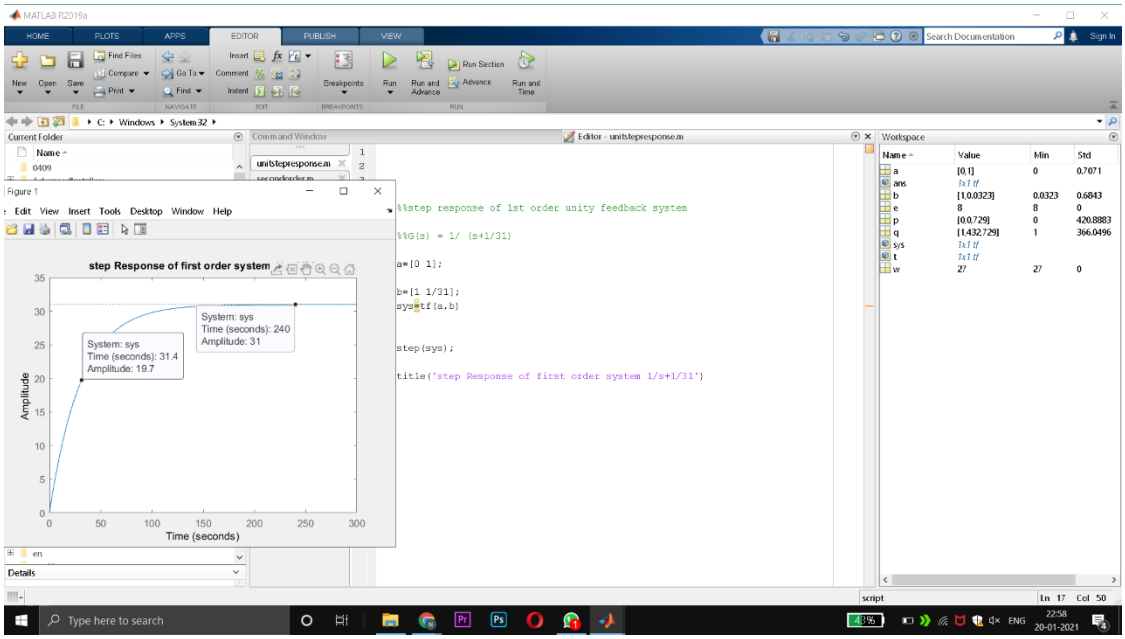
BATCH-3

1.	K.Nithin	511831
2.	R.Dheeraj	511862
3.	M.Jitendhra	511848
4.	K.HarshaVardhan Reddy	511836
5.	B.Sai Teja	511865

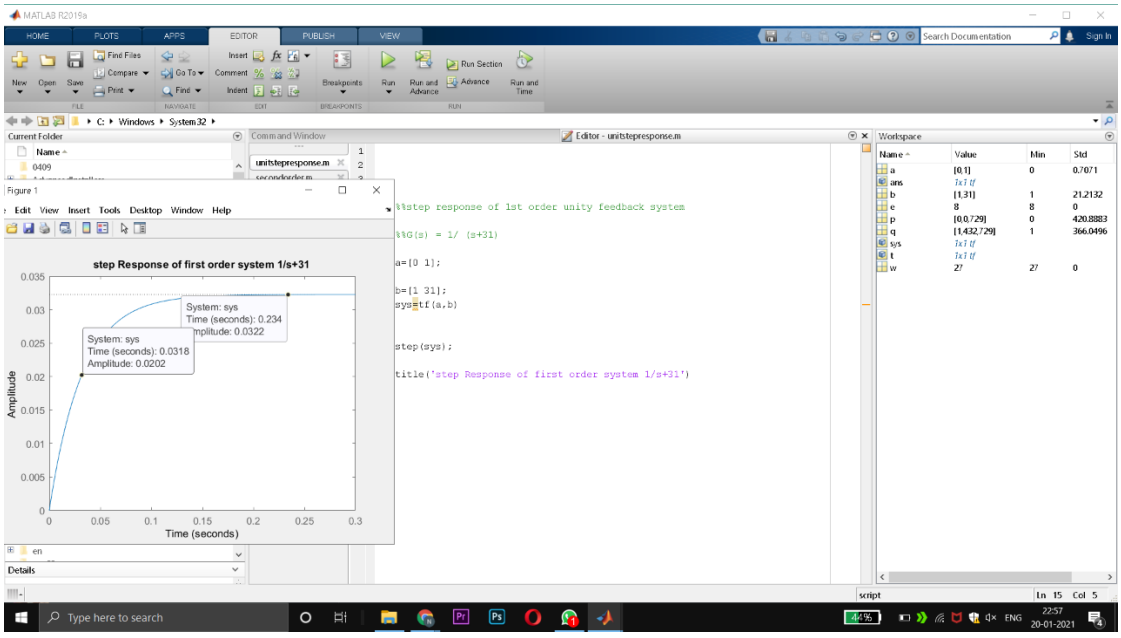
TIME RESPONSE OF FIRST ORDER SYTEM

STEP RESPONSE:

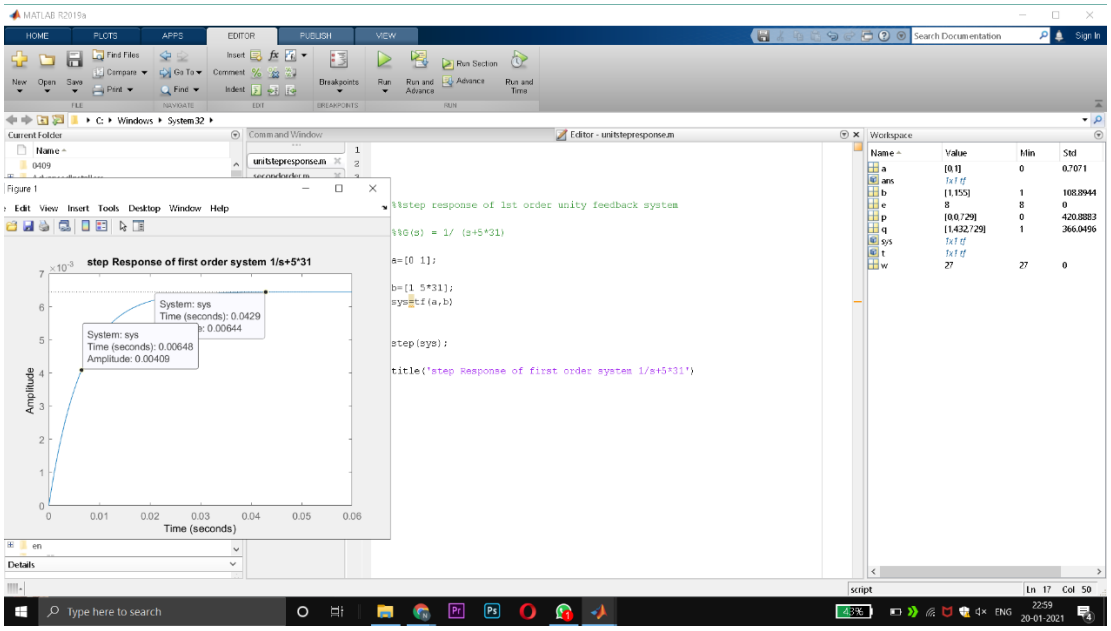
Pole at -1/31



Pole at -31

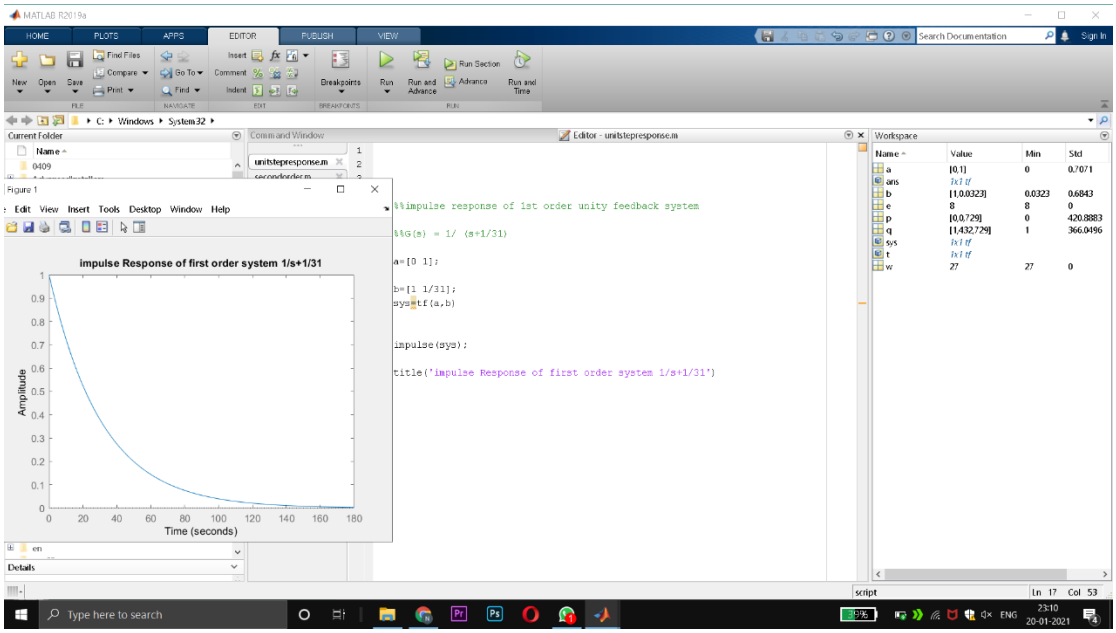


