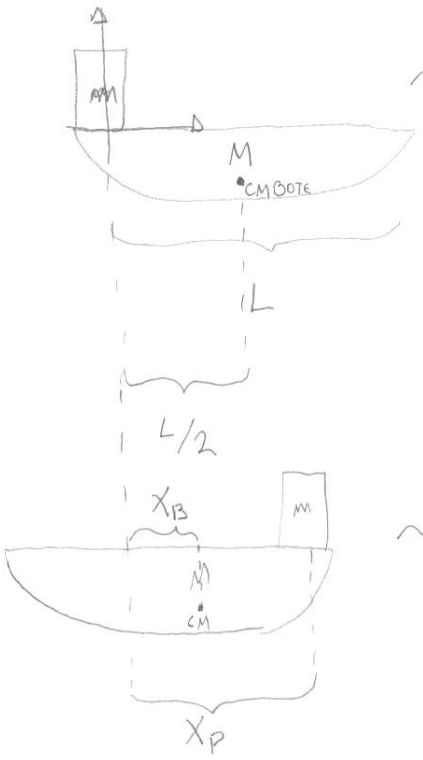
# Aux 2 Determine desplazamiento del bote




$$\rightsquigarrow X_{CM} = \frac{m \cdot 0 + M \cdot (L/2)}{M+m} = \frac{ML}{2(M+m)}$$

$$\rightsquigarrow X_{CM} = \frac{m \cdot X_P + M X_B}{M+m} \quad \text{y} \quad X_P - X_B = \frac{L}{2}$$

$$\Downarrow$$

$$X_P = X_B + \frac{L}{2}$$

$$\Rightarrow X_{CM} = \frac{m\left(X_B + \frac{L}{2}\right) + M X_B}{(M+m)} = \frac{ML}{2(M+m)}$$

$$m X_B + m\frac{L}{2} + M X_B = M\frac{L}{2}$$

$$\boxed{X_B = \frac{\frac{L}{2}(M-m)}{(M+m)}}$$

$$\Rightarrow \text{Desplazamiento (del CM del bote)} = X_{OB} - X_{FB} = \frac{L}{2} - \frac{L}{2}\frac{(M-m)}{(M+m)}$$

$$= \frac{L}{2}\left(1 - \frac{(M-m)}{M+m}\right)$$

$$= \frac{L}{2}\left(\frac{M+m-M+m}{M+m}\right)$$

$$= \frac{L}{2}\left(\frac{2m}{M+m}\right) = L\left(\frac{m}{M+m}\right)$$