Feedback Motion Planning for the MIP

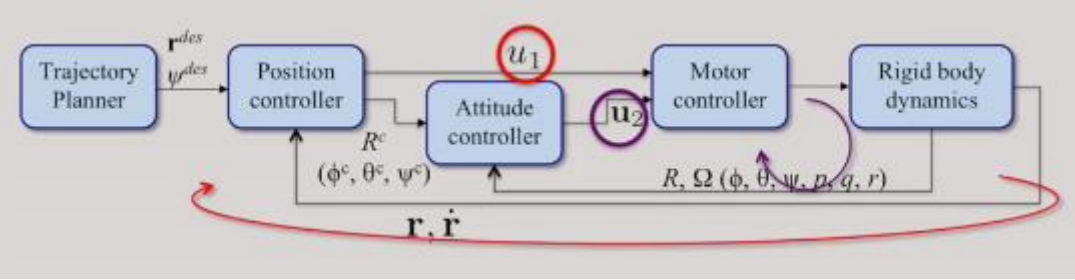
MIP track, week 6

Cascade Control Strategy

- Recall from week 4: $x = (\theta + \phi)r$
- Recall from week 5: $\ddot{\phi}|_{\phi=0,\dot{\phi}=0} = \alpha\tau$

- Also notice (try yourself) $\ddot{\theta}|_{\phi=0,\dot{\phi}=0} = \beta \sin\phi$

- Approximately a cascade system
- Think of body angle as *input* to control position
- Should sound similar to "inner" and "outer" loops in quadrotor position control system



MIP Position Control

- The isolated $\ddot{\theta}|_{\phi=0,\dot{\phi}=0} = \beta \sin\phi$ is almost a double integrator
- Use a PD controller
- Set desired body angle $\phi_{\text{des}} = u_{\text{PD}}(x, \dot{x})$
- And use ϕ_{des} as goal for balance controller