Pole at -5x31

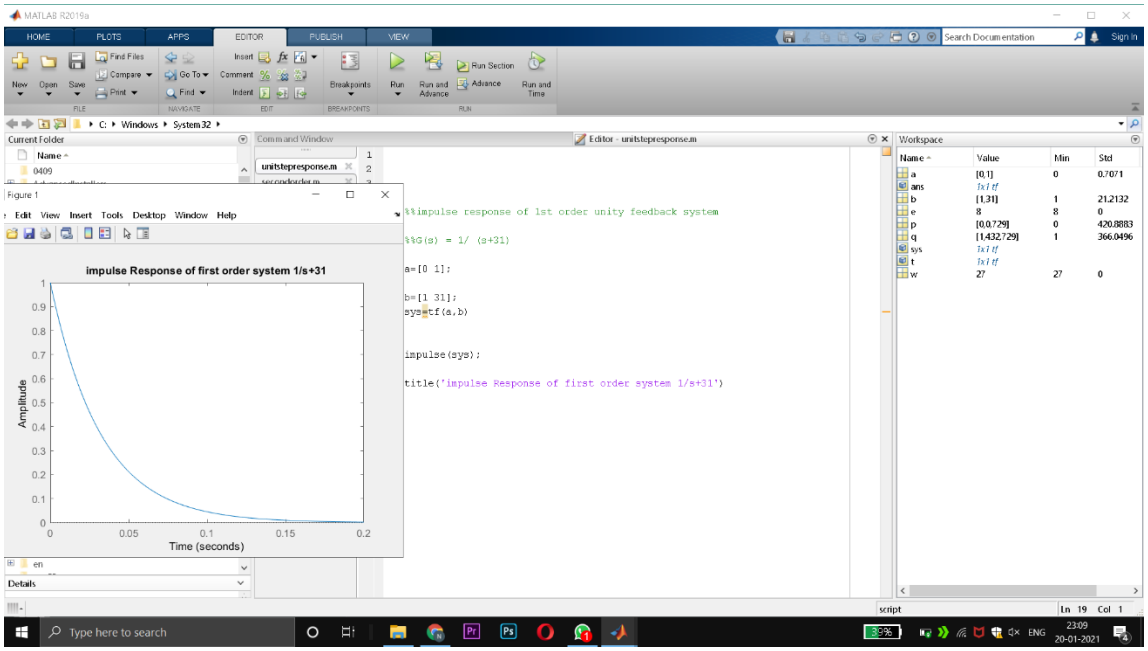


IMPULSE RESPONSE:

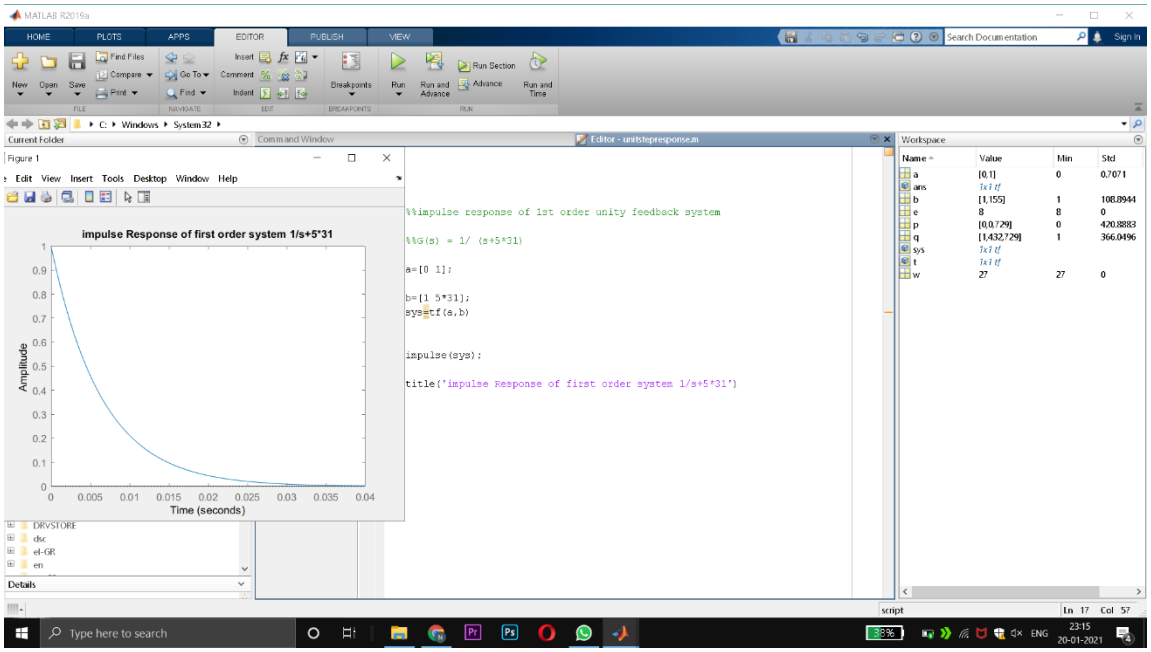
Pole at -1/31



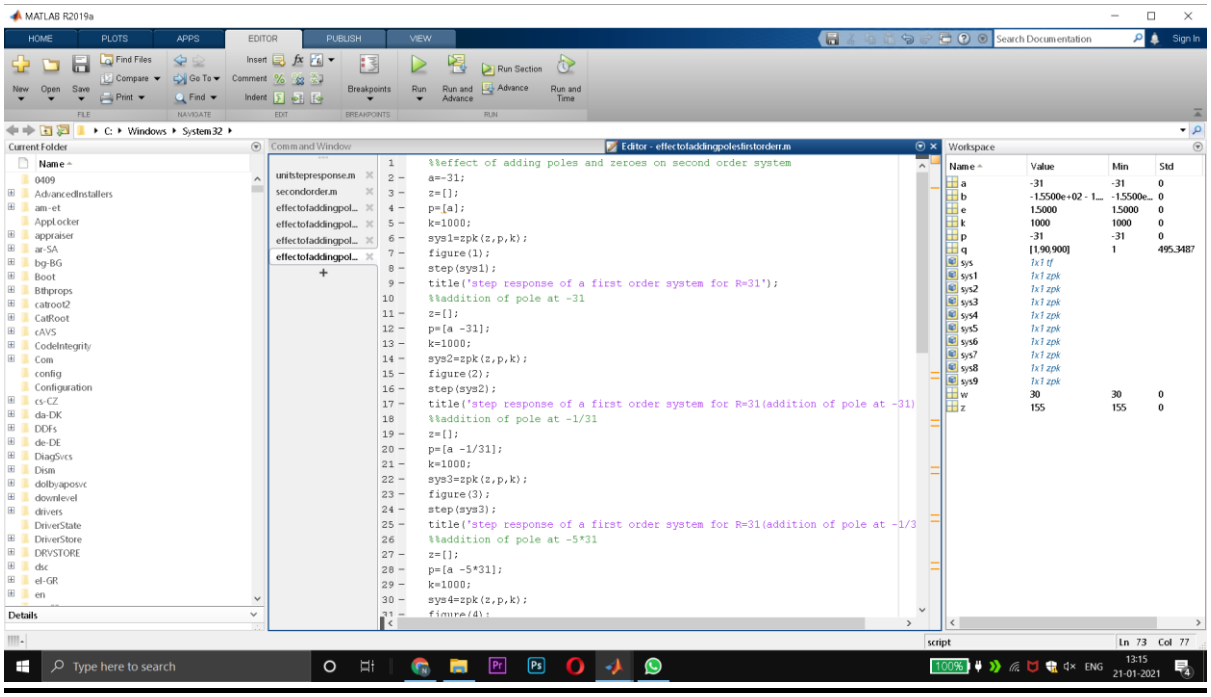
Pole at -31

