Motor Specing Calculations

$$\Sigma \tau = I\ddot{\theta} = \tau_m - B\dot{\theta} - C - D(\theta)$$

$$\tau_m = \underbrace{I\ddot{\theta}}_{\text{inertial}} + \underbrace{B\dot{\theta}}_{\text{dissipative}} + \underbrace{C}_{\text{dissipative}} + \underbrace{D(\theta)}_{\text{positional}}$$

B damping

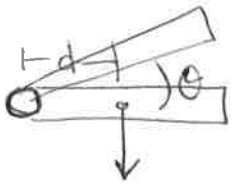
C coulomb friction experimentally found

inertial:

J_m from motor datasheet

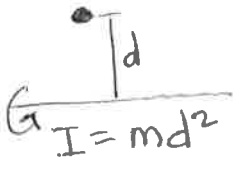
I from stuff

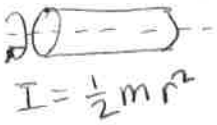
positional:

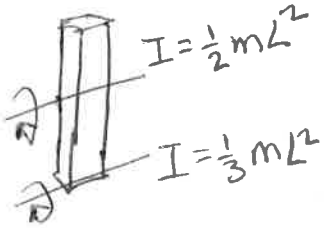


$\tau = mgd\cos\theta$

$\tau = mgr$

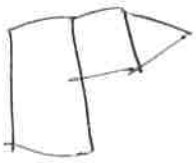


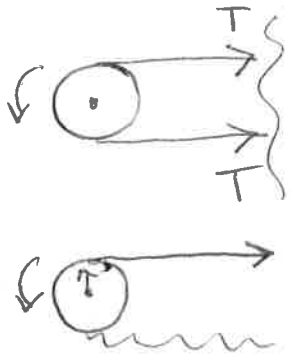




PAT: $I = I_{cg} + md^2$

$I = \int_m r^2 dm$





$\tau_F = Tr$

worst case friction

(if it's worse than this, you have bigger problems)

you choose $\ddot{\theta}$

by choosing $\frac{\dot{\theta}}{\Delta t} = \frac{V}{r(\Delta t)}$