

BATCH 4

EXPERIMENT NO 6

FROM MATLAB

BY

511805

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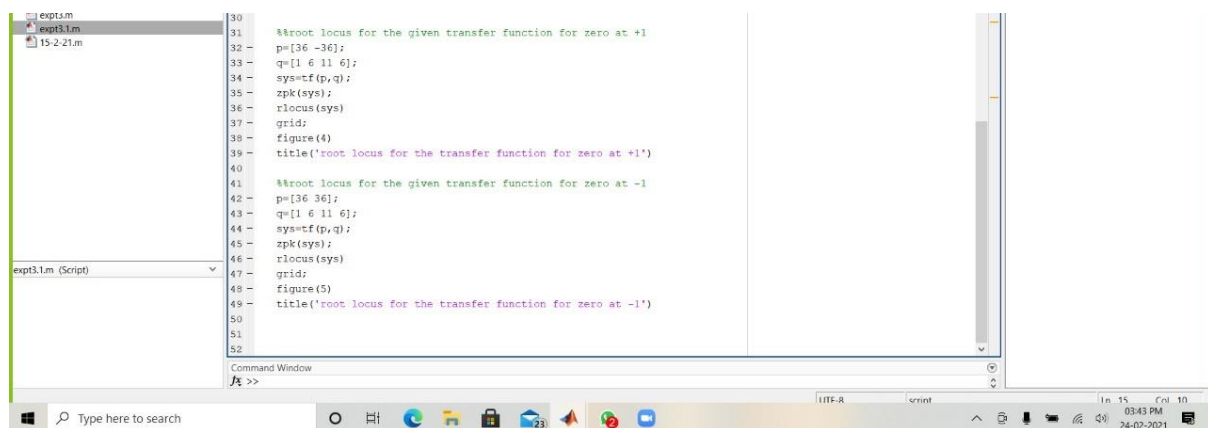
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A)ROOT LOCUS OF GIVEN TRANSFER FUNCTION

FUNCTION

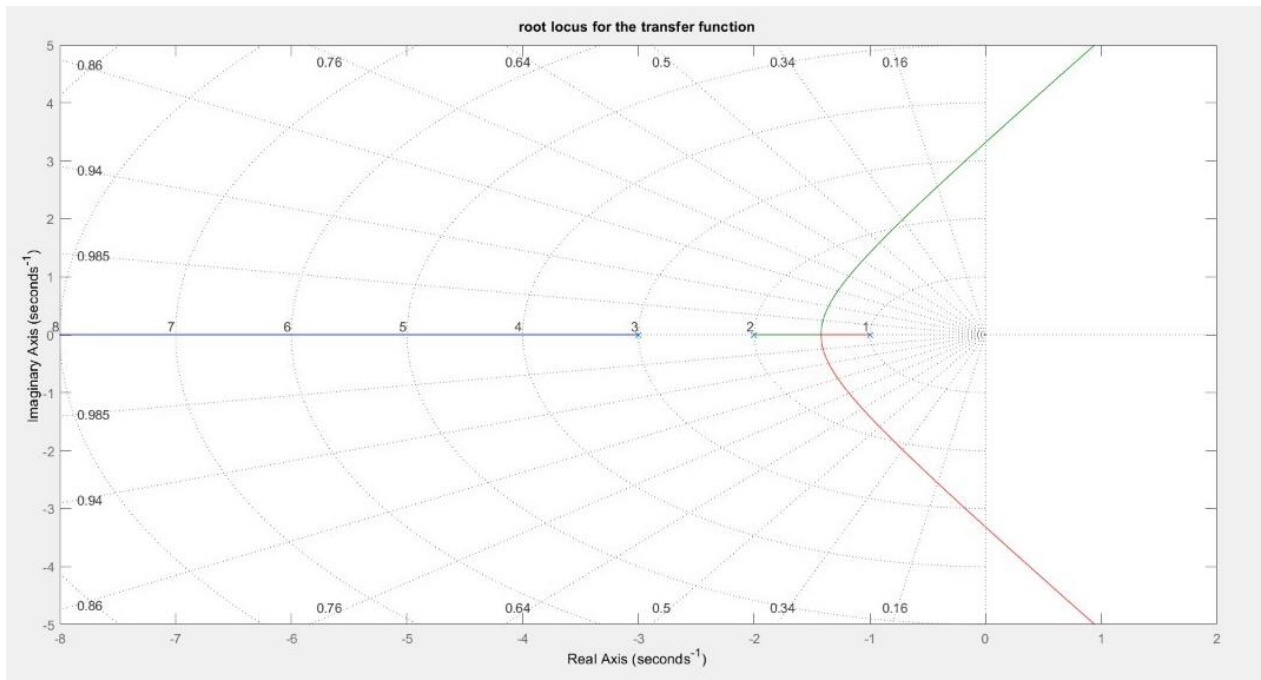
```
Editor - C:\Users\ajayb\Documents\MATLAB\CS LAB\ES LAB\expt6a.m
expt6a.m x +
1 %%root locus for the given transfer function
2 - p=[36];
3 - q=[1 6 11 6];
4 - sys=tf(p,q);
5 - zpk(sys);
6 - rlocus(sys)
7 - grid;
8 - title('root locus for the transfer function')
9 - figure(1)
10
11 %%root locus for the given transfer function for pole at +1
12 - p=[36];
13 - q=[1 5 5 -5 5];
14 - sys=tf(p,q);
15 - zpk(sys);
16 - rlocus(sys)
17 - grid;
18 - figure(2)
19 - title('root locus for the transfer function for pole at +1')
20
21 %%root locus for the given transfer function for pole at -1
22 - p=[36];
23 - q=[1 7 17 17 6];
24 - sys=tf(p,q);
25 - zpk(sys);
26 - rlocus(sys)
27 - grid;
28 - figure(3)
29 - title('root locus for the transfer function for pole at -1')
```



