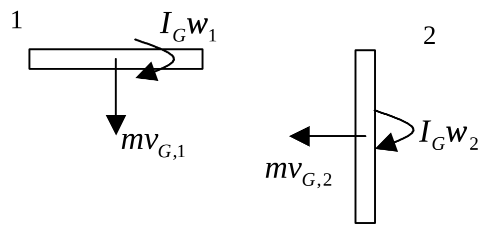
We left off last time needing to find the angular velocity and angular acceleration of the bar in the vertical position. I proposed that we could get these terms using COE(FT) and COAM(RF) respectively. Let's see if I was right...

Angular Velocity via COE(FT)



Kinetics (COE)

$$\Delta E_{sys} = W = 0$$

$$\therefore E_{K,1} + E_{G,1} + E_{S,1} = E_{K,2} + E_{G,2} + E_{S,2}$$

where

$$E_{K,1} = 0 \qquad E_{K,2} = \frac{1}{2} m v_{G,2}^2 + \frac{1}{2} I_G w_2^2$$

$$E_{G,1} = 0 \qquad E_{G,2} = -mg\frac{L}{2}$$

$$E_{S,1} = 0 \qquad E_{S,2} = 0$$

Kinematics

$$v_{G,2} = w_2 r_{G/A} = w_2 \frac{L}{2}$$

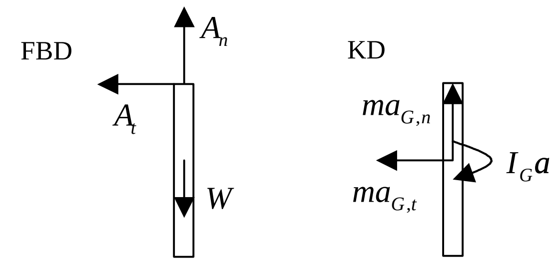
Other

$$I_G = \frac{1}{12} mL^2$$

Solving

$$\boxed{w_2 = \frac{3g}{L}}$$

Angular Acceleration via COAM(RF)



Kinetics (COAM @ A)

$$0 = ma_{G,t}\frac{L}{2} + I_G a$$

Kinematics

$$a_{G,t} = a r_{G/A} = a\frac{L}{2}$$

Other

$$I_G = \frac{1}{12} mL^2$$

$$W = mg$$

Solving

$$\boxed{a = 0}$$