BATCH 4

EXPERIMENT NO 6

FROM MATLAB

BY

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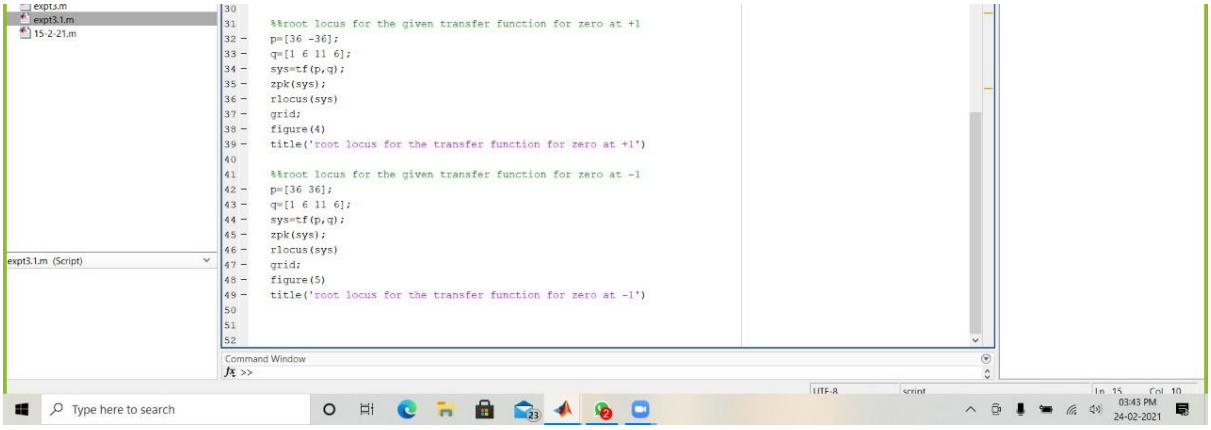
A)ROOT LOCUS OF GIVEN TRANSFER FUNCTION

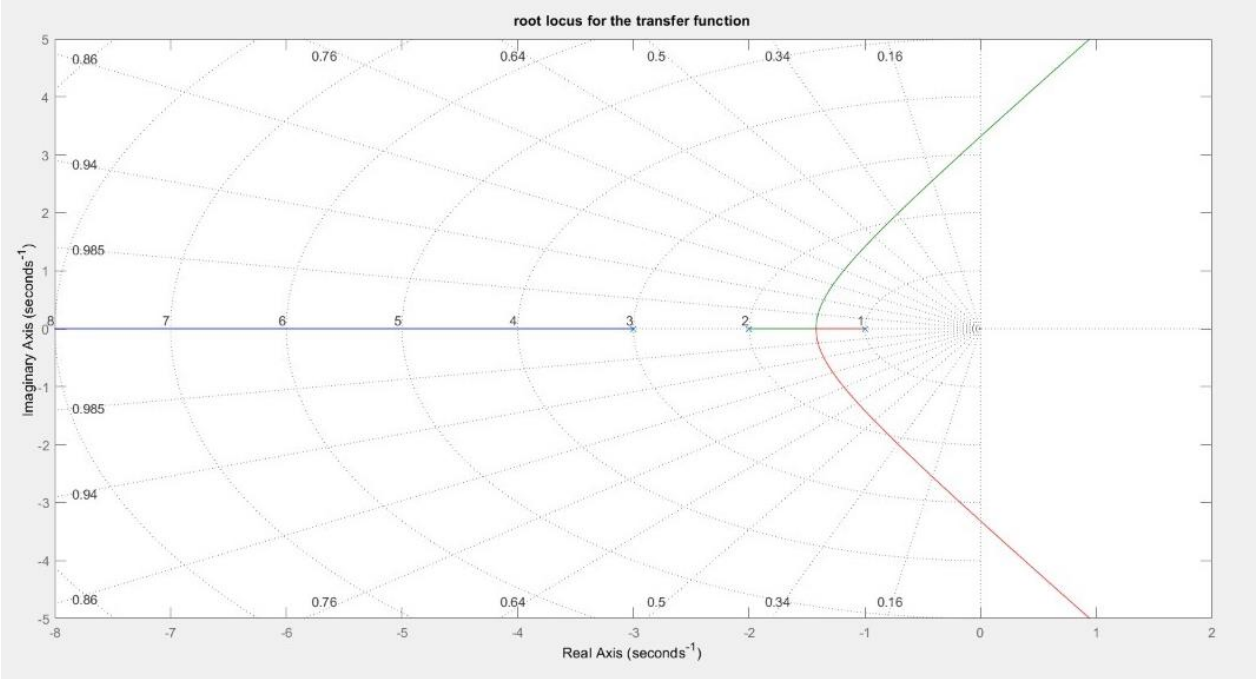
Editor - C:\Users\ajayb\Documents\MATLAB\CS LAB\ES LAB\expt6a.m

