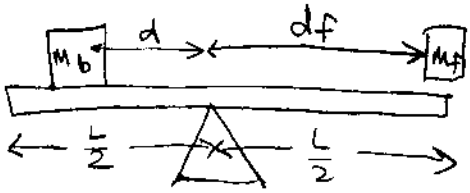
Written HW solutions week 10



Define d_f as Frank's distance.

Torques about pivot: $\tau_b = (m_b g)(d)$

$\tau_f = -(m_f g)(d_f)$

To be equally balanced, $\tau_b + \tau_f = 0$:

$$m_b g d = m_f g d_f$$

so as m_f decreases, d_f must increase. But the see-saw is only L in length, so max d_f is $\frac{L}{2}$:

$$m_b g d = m_f g \frac{L}{2}$$

(A) solve for m_f: minimum $m_f = \frac{2 m_b d}{L}$

(B) Take previous equation and solve for d instead:

$$d = \frac{L}{2} \cdot \frac{m_f}{m_b}$$