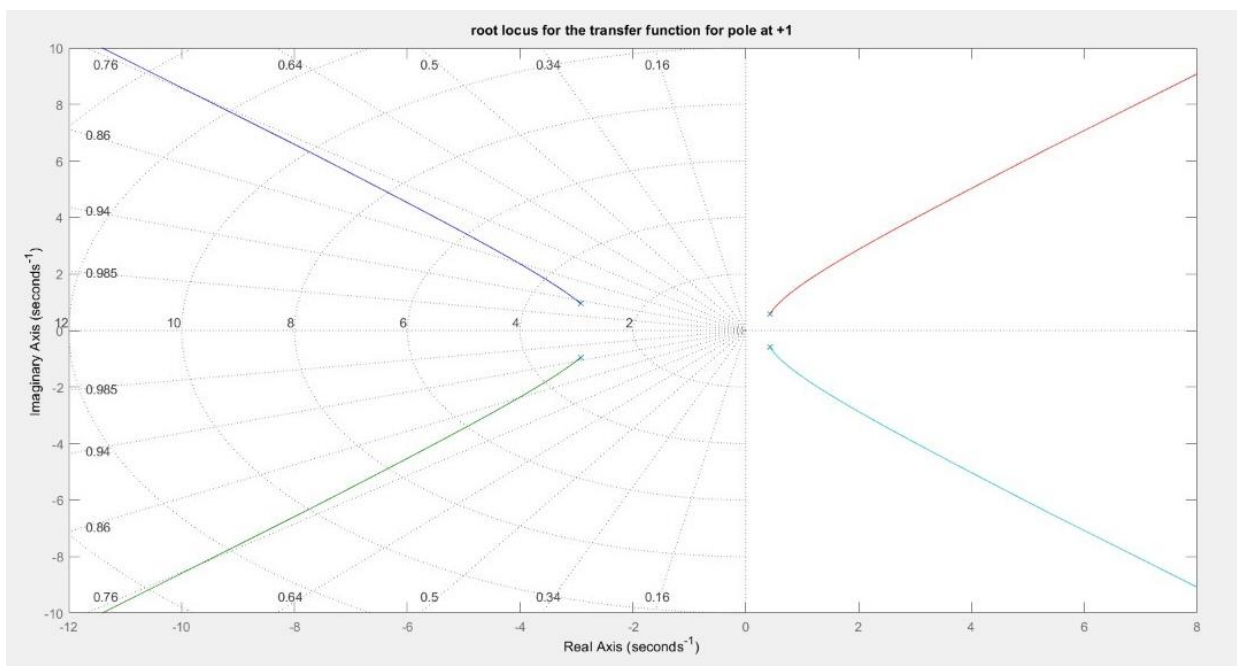
The image shows the MATLAB interface. On the left, the file explorer shows 'expts.m', 'expt3.1.m', and '15-2-21.m'. The script editor displays the code from the previous block, with line numbers 30 through 52. The command window at the bottom shows the prompt 'J>>'.

```
30
31 %%root locus for the given transfer function for zero at +1
32 - p=[36 -36];
33 - q=[1 6 11 6];
34 - sys=tf(p,q);
35 - zpk(sys);
36 - rlocus(sys)
37 - grid;
38 - figure(4)
39 - title('root locus for the transfer function for zero at +1')
40
41 %%root locus for the given transfer function for zero at -1
42 - p=[36 36];
43 - q=[1 6 11 6];
44 - sys=tf(p,q);
45 - zpk(sys);
46 - rlocus(sys)
47 - grid;
48 - figure(5)
49 - title('root locus for the transfer function for zero at -1')
50
51
52
Command Window
J>>
```