expt6a.m

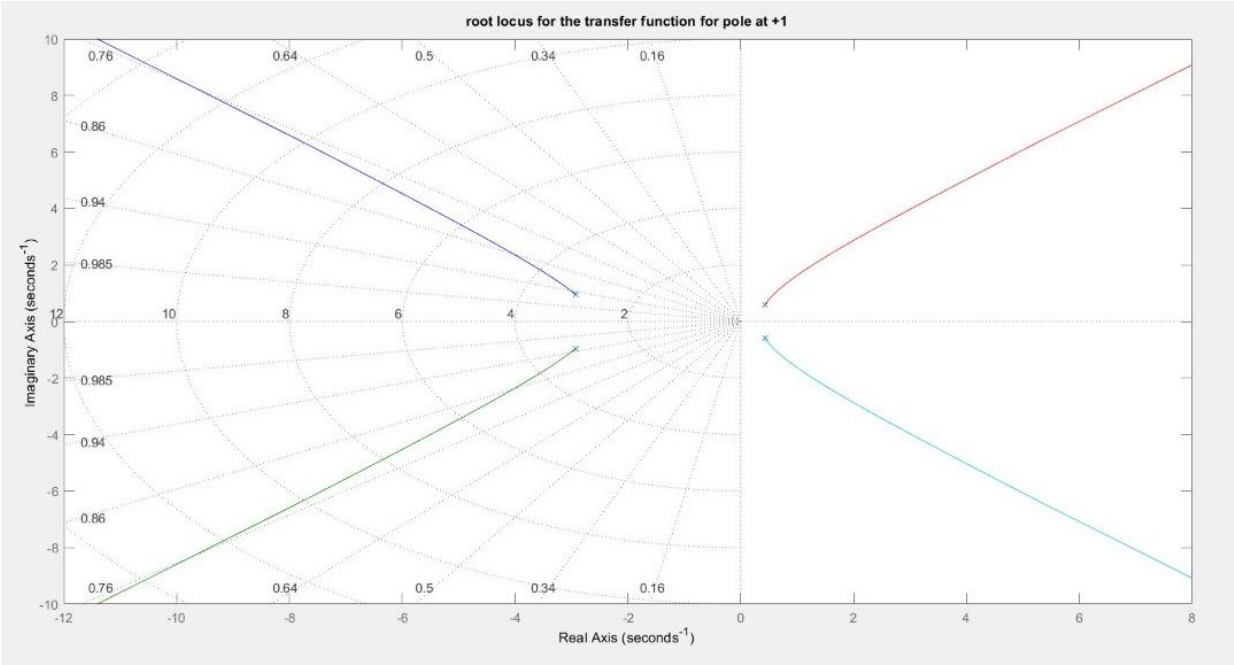
```
%%root locus for the given transfer function
p=[36];
q=[1 6 11 6];
sys=tf(p,q);
zpk(sys);
rlocus(sys)
grid;
title('root locus for the transfer function')
figure(1)

%%root locus for the given transfer function for pole at +1
p=[36];
q=[1 5 5 -5 5];
sys=tf(p,q);
zpk(sys);
rlocus(sys)
grid;
figure(2)
title('root locus for the transfer function for pole at +1')

%%root locus for the given transfer function for pole at -1
p=[36];
q=[1 7 17 17 6];
sys=tf(p,q);
zpk(sys);
rlocus(sys)
grid;
figure(3)
title('root locus for the transfer function for pole at -1')
```



