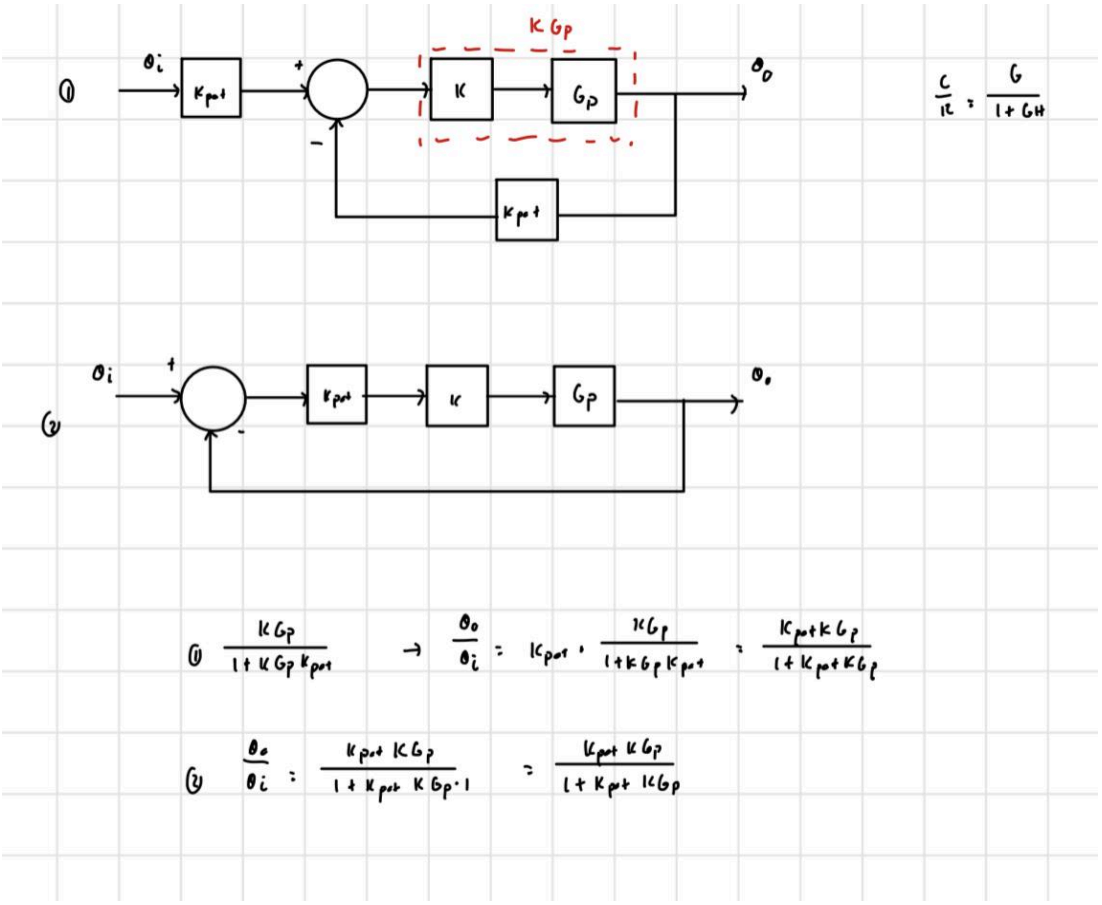
Ricardo Jimenez

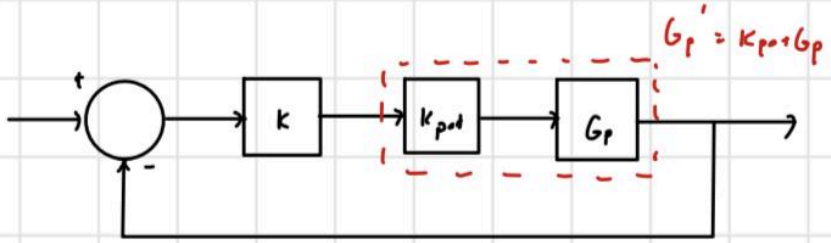
April 12, 2023

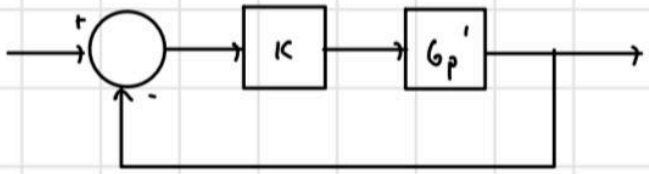
MAE 476, Sec 3

Project 2



Step 2 :

