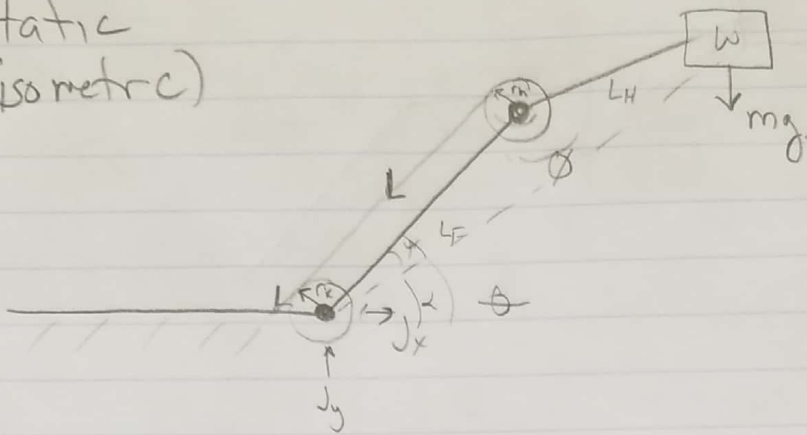


Static  
(isometric)



$\theta$  = knee angle  
 $\phi$  = hip angle  
 $\alpha$  = COM angle

$$L_m = \sqrt{L_F^2 + L_H^2 - 2L_FL_H \cos \phi}$$

$$\frac{L_H}{\sin \psi} = \frac{L_m}{\sin \phi} \quad \sin \psi = \sin \phi \frac{L_H}{L_m}$$

$$\psi = \sin^{-1} \left( \sin(\phi) \cdot \frac{L_H}{L_m} \right)$$

$$\alpha = \theta - \psi$$

$$M_w = L_m \cos(\alpha) \quad \text{mass moment arm}$$

$$\Sigma M = 0 = F \cdot r_k - mg \cdot L_m \cos \alpha$$

$$\Sigma F_x = 0 = J_x - F \cos \theta$$

$$\Sigma F_y = 0 = J_y - F \sin \theta - mg$$