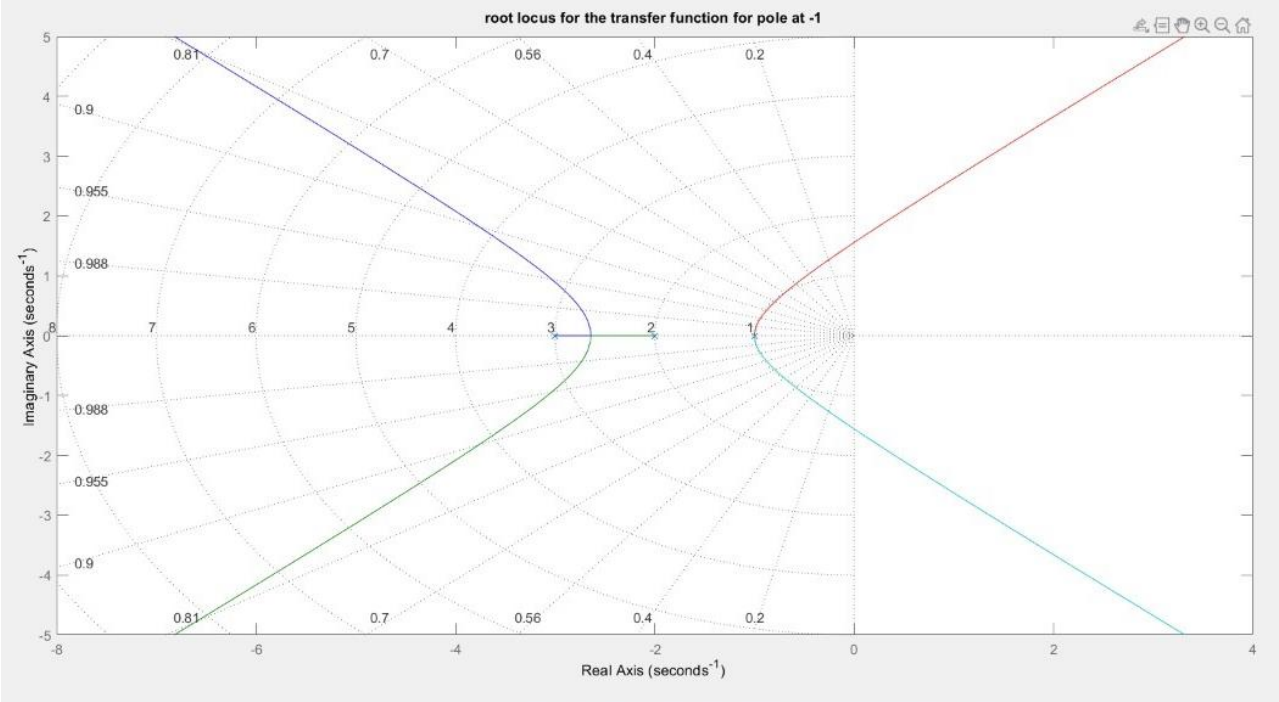
For Given Transfer Function



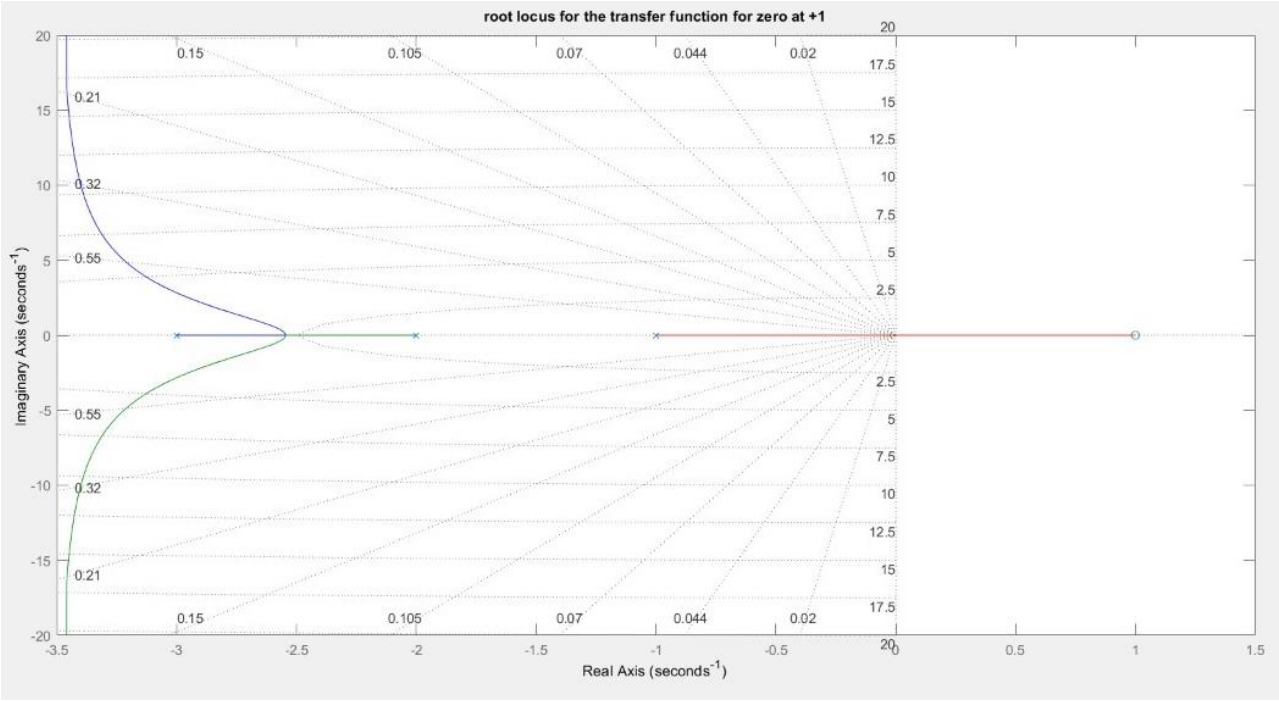
For adding pole at S=+1



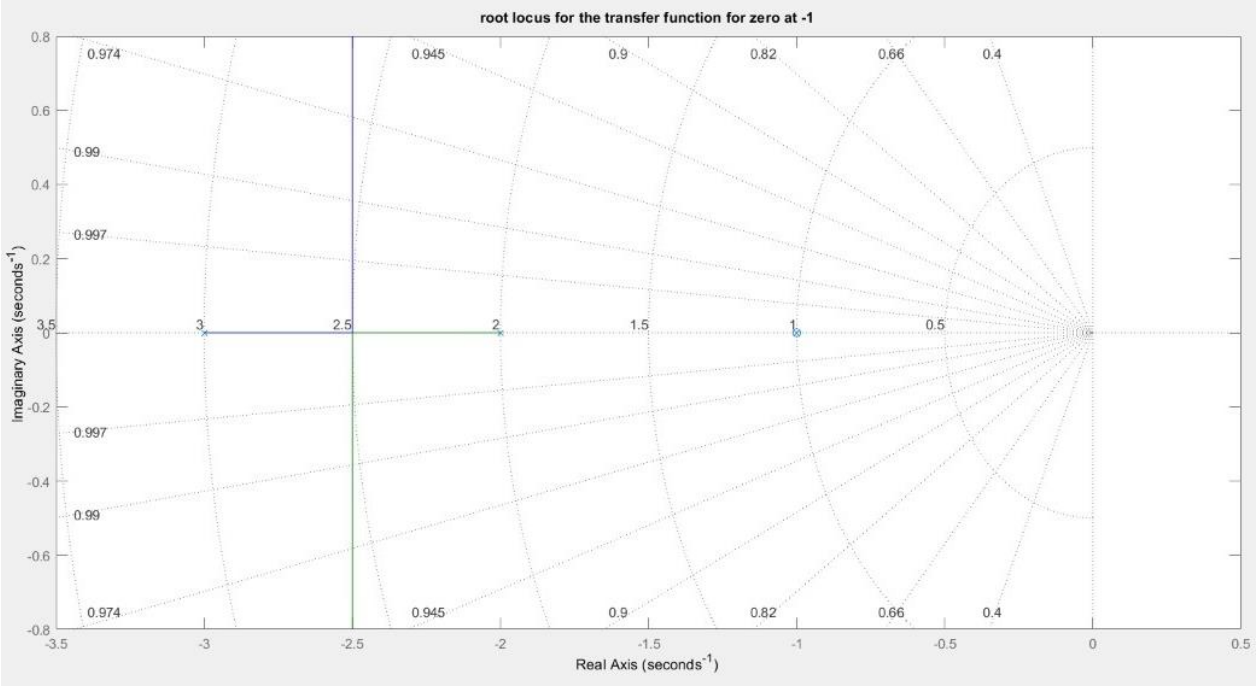
For adding pole at S=-1



