



$$p_i = -(m_A + m_B)v_i \quad p_f = -m_B v_B + m_A v_A$$

$$v_A = \frac{-(m_A + m_B)v_i + m_B v_B}{m_A}$$

Now, we want Al to catch up to wrench in $t \leq 1000$

$$\text{position of Al} = -0.70 \text{ m} + v_A(t - 10)$$

$$\text{position of wrench} = 0 + (2.93 \frac{\text{m}}{\text{s}})t$$

So

$$-0.70 \text{ m} + v_A(t - 10) \geq (2.93 \frac{\text{m}}{\text{s}})t \quad @ t = 1000$$

$$-0.70 \text{ m} + v_A(990) \geq (2.93 \frac{\text{m}}{\text{s}})(1000)$$

$$v_A \geq \frac{2930 \text{ m} + 0.70 \text{ m}}{990} \geq 2.96 \frac{\text{m}}{\text{s}}$$