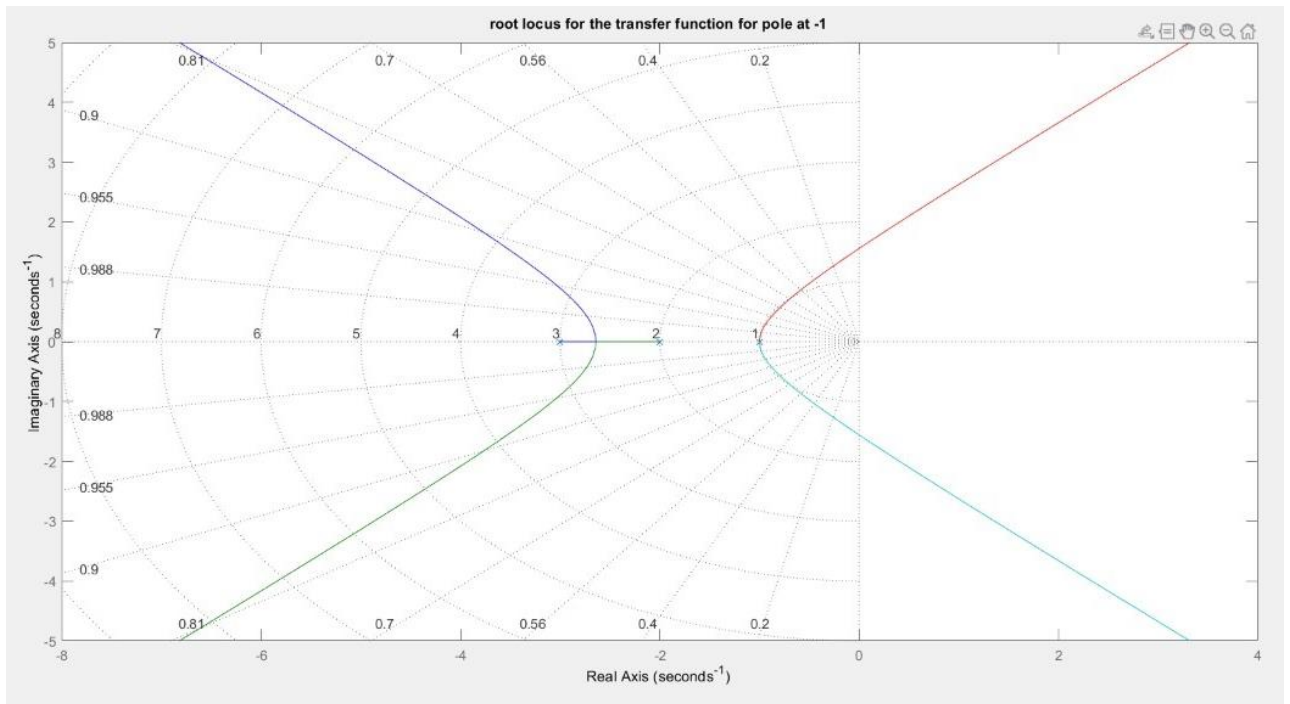
For Given Transfer Function



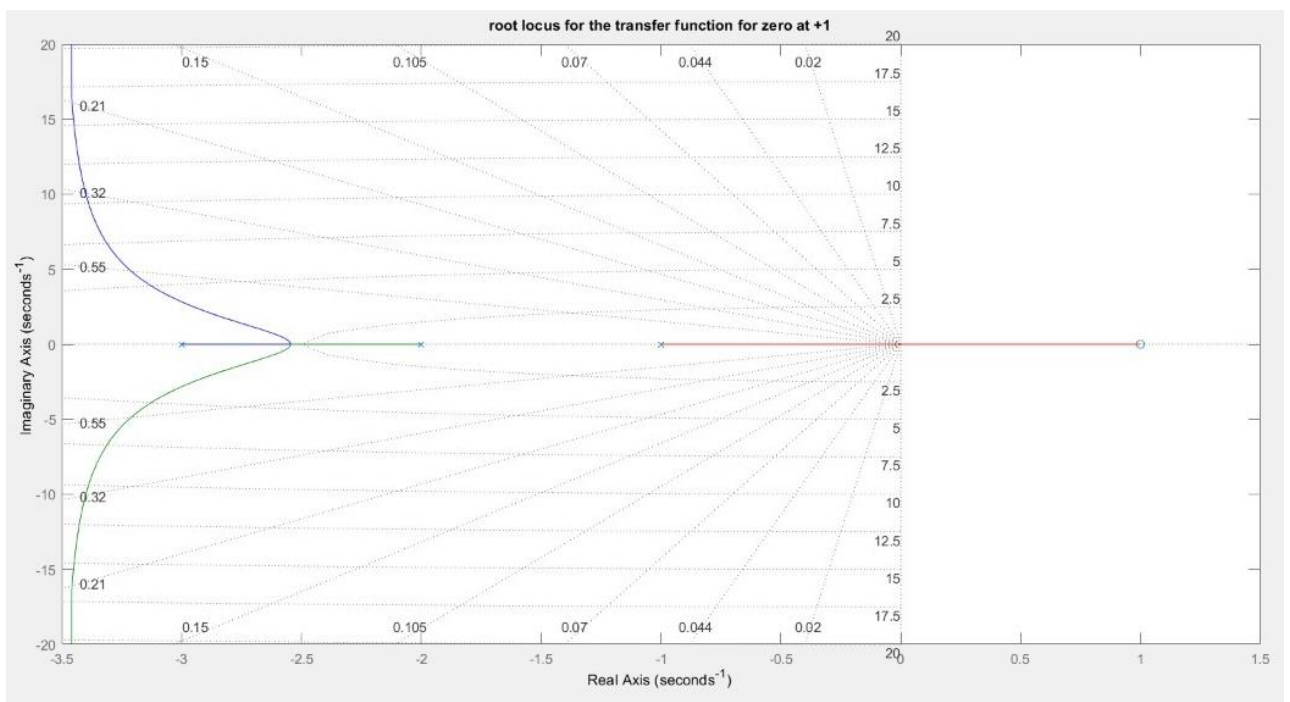
For adding pole at $S=+1$



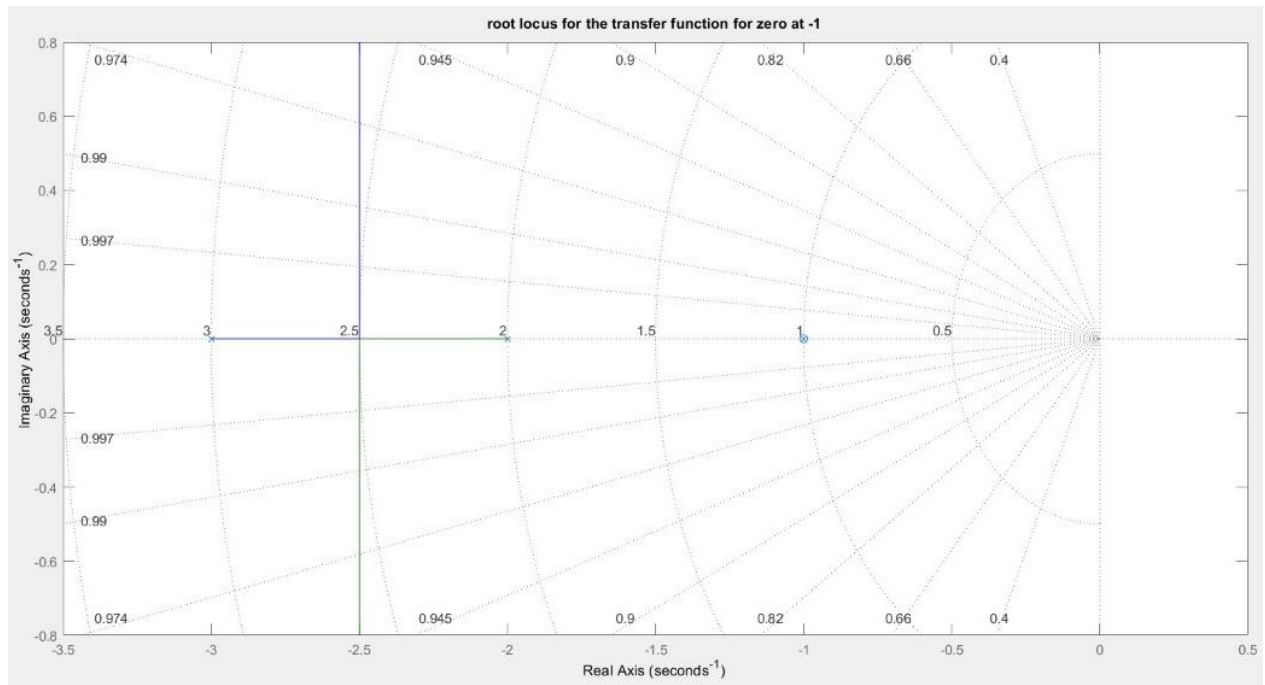
For adding pole at $S=-1$



For adding Zero at $S=+1$

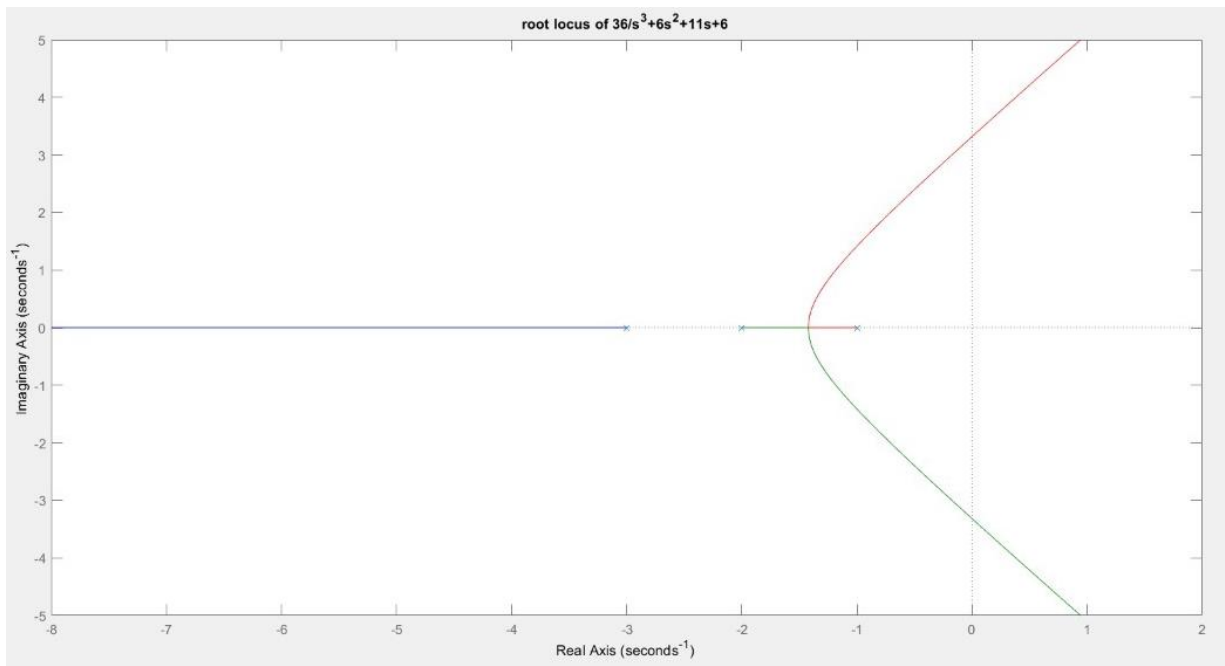


For adding Zero at $S=-1$