For adding Zero at S=+1



For adding Zero at S=-1

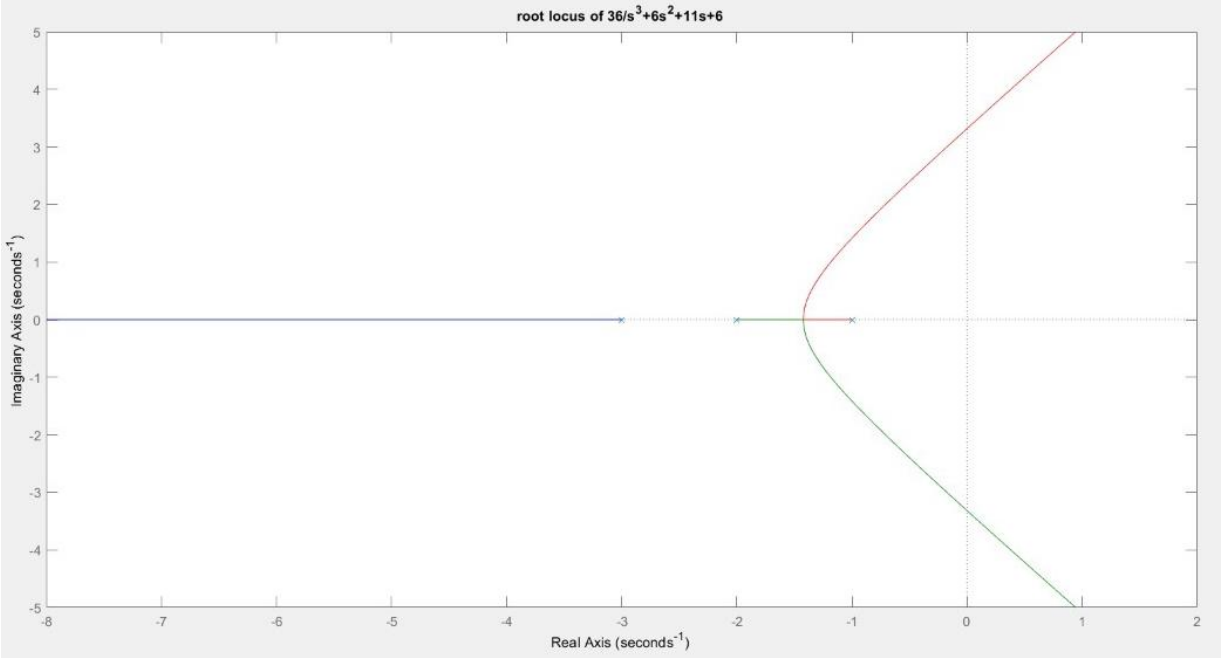


B)Root locus for various open loop gain

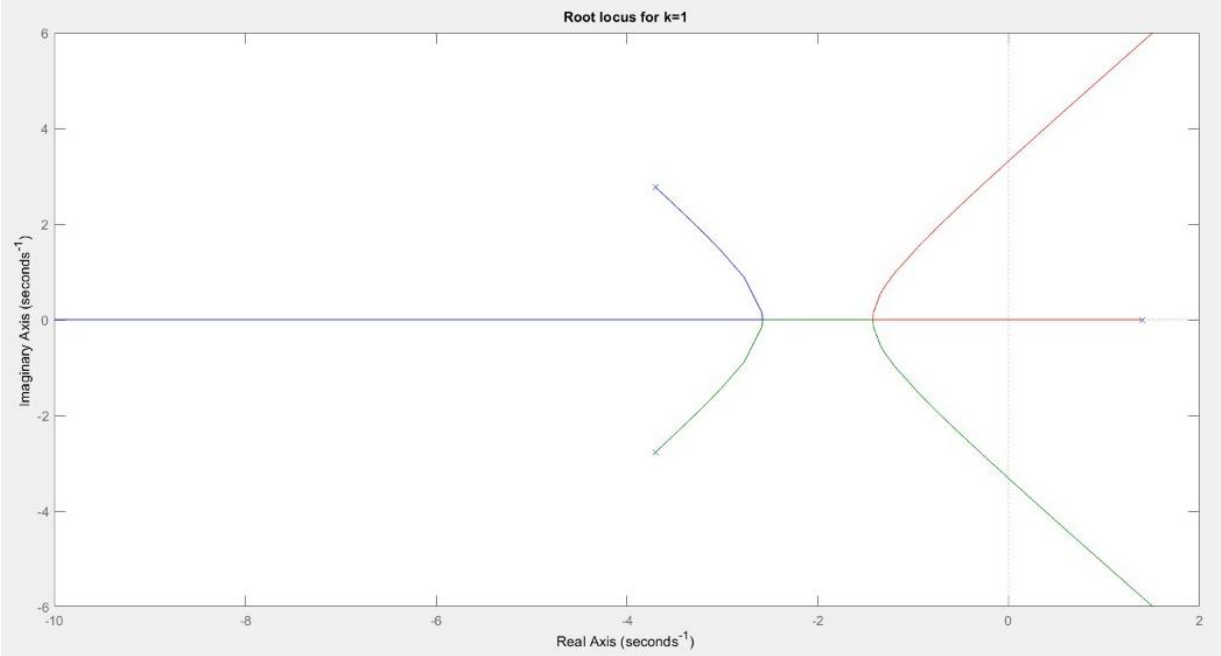
Editor - C:\Users\HP\3D Objects\3-2\CS LAB\Untitled6.m