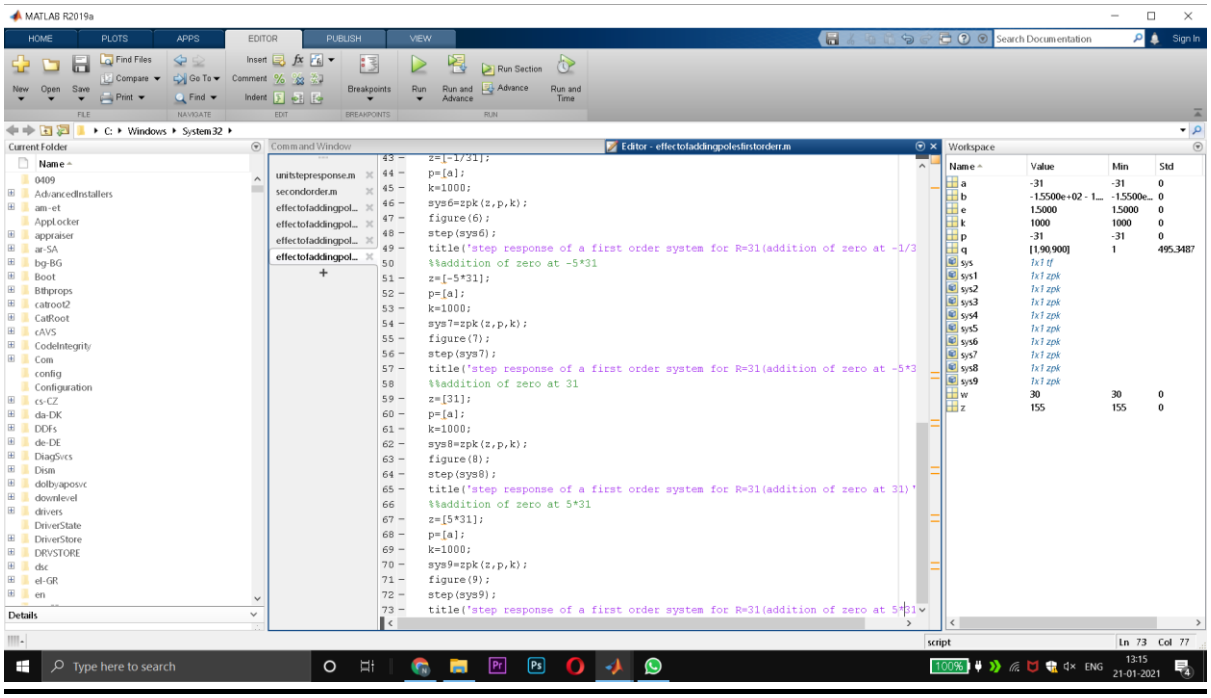


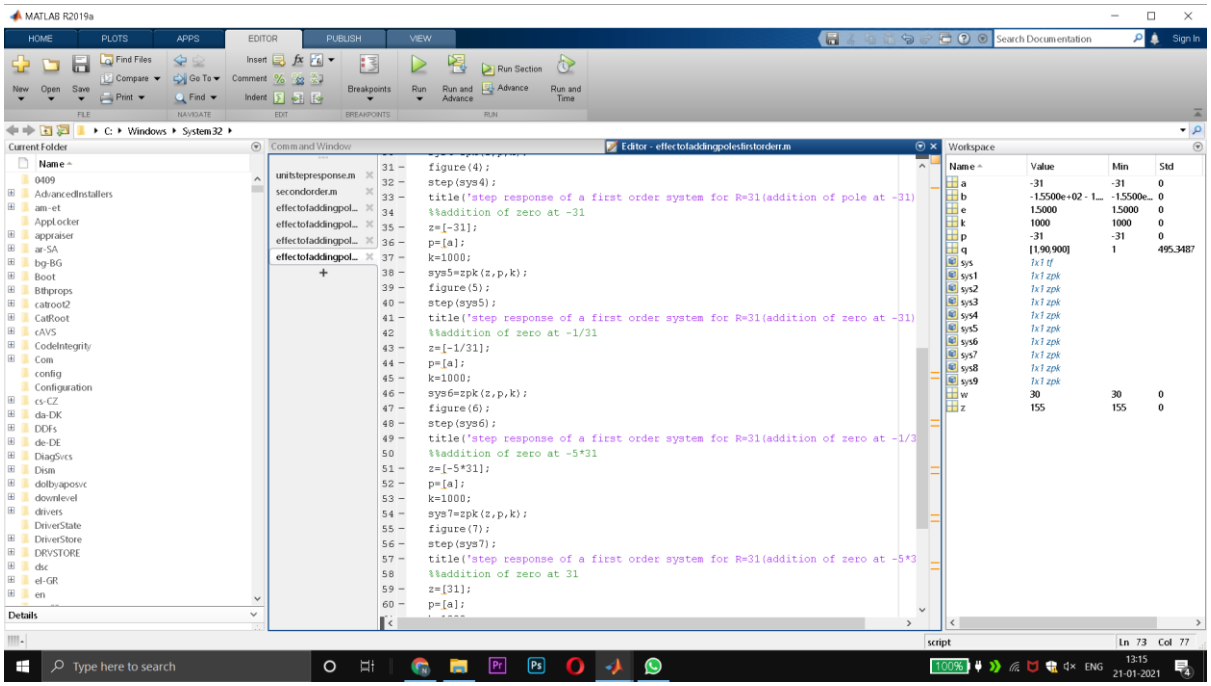
Pole at -5x31



Effect of adding Poles and Zeroes:






MATLAB R2019a
HOME
PLOTS
APPS
EDITOR
PUBLISH
VIEW
Search Documentation
Sign In
New
Open
Save
Find Files
Compare
Print
Go To
Find
Comment
Indent
Breakpoints
Run
Run and Advance
Run Section
Advance
Run and Time
C: ▸ Windows ▸ System32 ▸
Current Folder
Name
0409
AdvancedInstallers
am-et
AppLocker
appraiser
ar-SA
bg-BG
Boot
Bthprops
catroot2
CatRoot
cAVS
CodeIntegrity
Com
config
Configuration
cs-CZ
da-DK
DDFs
de-DE
DiagSvcs
Dism
dolbyaposvc
downlevel
drivers
DriverState
DriverStore
DRVSTORE
dsc
el-GR
en
Details
Command Window
Editor - effectofaddingpoleslirstorderr.m
unitstepresponse.m
secondorder.m
effectofaddingpol...
effectofaddingpol...
effectofaddingpol...
effectofaddingpol...
31 – figure(4);
32 – step(sys4);
33 – title('step response of a first order system for R=31(addition of pole at -31)
34 %%addition of zero at -31
35 – z=[-31];
36 – p=[a];
37 – k=1000;
38 – sys5=zpk(z,p,k);
39 – figure(5);
40 – step(sys5);
41 – title('step response of a first order system for R=31(addition of zero at -31)
42 %%addition of zero at -1/31
43 – z=[-1/31];
44 – p=[a];
45 – k=1000;
46 – sys6=zpk(z,p,k);
47 – figure(6);
48 – step(sys6);
49 – title('step response of a first order system for R=31(addition of zero at -1/3
50 %%addition of zero at -5*31
51 – z=[-5*31];
52 – p=[a];
53 – k=1000;
54 – sys7=zpk(z,p,k);
55 – figure(7);
56 – step(sys7);
57 – title('step response of a first order system for R=31(addition of zero at -5*3
58 %%addition of zero at 31
59 – z=[31];
60 – p=[a];
Workspace
Name
Value
Min
Std
a -31 -31 0
b -1.5500e+02 - 1... -1.5500e... 0
e 1.5000 1.5000 0
k 1000 1000 0
p -31 -31 0
q [1,90,900] 1 495.3487
sys 1x1 tf
sys1 1x1 zpk
sys2 1x1 zpk
sys3 1x1 zpk
sys4 1x1 zpk
sys5 1x1 zpk
sys6 1x1 zpk
sys7 1x1 zpk
sys8 1x1 zpk
sys9 1x1 zpk
w 30 30 0
z 155 155 0
script
Ln 73 Col 77
Type here to search
100%
ENG
13:15
21-01-2021

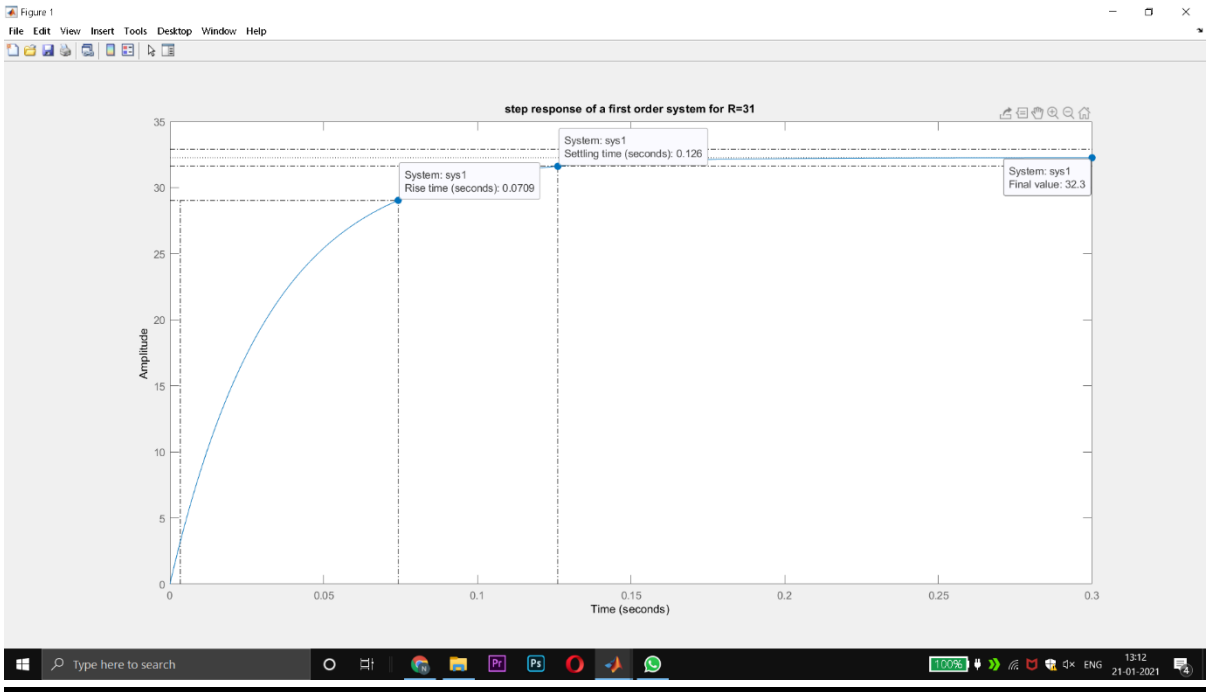


Figure 1
File Edit View Insert Tools Desktop Window Help
step response of a first order system for R=31
System: sys1
Settling time (seconds): 0.126
System: sys1
Rise time (seconds): 0.0709
System: sys1
Final value: 32.3
Amplitude
Time (seconds)
0
5
10
15
20
25
30
35
0
0.05
0.1
0.15
0.2
0.25
0.3
Type here to search
100%
ENG
13:12
21-01-2021

