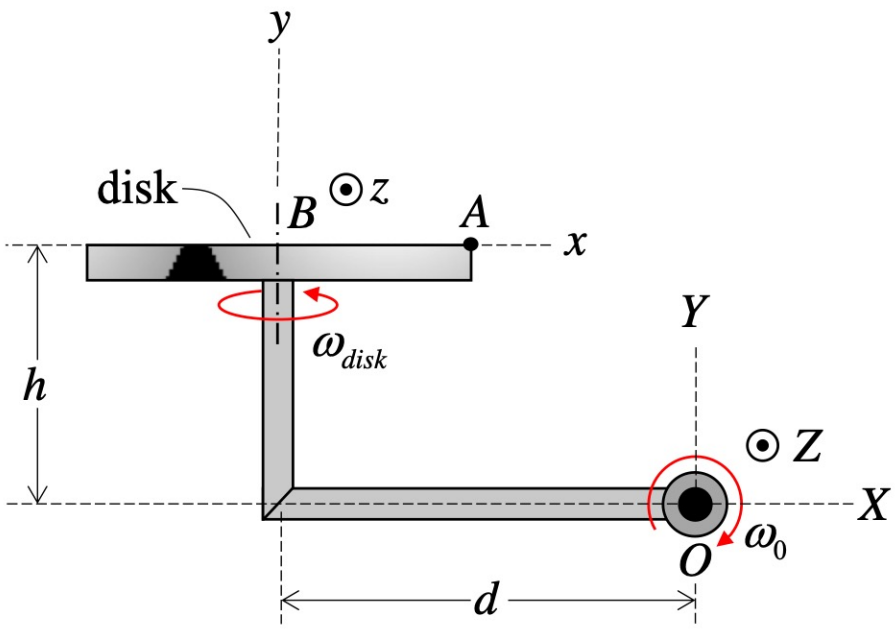
Homework H.3.G

Given: Arm OB rotates about a fixed axis with a constant rate of ω_0. A disk of radius R rotates about its central axis with a constant rate of ω_{disk} relative to the arm OB. The XYZ coordinate system is fixed with the Z-axis aligned with the fixed rotation axis of OB. The xyz coordinate system is attached to the disk with the y-axis aligned with the upper part of the arm for all time. For the position shown below, the xyz axes are aligned with the XYZ axes.

Find: For the position shown:

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

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



Use the following parameters in your analysis: $\omega_0 = 4$ rad/s, $\omega_{disk} = 3$ rad/s, $d = 18$ cm, $h = 10$ cm and $R = 6$ cm.