Untitled6.m

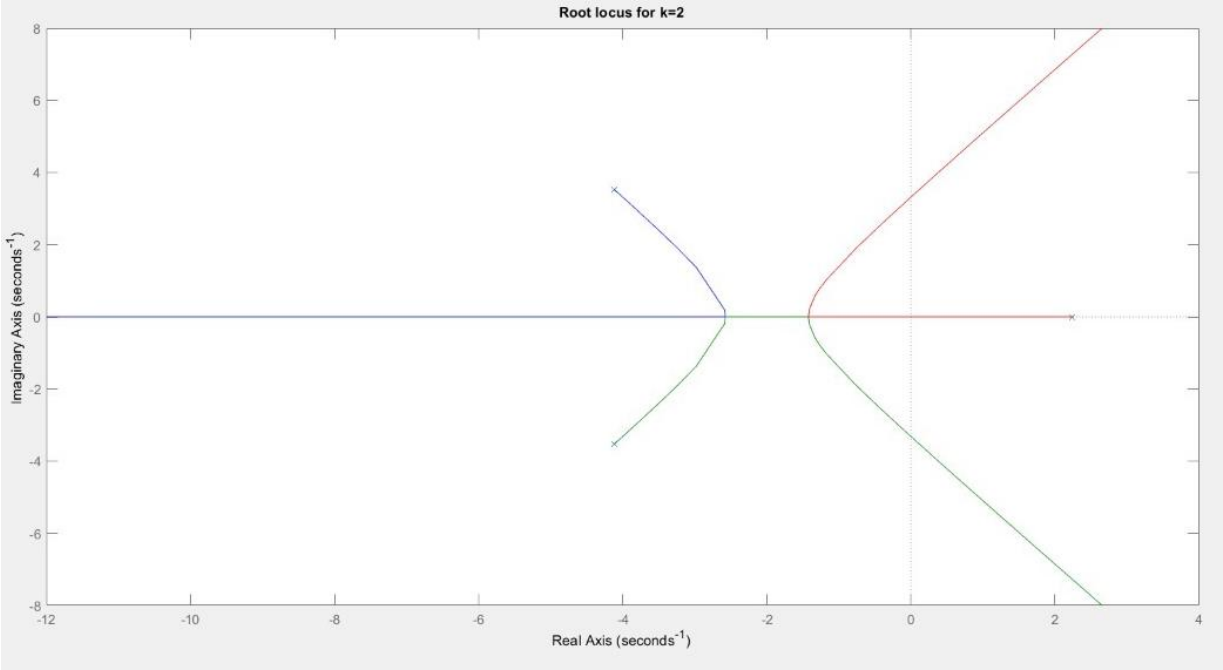
```
%%transfer function G(s)=k/s^3+6s^2+11s+6
p=[36];
q=[1,6,11,6];
sys=tf(p,q);
figure(1);
zpk(sys);
rlocus(sys);
title('root locus of 36/s^3+6s^2+11s+6');
%%for different values of k
for i=1:3
    ki=input('enter k value');
    gi=feedback(sys*ki,-1);
    figure(i+1)
    zpk(gi);
    rlocus(gi);
    title('Root locus for k=');
end

```


root locus of 36/s^3+6s^2+11s+6
Imaginary Axis (seconds^-1)
Real Axis (seconds^-1)

