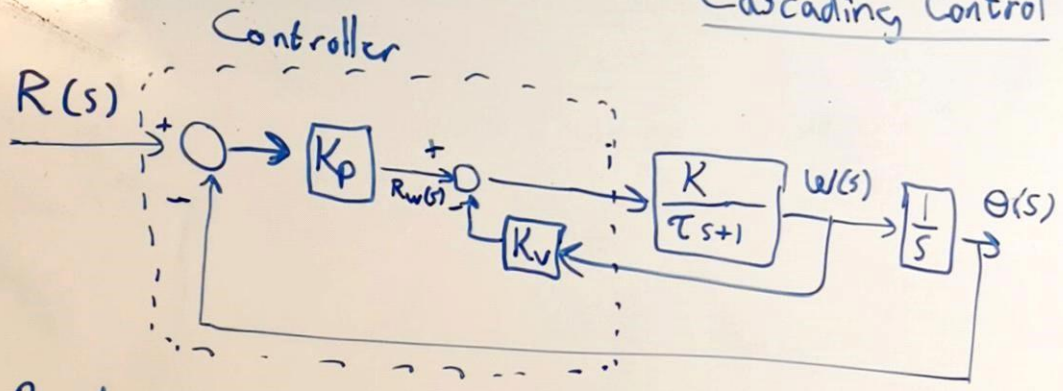
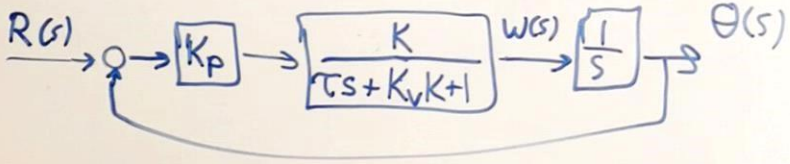
Cascading Control



1) Vis 2. ordens i closed loop

inner:

$$\frac{w(s)}{R_w(s)} = \frac{\frac{K}{\tau s+1}}{1+K_v\frac{K}{\tau s+1}} = \frac{K}{\tau s+1+K_vK} \Rightarrow$$



$$\frac{\theta(s)}{R(s)} = \frac{K_p\frac{K}{\tau s+K_vK+1}\cdot\frac{1}{s}}{1+K_p\frac{K}{\tau s+K_vK+1}\cdot\frac{1}{s}} = \frac{K_pK}{\tau s^2+(K_vK+1)s+K_pK}$$

2) Show overshoot depends on K_v

$$2\zeta\omega_n = \frac{K_vK+1}{\tau}$$

$M_p = e^{-\pi\zeta/\sqrt{1-\zeta^2}}$ depends on K_v...

3) Show bandwidth only depends on K_p

$\omega_n^2 = \frac{K_pK}{\tau}$ depends only on K_p