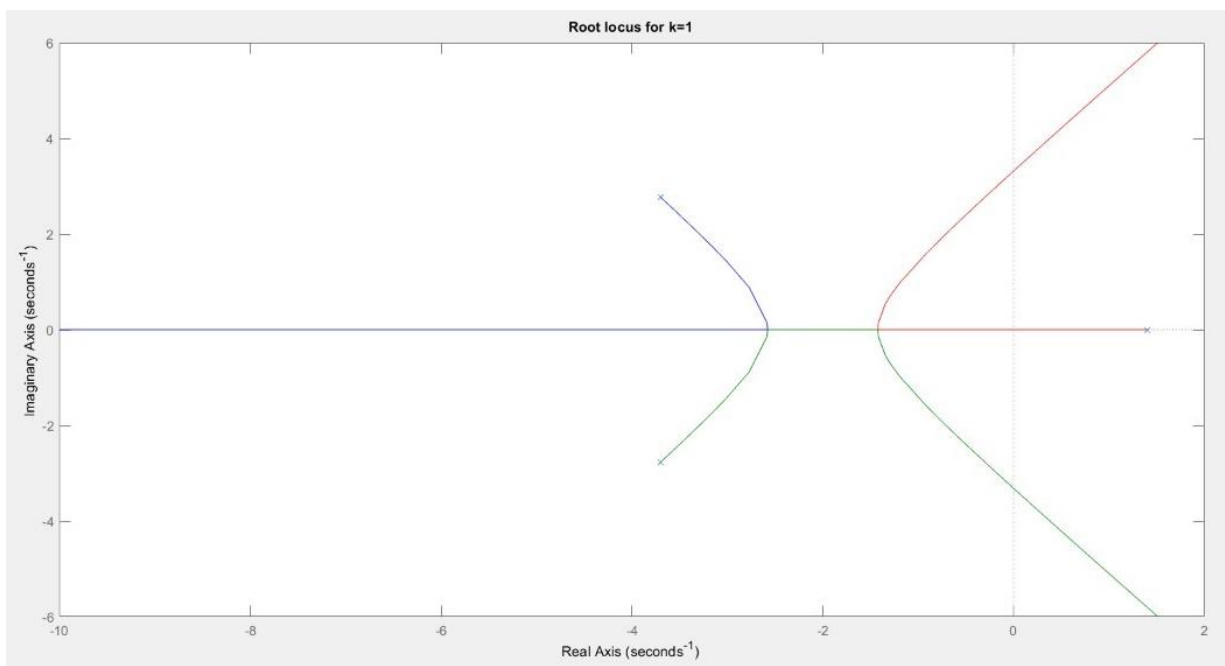


B) Root locus for various open loop gain

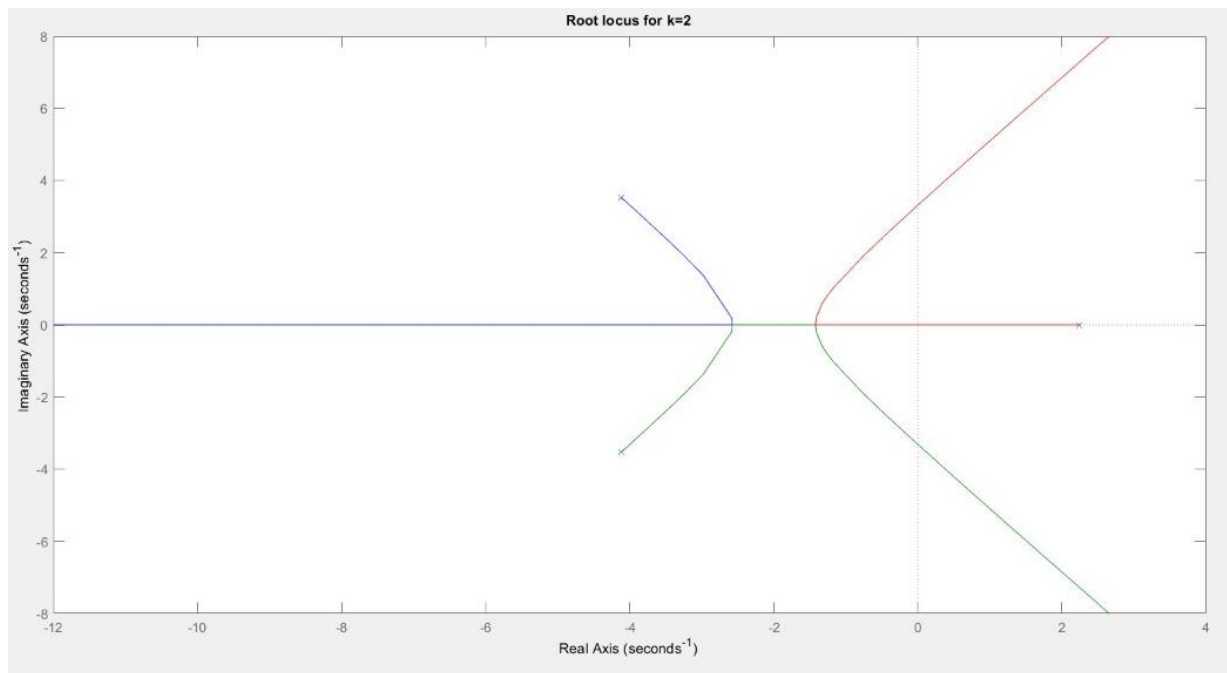
```
Editor - C:\Users\HP\3D Objects\3-2\CS LAB\Untitled6.m
Untitled6.m  X  +
1  %%transfer function G(s)=k/s^3+6s^2+11s+6
2  p=[36];
3  q=[1,6,11,6];
4  sys=tf(p,q);
5  figure(1);
6  zpk(sys);
7  rlocus(sys);
8  title('root locus of 36/s^3+6s^2+11s+6');
9  %%for different values of k
10 for i=1:3
11     ki=input('enter k value');
12     gi=feedback(sys*ki,-1);
13     figure(i+1)
14     zpk(gi);
15     rlocus(gi);
16     title('Root locus for k=');
17 end
18
```