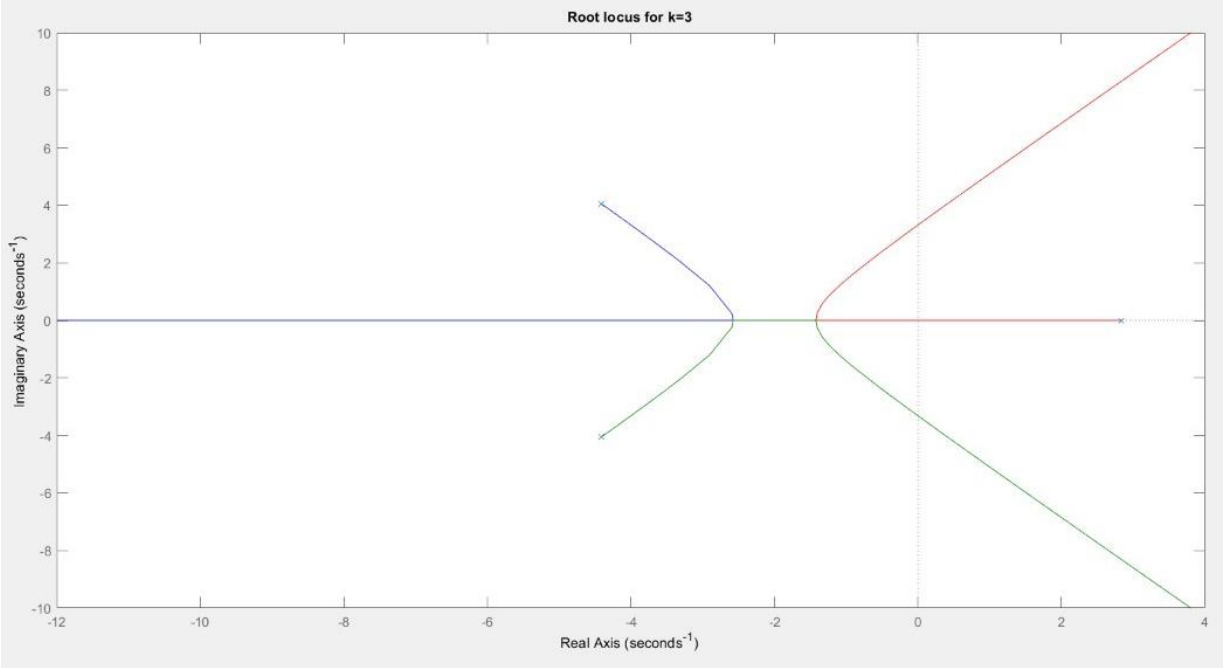
For k=1


Root locus for k=1
Imaginary Axis (seconds^-1)
Real Axis (seconds^-1)

For K=2


Root locus for k=2
Imaginary Axis (seconds^{-1})
Real Axis (seconds^{-1})
8
6
4
2
0
-2
-4
-6
-8
-12
-10
-8
-6
-4
-2
0
2
4

For K=3


Root locus for k=3
Imaginary Axis (seconds^{-1})
Real Axis (seconds^{-1})
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-10
-8
-6
-4
-2
0
2
4

C)COMPARISION OF BODE AND NYQUIST PLOT AND ROOT LOCUS ON STABILITY

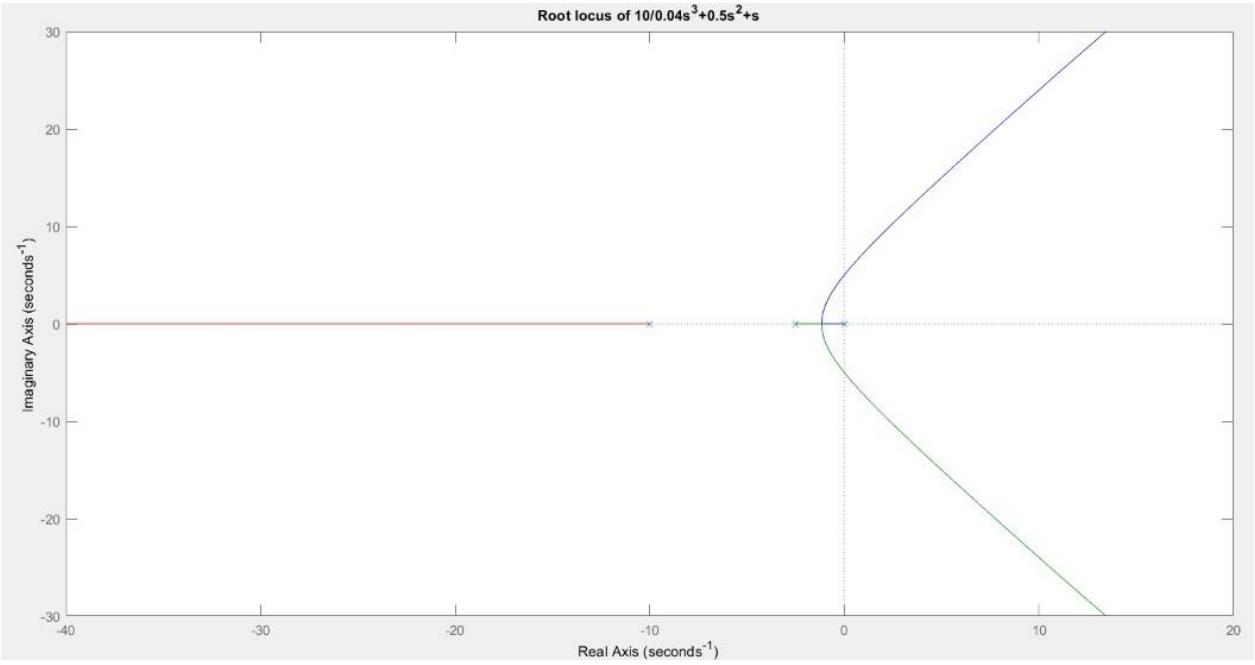
1.G(s)=10/s(1+0.4s)(1+0.1s)