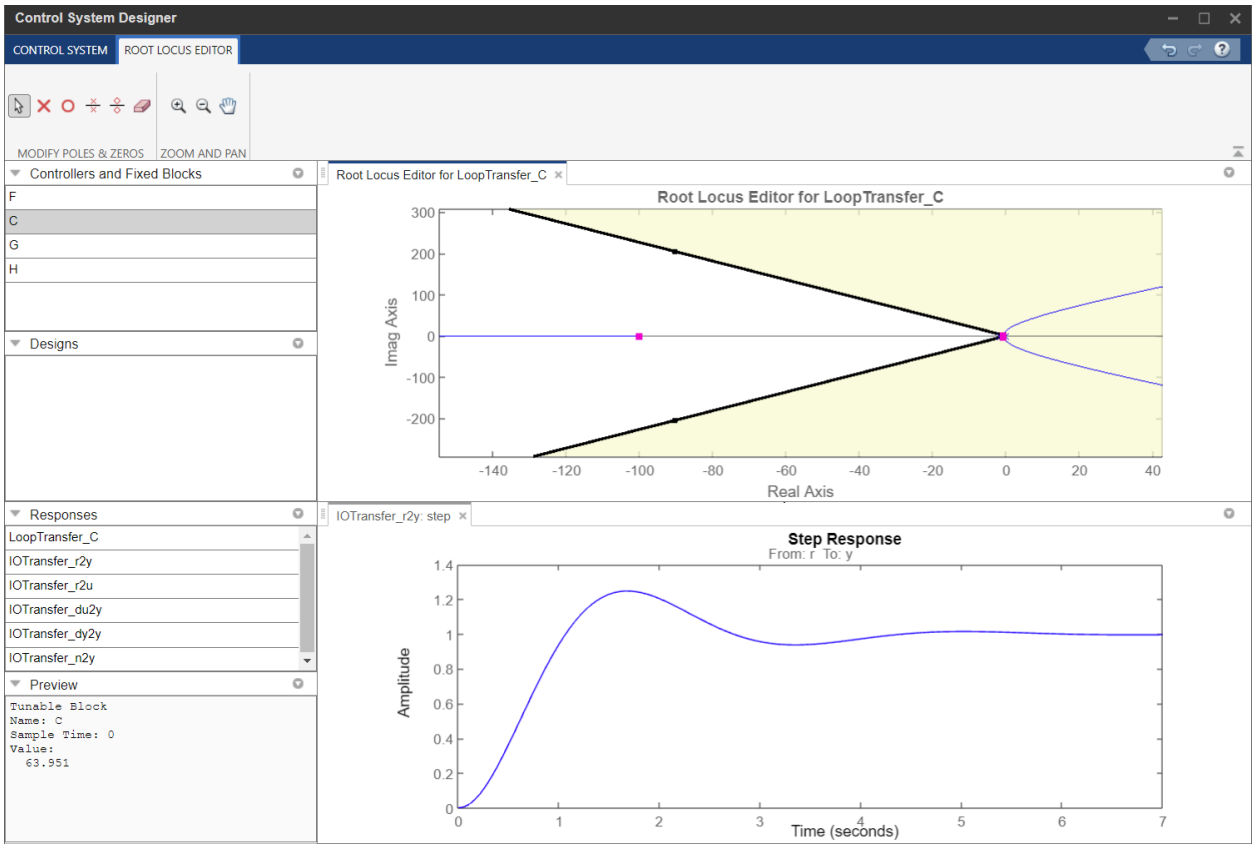




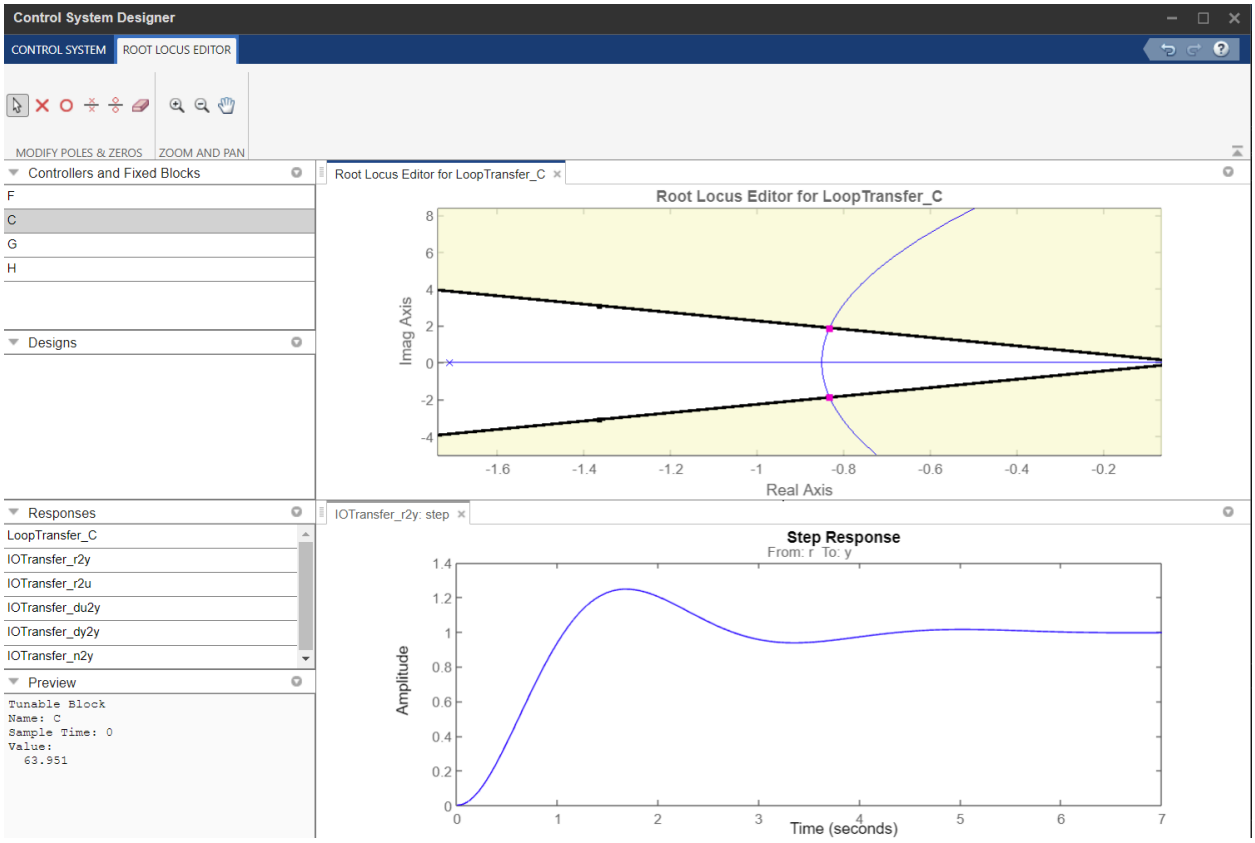
$$G_p' = K_{pot}\, G_p = K_{pot} \cdot \frac{K_1}{s+a} \cdot \frac{K_m}{s(s+a_1)} \cdot K_g$$

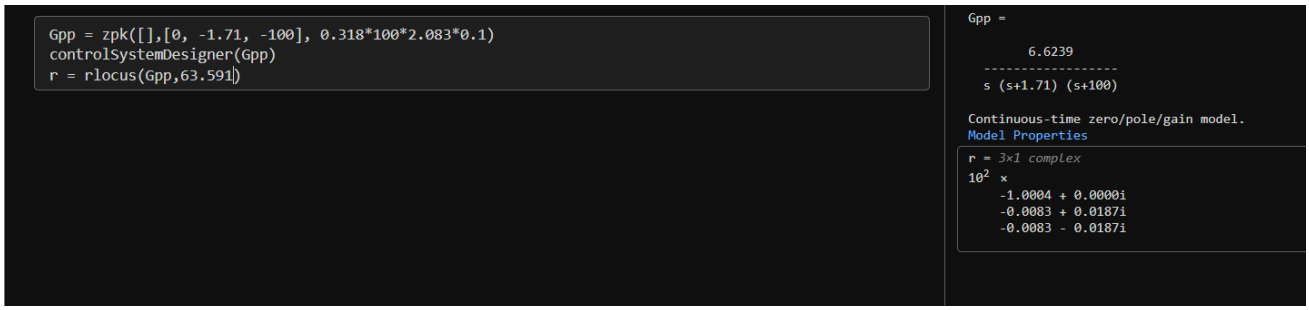
$$= 0.318 \cdot \frac{100}{s+100} \cdot \frac{2.083}{s(s+1.71)} \cdot 0.1$$

Root locus of G_p'



Design requirement 25% overshoot, then move dots to lay on graph, then C gives the gain.

