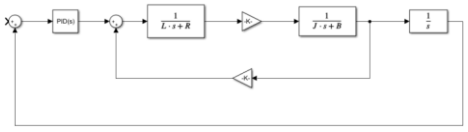
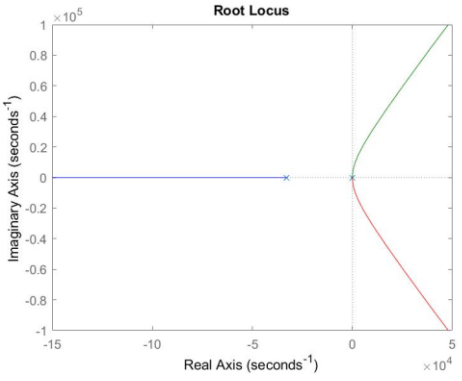
Assignment 9
Frequency Domain

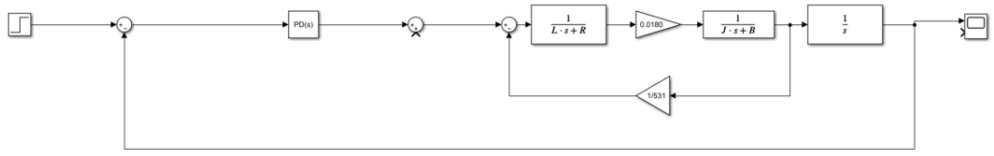
Nusair Islam

Step 2: P-controlled system and root locus



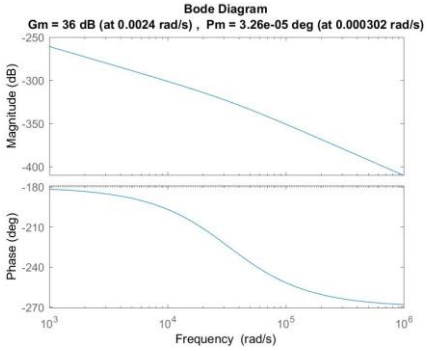


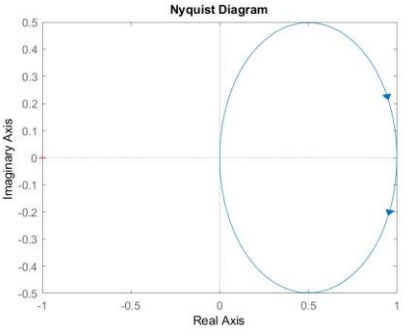
Step 3: I used the filter I created for assignment 8



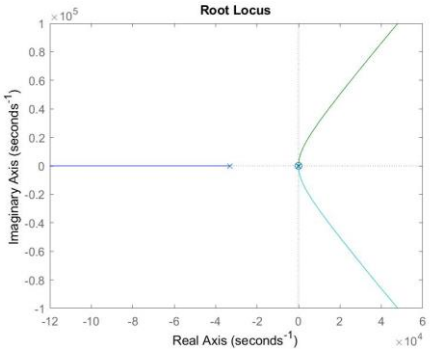
Step 4: Generated bode and Nyquist Plots of the last block diagram