Editor - C:\Users\HP\3D Objects\3-2\CS LAB\Untitled2.m

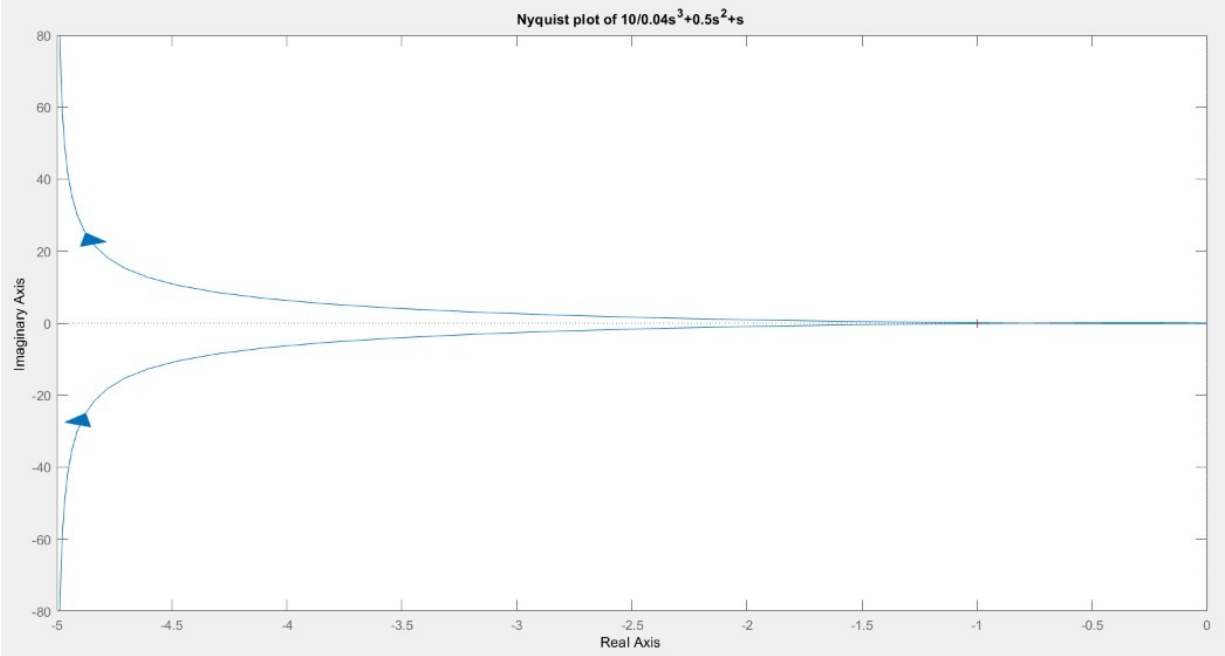
Untitled6.m | Untitled2.m

```
%%stability for 3rd order system
num=[10];
den=[0.04,0.5,1,0];
g2=tf(num,den);
figure(5)
bode(g2);
margin(g2);
title('Bode plot of 10/0.04s^3+0.5s^2+s');
margin(g2);
figure(6);
nyquist(g2);
title('Nyquist plot of 10/0.04s^3+0.5s^2+s');
figure(7);
rlocus(g2);
title('Root locus of 10/0.04s^3+0.5s^2+s');

```

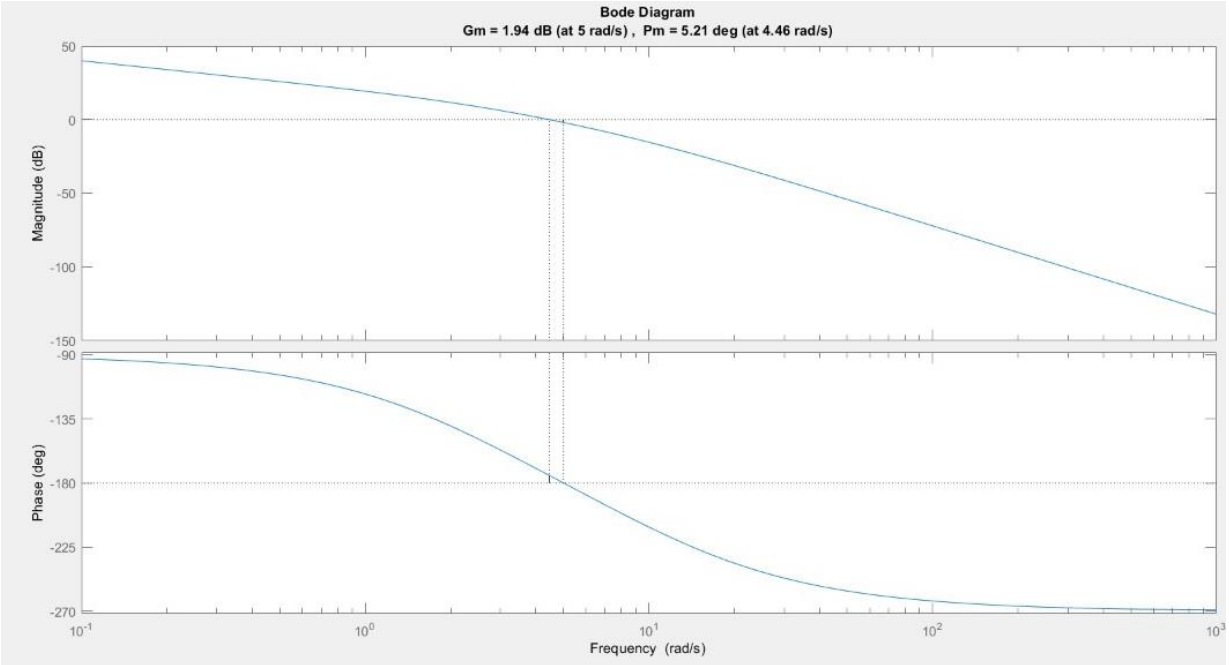
Root Locus :



Nyquist Plot:



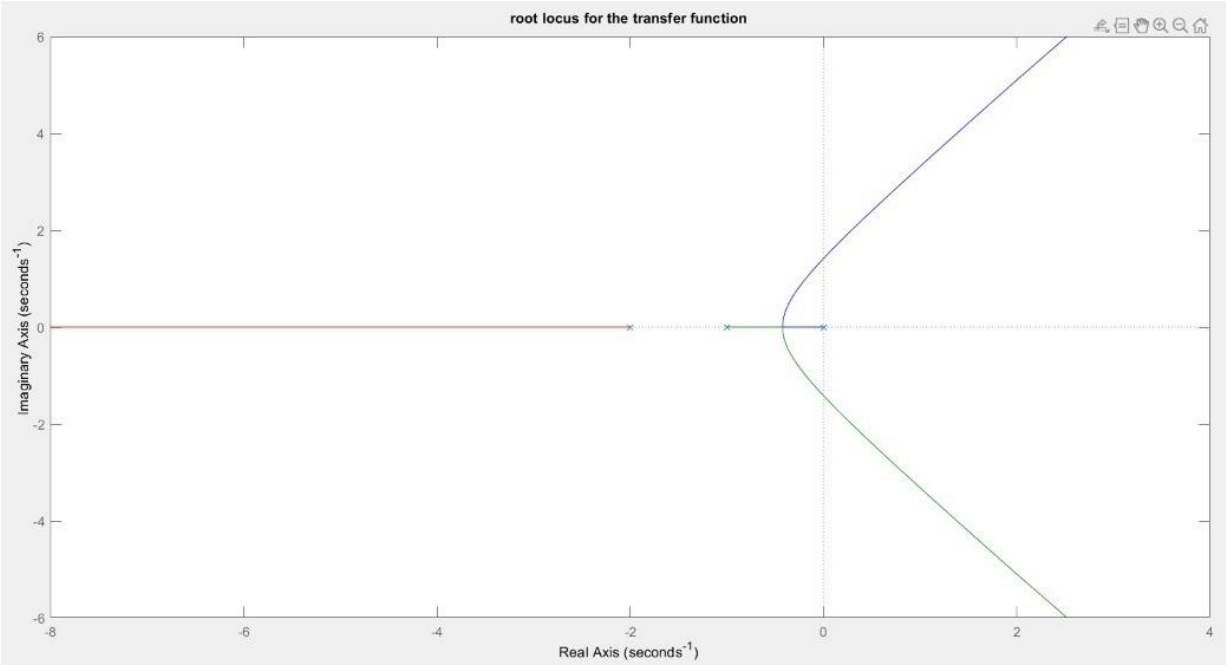
Bode Plot:



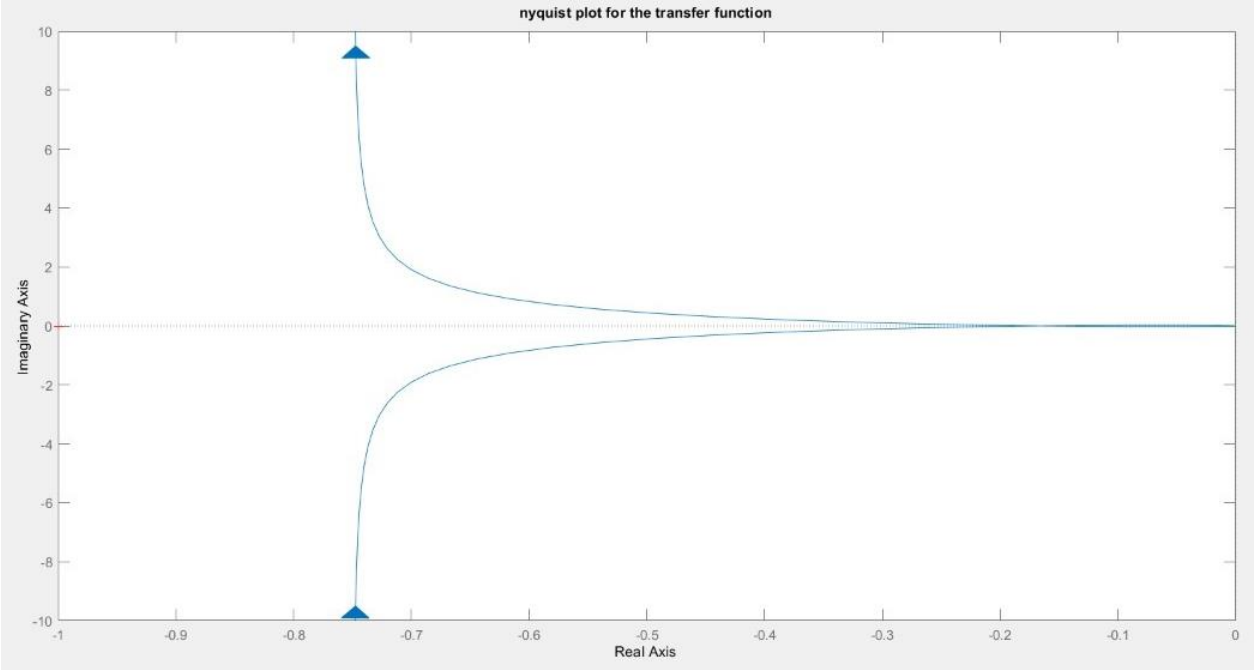
2.G(s)=1/s(s+1)(s+2)

```
1      %%nyquist plot for the transfer function
2 -    p=[1]
3 -    q=[1 3 2 0]
4 -    g1=tf(p,q);
5 -    margin(g1);
6 -    figure(1);
7 -    nyquist(g1);
8 -    title('nyquist plot for the transfer function');
9 -    figure(2)
10 -   bode(g1);
11 -   margin(g1);
12 -   title('bode plot for the transfer function');
13 -   figure(3);
14 -   rlocus(g1);
15 -   title('root locus for the transfer function');
```

Root Locus



Nyquist Plot



Bode Plot