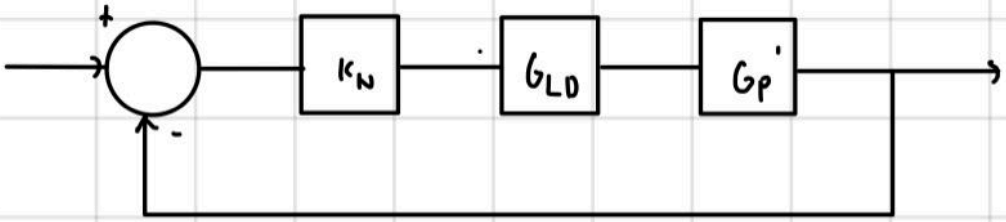




Plug gain into rlocus to find the roots

Step 3:

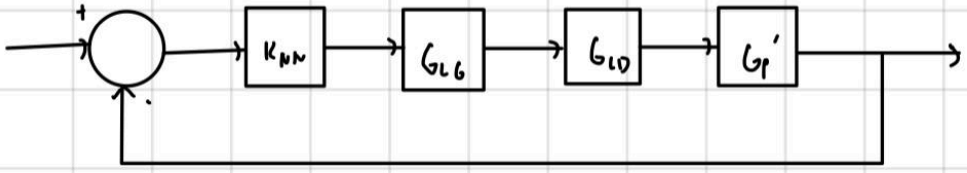
Lead Comp



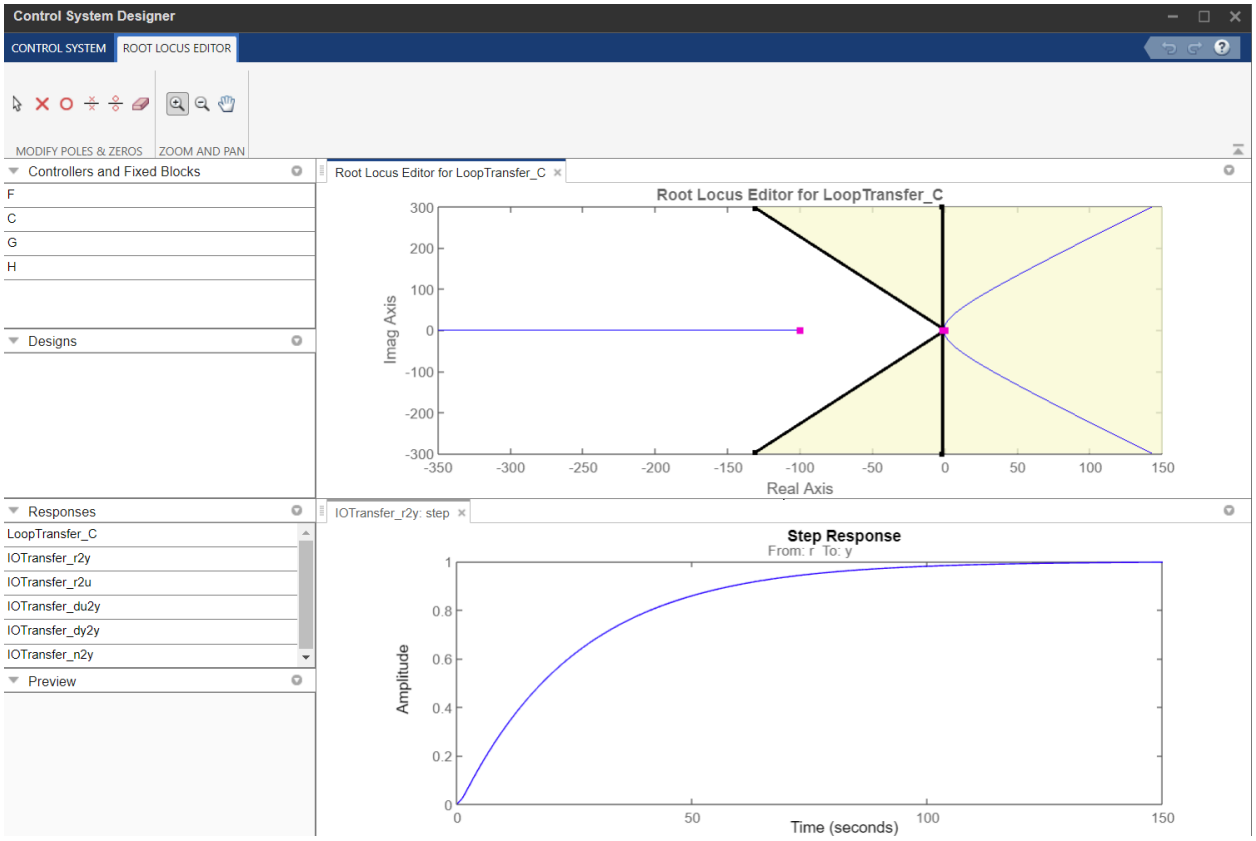
Root locus of $G_{LD}\,G_p'$

Step 4:

Lag Comp



Root Locus of $G_{LG}\,G_{LD}\,G_p'$



Add design requirements of 25% overshoot and 2 second settling time to the new system and find intersection of root locus and ray.

Z = -0.85

e(ss) = 1/(1+kp) = 1/(1+limG(s))

G = k*Gpp