

To just find α (as required) there is a quicker way...

(F10)

TAKE MOMENTS ABOUT A

$$\sum M_A = I_G \alpha - m a_G d \quad (\text{get sign from R.H.R.})$$

$$- (100)(0.7) + m g (0.5) = I_G \alpha - m a_G (0.5)$$

$$a_G = -0.5 \alpha \text{ as before}$$

$$\Rightarrow -70 + (8)(9.81)(0.5) = (8)(k_g^2) \alpha + (8)(0.5) \alpha (0.5)$$

$$\Rightarrow \underline{\alpha = -10.3 \text{ rad s}^{-2}}$$

Same as before

note sign $\Rightarrow \alpha$ is in direction opposite to the one we sketched on Diagram
i.e. α is actually clockwise $\curvearrowright$