$W_A = 1.4^{LB}$, $K_A = 0.75^{IN} = 0.0625^{ft}$, $r_A = 0.9^{IN} = 0.075^{ft}$

$W_B = 3.5^{LB}$, $K_B = 1.25^{IN} = 0.1042^{ft}$, $r_B = 1.5^{IN} = 0.125^{ft}$

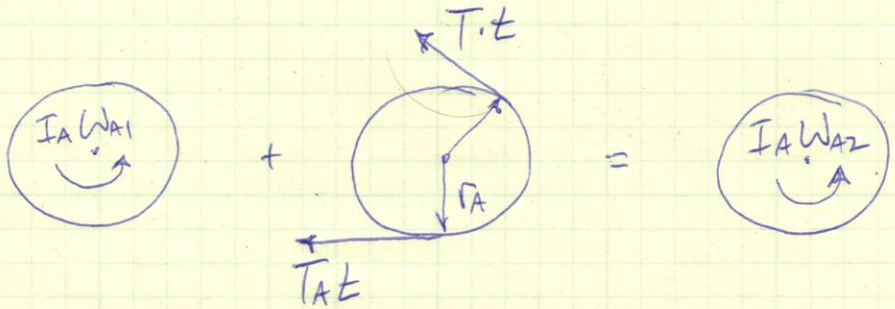
$T_A = 0.75^{LB}$, $W_{A1} = 0$, $W_{B1} = 0$

FIND T_B FOR $v = 10\ \frac{ft}{s}$ AFTER $t = 0.24^{s}$,

FIND TENSION BETWEEN DRUMS.

PRINCIPLE OF IMPULSE AND MOMENTUM:

DRUM A:



ANG. MOM. ABOUT A ↻:

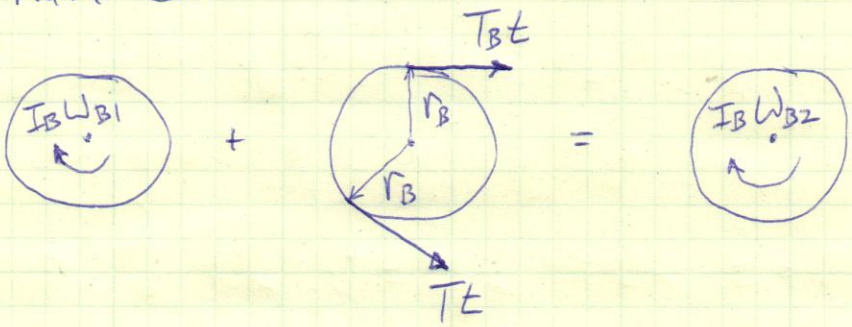
$I_A \cancel{W_{A1}}^{0} + Tt \cdot r_A - T_A t \cdot r_A = I_A W_{A2}$

$$Tt = T_A t + \frac{I_A W_{A2}}{r_A}$$

$$I_A = m_A K_A^2$$

$$\boxed{Tt = T_A t + \frac{m_A K_A^2 W_{A2}}{r_A}} \quad (1)$$

DRUM B:



ANG. MOM. ABOUT B $\circlearrowleft$:

$$-I_B \cancel{\omega_{B1}}^{0} + T t \cdot r_B - T_B t \cdot r_B = -I_B \omega_{B2}$$

$$T t = T_B t - \frac{I_B}{r_B} \omega_{B2}$$

$$I_B = m_B k_B^2$$

$$\boxed{T t = T_B t - \frac{m_B k_B^2 \omega_{B2}}{r_B}} \quad (2)$$

SET (1) = (2):

$$T_A t + \frac{m_A k_A^2 \omega_{A2}}{r_A} = T_B t - \frac{m_B k_B^2 \omega_{B2}}{r_B}$$

$$T_B = T_A + \frac{1}{t}\left(\frac{m_A k_A^2 \omega_{A2}}{r_A} + \frac{m_B k_B^2 \omega_{B2}}{r_B}\right)$$

KINEMATICS: FOR NO SLIPPING,

$$v = r_A \omega_{A2} = r_B \omega_{B2}$$

$$\omega_{A2} = \frac{v}{r_A}, \quad \omega_{B2} = \frac{v}{r_B}$$

$$T_B = T_A + \frac{1}{t}\left[\left(\frac{m_A K_A^2}{r_A}\right)\cdot\left(\frac{v}{r_A}\right) + \left(\frac{m_B K_B^2}{r_B}\right)\cdot\left(\frac{v}{r_B}\right)\right]$$

$$T_B = T_A + \frac{v}{t}\left[m_A\left(\frac{K_A}{r_A}\right)^2 + m_B\left(\frac{K_B}{r_B}\right)^2\right]$$

$$W = mg, \quad m = \frac{W}{g}$$

$$T_B = T_A + \frac{v}{gt}\left[W_A\left(\frac{K_A}{r_A}\right)^2 + W_B\left(\frac{K_B}{r_B}\right)^2\right]$$

$$T_B = (0.75^{LB}) + \frac{\left(10\frac{ft}{s}\right)}{\left(32.2\frac{ft}{s^2}\right)(0.24s)}\cdot\left[(1.4^{LB})\left(\frac{0.0625}{0.075}\right)^2 + (3.5)\left(\frac{0.1042}{0.125}\right)^2\right]$$

$$\boxed{T_B = 5.155^{LB}}$$

$$T = T_A + \frac{m_A K_A^2 W_{A2}}{t r_A} = T_A + \frac{\left(\frac{W_A}{g}\right)K_A^2\left(\frac{v}{r_A}\right)}{t r_A}$$

$$T = T_A + \frac{W_A v}{gt}\cdot\left(\frac{K_A}{r_A}\right)^2$$

$$T = (0.75^{LB}) + \frac{(1.4)(10)}{(32.2)(0.24)}\cdot\left(\frac{0.0625}{0.075}\right)^2$$

$$\boxed{T = 2.008^{LB}}$$