Wx is located at 3.26e-05 degrees

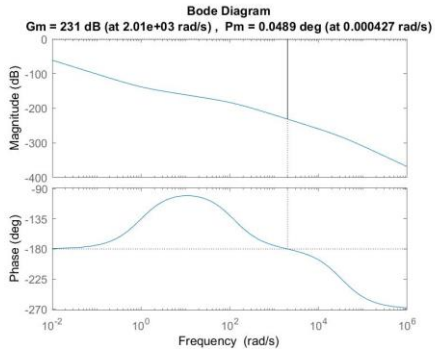


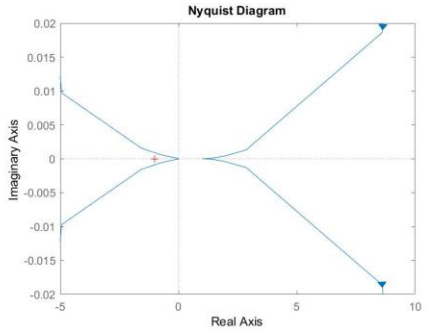


Step 5: The zero gets placed at wx and results in the following rlocus



Step 6: Bode and Nyquist plots of unity gain

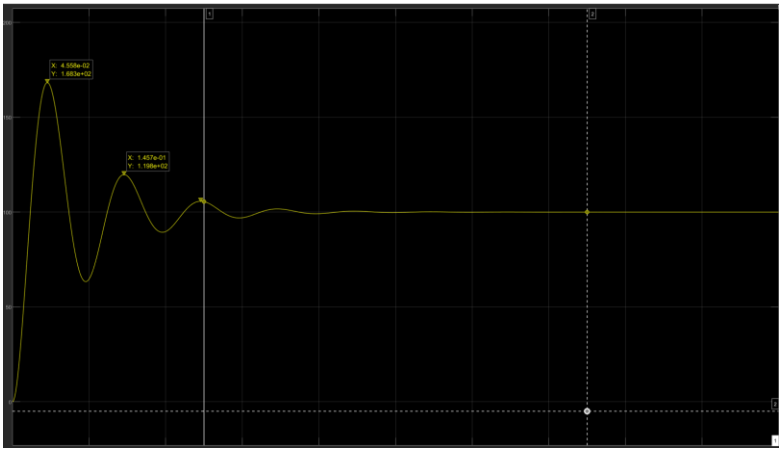




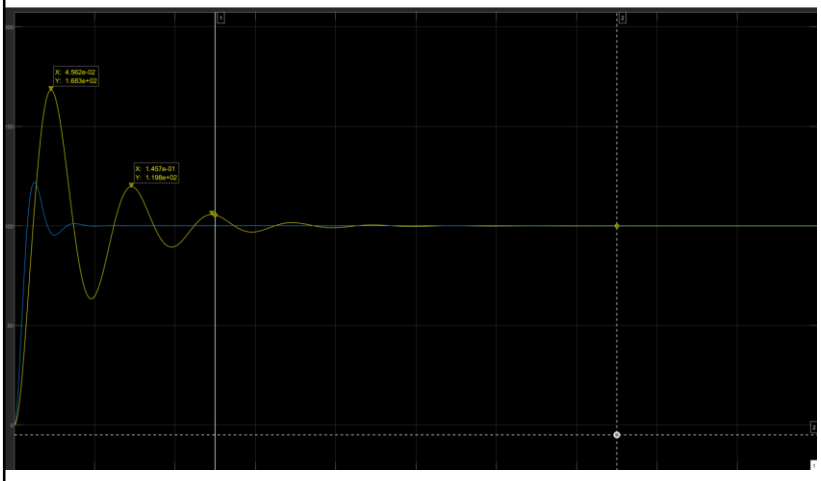
Ku = 3.59e+11

Step 7: New K and step response

K = 20%*3.59e+11 = 7.18e+10



Step 7: New K and step response



As you can see changing My k and z values resulted In a much more stable-Looking graph (blue) Compared to the original Yellow. The OS amount Is smaller, and the Tr Occurs sooner

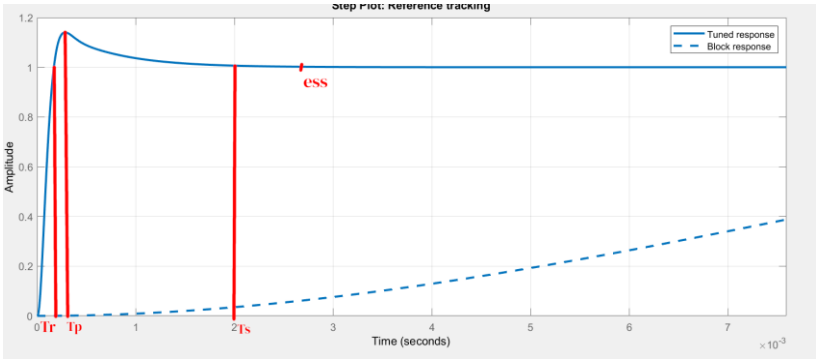
I set my K = 2.154e+04

Z = 1.9219

P gain = 3.365e+09

D gain = 9.844e-01

Step 8: Tuned PID step response



Tr = 169 us

Tp = 256 us

Ts = 2ms

Ess = 0

Step 9: PID controlled circuit and output