$$\theta = \frac{s\left(\frac{1}{J}\right)T + \left(\frac{1}{J}\right)K_p K_{pp}(K_i + s)\theta_r}{s^3 + s^2\left(\frac{1}{J}\right)\left(J_m K_i + K_p\right) + s\left(\frac{1}{J}\right)\left(K_i K_p + K_p K_{pp}\right) + \left(\frac{1}{J}\right)\left(K_i K_P K_{pp}\right)}$$

If treat $K = K_i = K_p$, then

$$\theta = \frac{s\left(\frac{1}{J}\right)T + \left(\frac{1}{J}\right)K K_{pp}(K + s)\theta_r}{s^3 + s^2\left(\frac{1}{J}\right)(J_m K + K) + s\left(\frac{1}{J}\right)\left(K^2 + K K_{pp}\right) + \left(\frac{1}{J}\right)\left(K^2 K_{pp}\right)}$$

Bring out inner loop, obtain

$$\theta = \frac{1}{s}K_{pp}(\theta_r - \theta)$$

$$\theta\left(s + K_{pp}\right) = K_{pp}\theta_r$$

$$\theta = \frac{K_{pp}\theta}{s + K_{pp}}$$

Time constant for angular position,

$$\tau_{theta} = \frac{1}{K_{pp}}$$

Go ham with this value, limited by motor response.