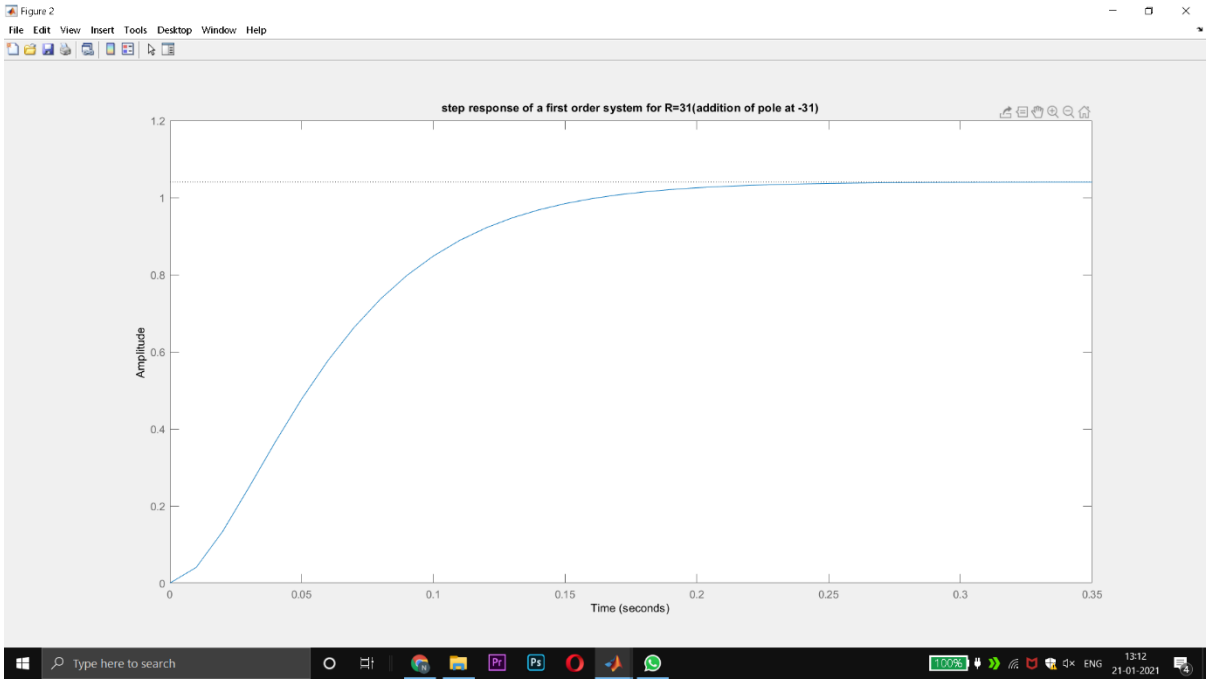


Figure 2
File Edit View Insert Tools Desktop Window Help
step response of a first order system for R=31(addition of pole at -31)
Amplitude
Time (seconds)
0
0.2
0.4
0.6
0.8
1
1.2
0.05
0.1
0.15
0.2
0.25
0.3
0.35
Type here to search
ENG
13:12
21-01-2021