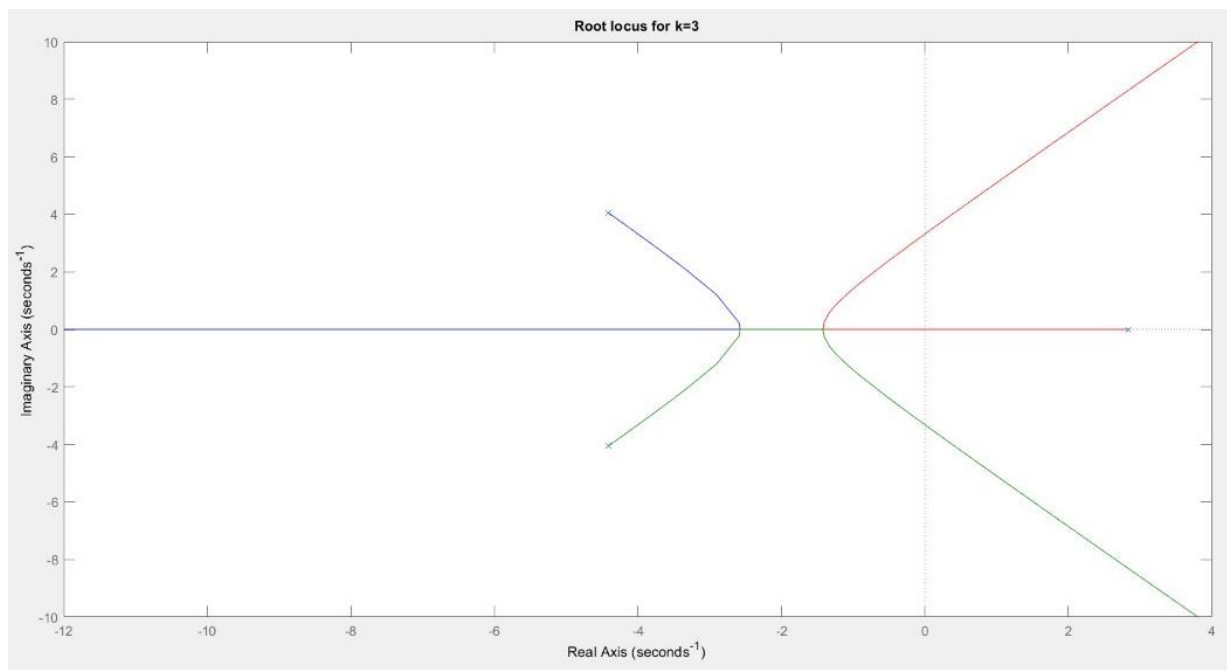
For $k=1$



For $K=2$



For $K=3$

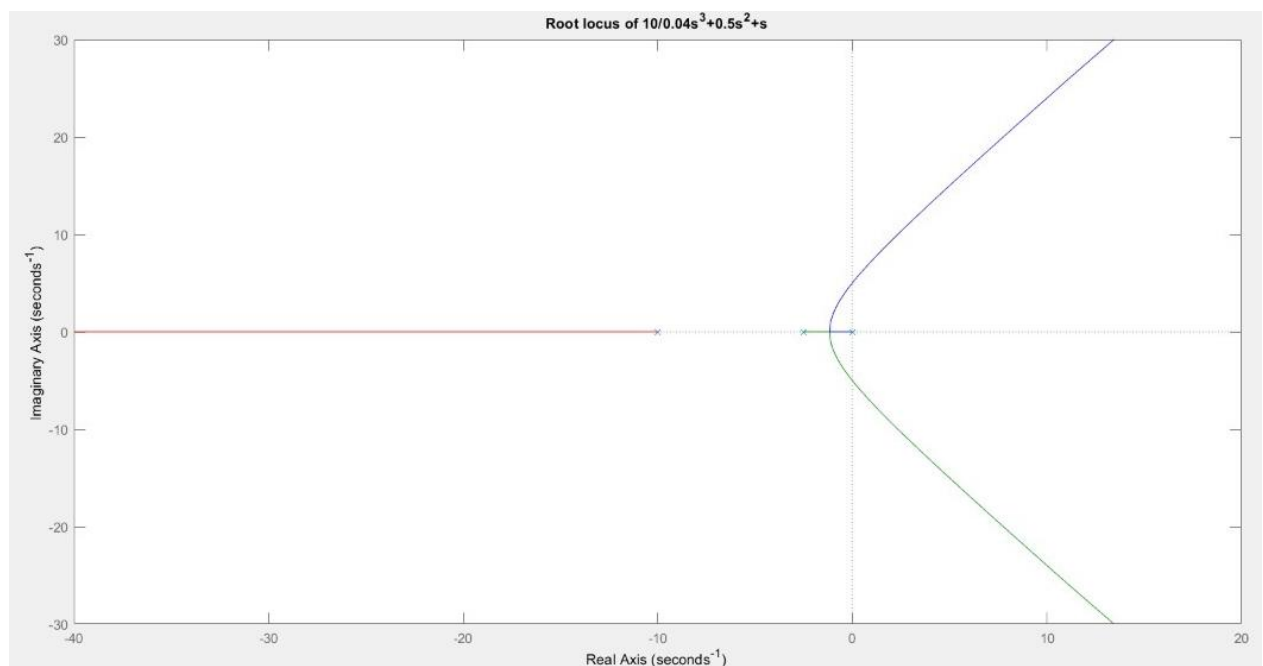


C)COMPARISION OF BODE AND NYQUIST PLOT AND ROOT LOCUS ON STABILITY

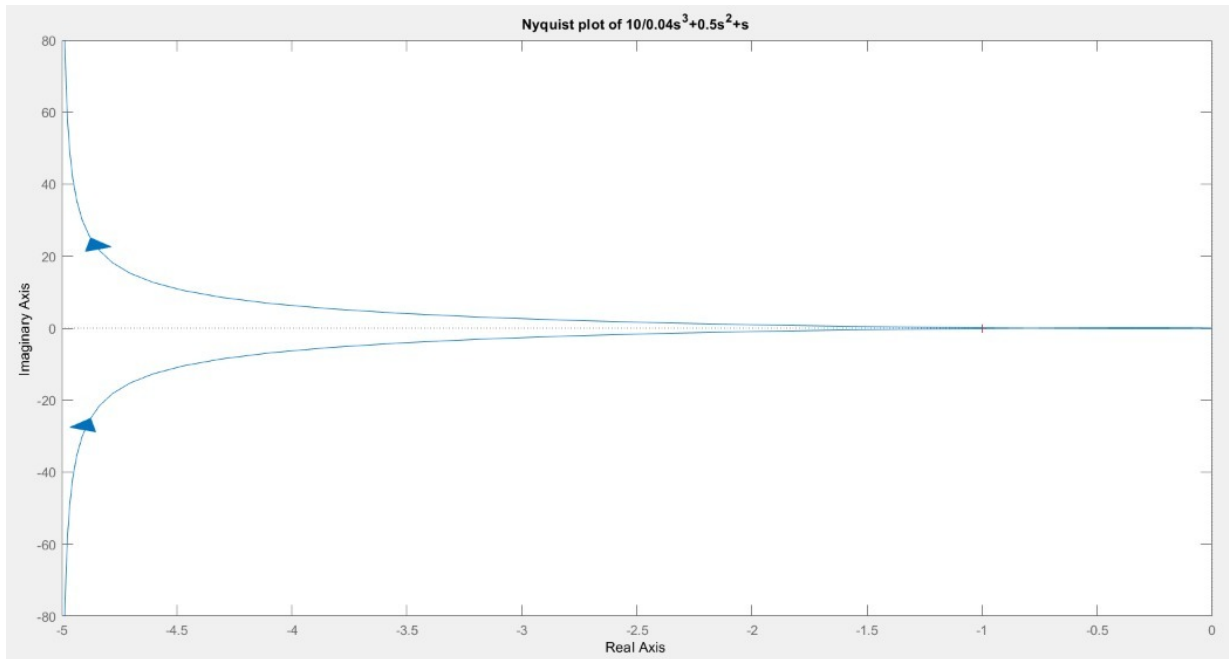
1. $G(s)=10/s(1+0.4s)(1+0.1s)$

```
Editor - C:\Users\HP\3D Objects\3-2\CS LAB\Untitled2.m
Untitled6.m x Untitled2.m x +
1 %%stability for 3rd order system
2 num=[10];
