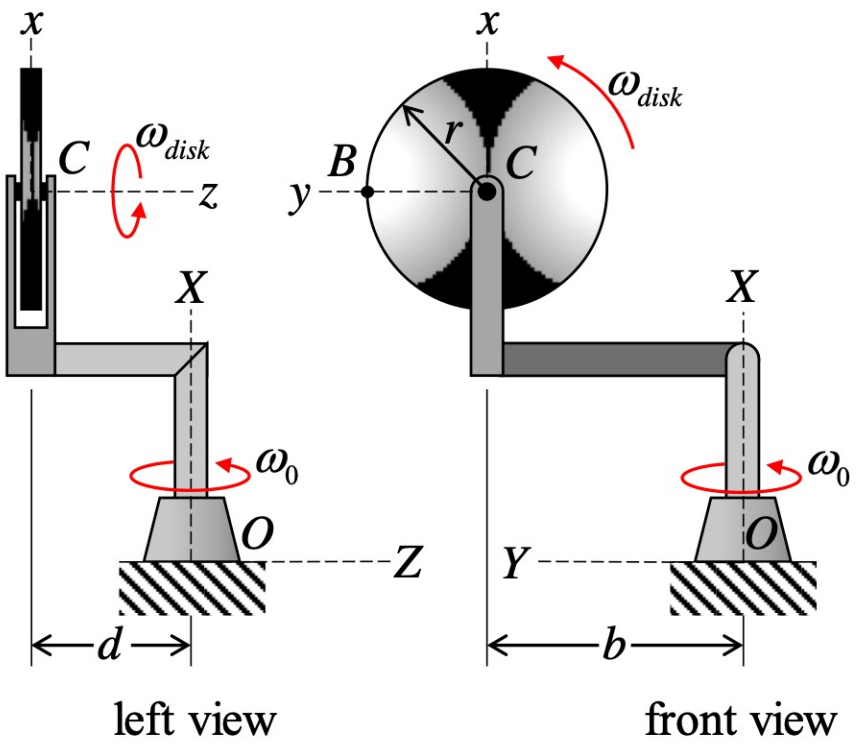
Homework H.3.G

Given: The yoke shown below rotates about a fixed axis with a constant rate of ω_0. A disk, of radius r, rotates about its center C at a constant rate of ω_{disk} relative to yoke. The XYZ coordinate system is fixed with the X-axis aligned with the fixed rotation axis of the yoke. The xyz coordinate system is attached to the disk with the z-axis aligned with the rotation axis of the disk 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 velocity and angular acceleration of the disk. Write your answers as vectors in terms of their xyz components.

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



Use the following parameters in your analysis: $\omega_0 = 3$ rad/s, $\omega_{disk} = 2$ rad/s, $d = 0.5$ m, $b = 1.5$ m and $r = 0.25$ m.