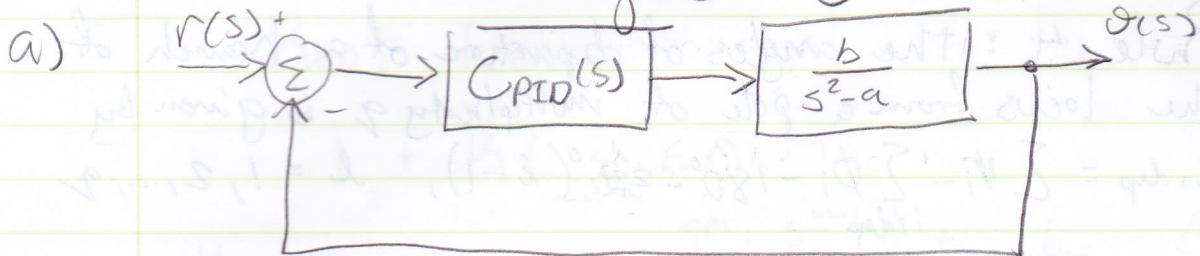


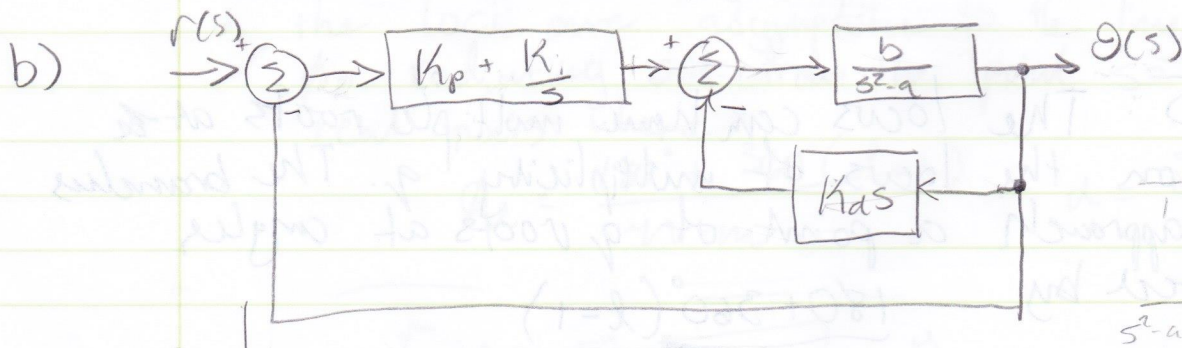
# Project 3



find  $\frac{\theta(s)}{r(s)}$  if  $C_{PID}(s) = K_p + sK_d + \frac{K_i}{s}$

$$\frac{\theta(s)}{r(s)} = \frac{b(K_p + sK_d + K_i/s)}{s^2 - a} \cdot \frac{1}{1 + \frac{b(K_p + sK_d + K_i/s)}{s^2 - a}} = \frac{bK_p + bsK_d + bK_i/s}{s^2 - a + bK_p + bsK_d + bK_i/s}$$

$$\frac{\theta(s)}{r(s)} = \frac{s^2 bK_d + s bK_p + bK_i}{s^3 + s^2 bK_d + s(bK_p - a) + bK_i}$$



$$\frac{b}{s^2 - a} \cdot \frac{1}{1 + \frac{bK_d s}{s^2 - a}} = \frac{b}{s^2 - a + bK_d s}$$

