

$$\begin{aligned}\Sigma \tau &= T r_p - \tau_f = I \alpha \\ mg - T &= m a \\ \alpha &= a / r_p\end{aligned}$$

constant speed :  $a=0; \alpha=0$

$$\tau_f = m_f g a$$

finding  $I$  :

$$\begin{aligned}T &= mg - m a \\ T r_p - \tau_f &= I a / r_p \\ I &= (T r_p - \tau_f) * r_p / a\end{aligned}$$