3 den=[0.04,0.5,1,0];
4 g2=tf(num,den);
5 figure(5)
6 bode(g2);
7 margin(g2);
8 title('Bode plot of 10/0.04s^3+0.5s^2+s');
9 margin(g2);
10 figure(6);
11 nyquist(g2);
12 title('Nyquist plot of 10/0.04s^3+0.5s^2+s');
13 figure(7);
14 rlocus(g2);
15 title('Root locus of 10/0.04s^3+0.5s^2+s');
16
```

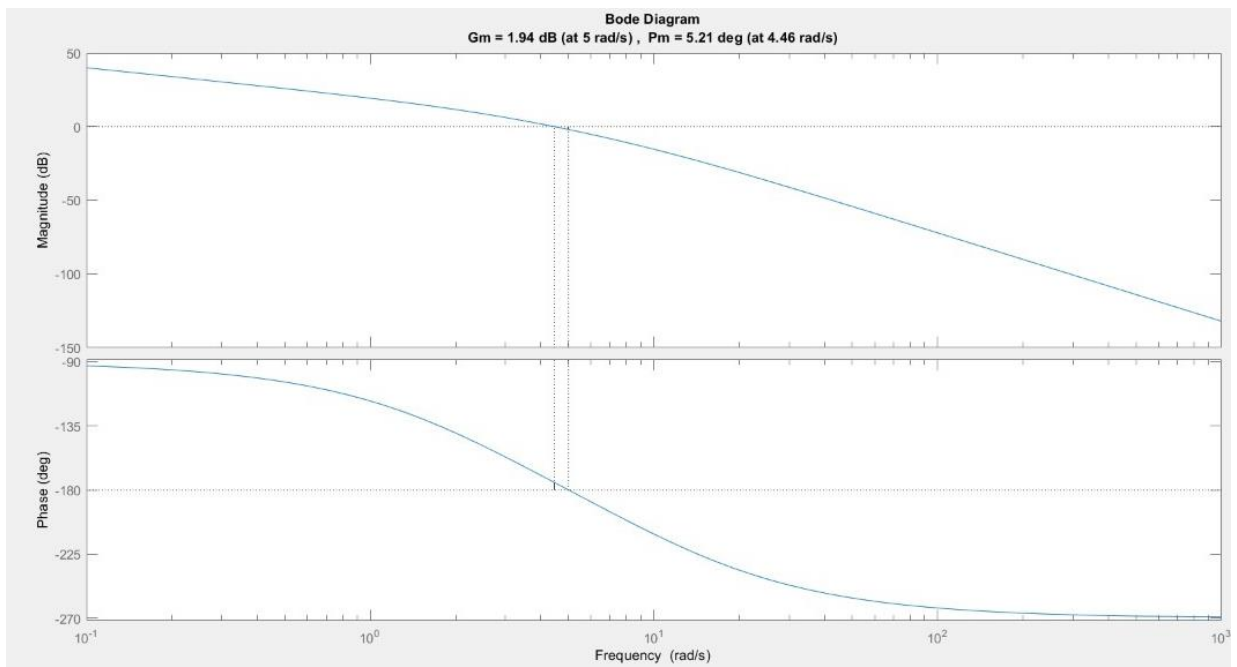
Root Locus :



Nyquist Plot:



Bode Plot:



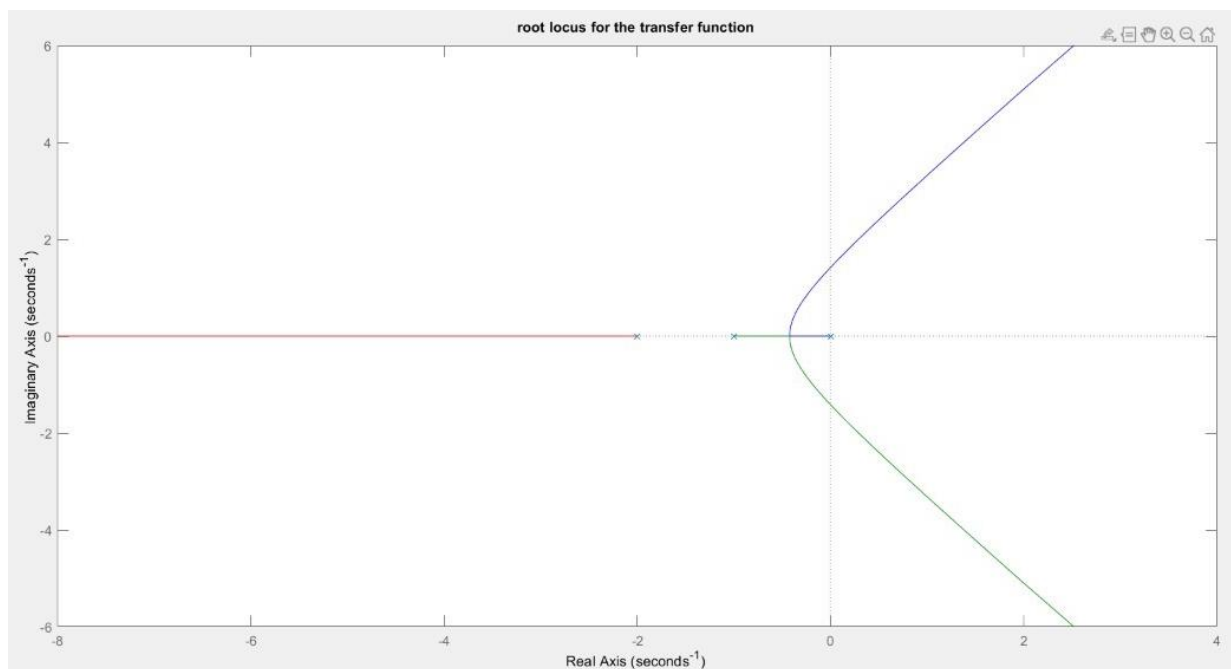
$$2. G(s) = 1/s(s+1)(s+2)$$

```

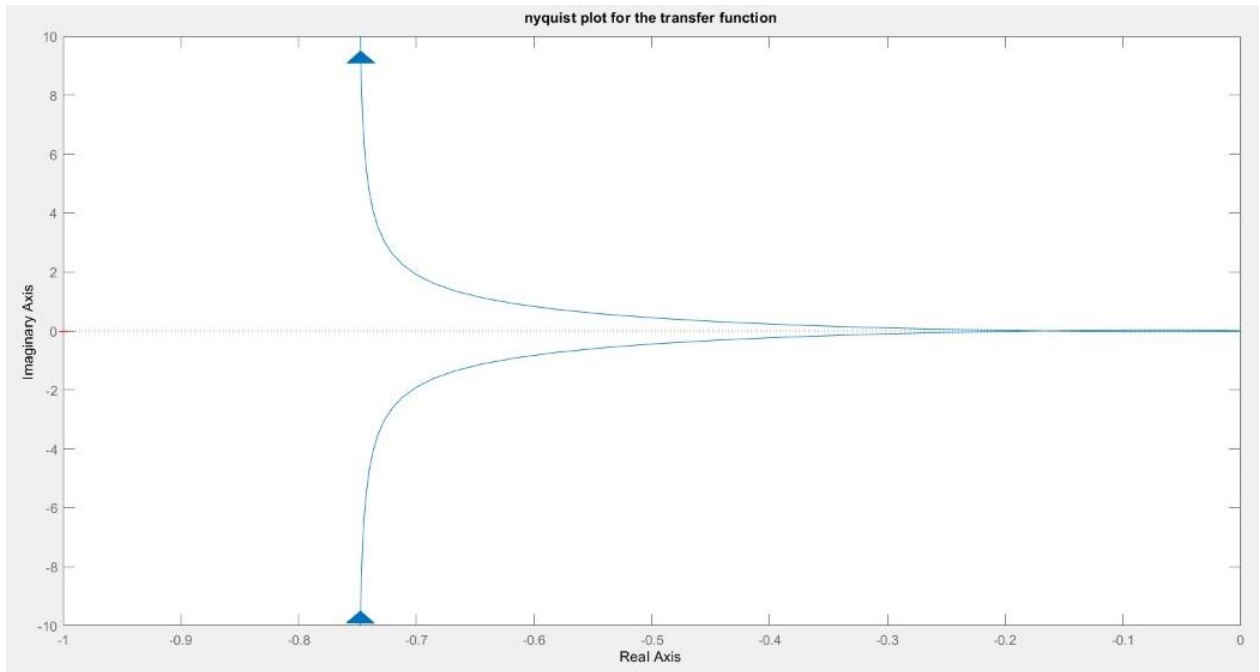
1  %%nyquist plot for the transfer function
2  p=[1]
3  q=[1 3 2 0]
4  gl=tf(p,q);
5  margin(gl);
6  figure(1);
7  nyquist(gl);
8  title('nyquist plot for the transfer function');
9  figure(2)
10 bode(gl);
11 margin(gl);
12 title('bode plot for the transfer function');
13 figure(3);
14 rlocus(gl);
15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

```

Root Locus



Nyquist Plot



Bode Plot