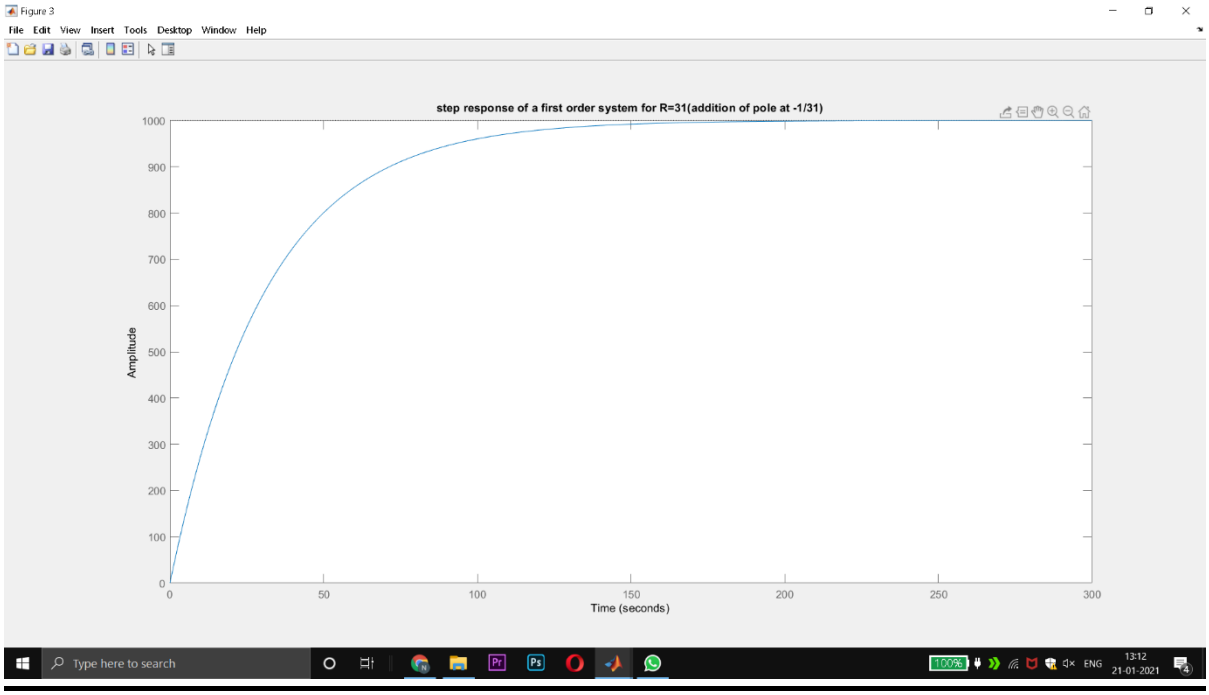


Figure 3
File Edit View Insert Tools Desktop Window Help
step response of a first order system for R=31(addition of pole at -1/31)
Amplitude
Time (seconds)
0
100
200
300
400
500
600
700
800
900
1000
50
150
250
Type here to search
ENG
13:12
21-01-2021

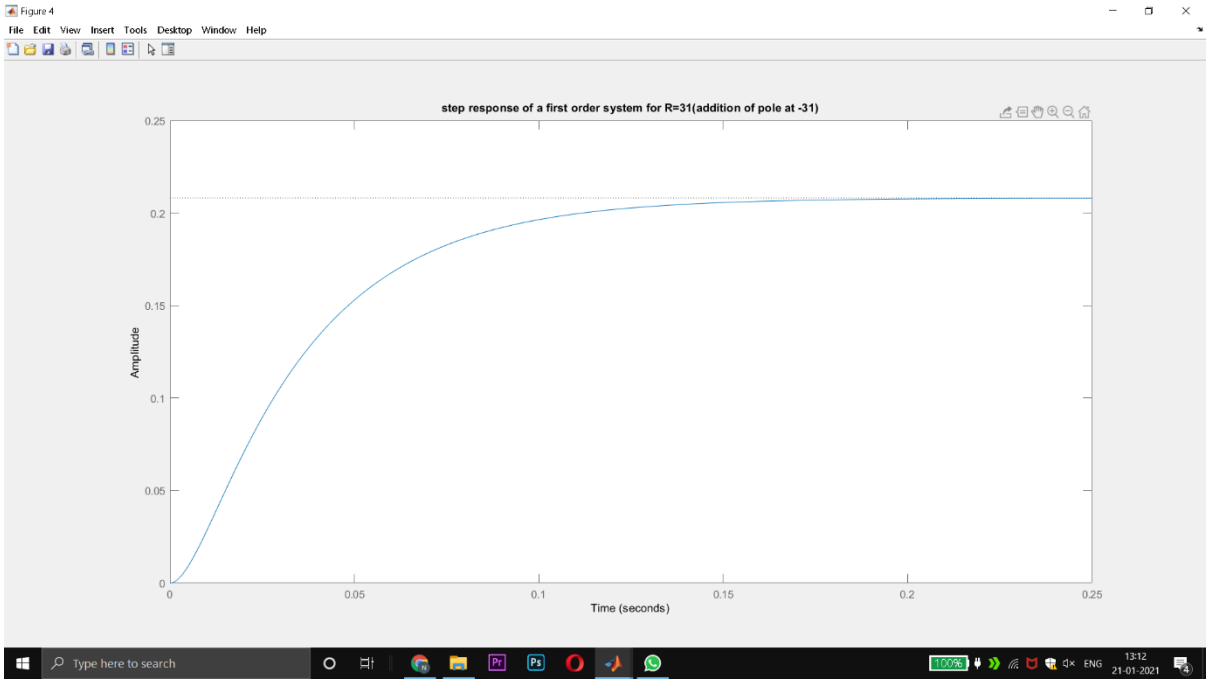


Figure 4
File Edit View Insert Tools Desktop Window Help
step response of a first order system for R=31(addition of pole at -31)
Amplitude
Time (seconds)
0
0.05
0.1
0.15
0.2
0.25
Type here to search
ENG
13:12
21-01-2021

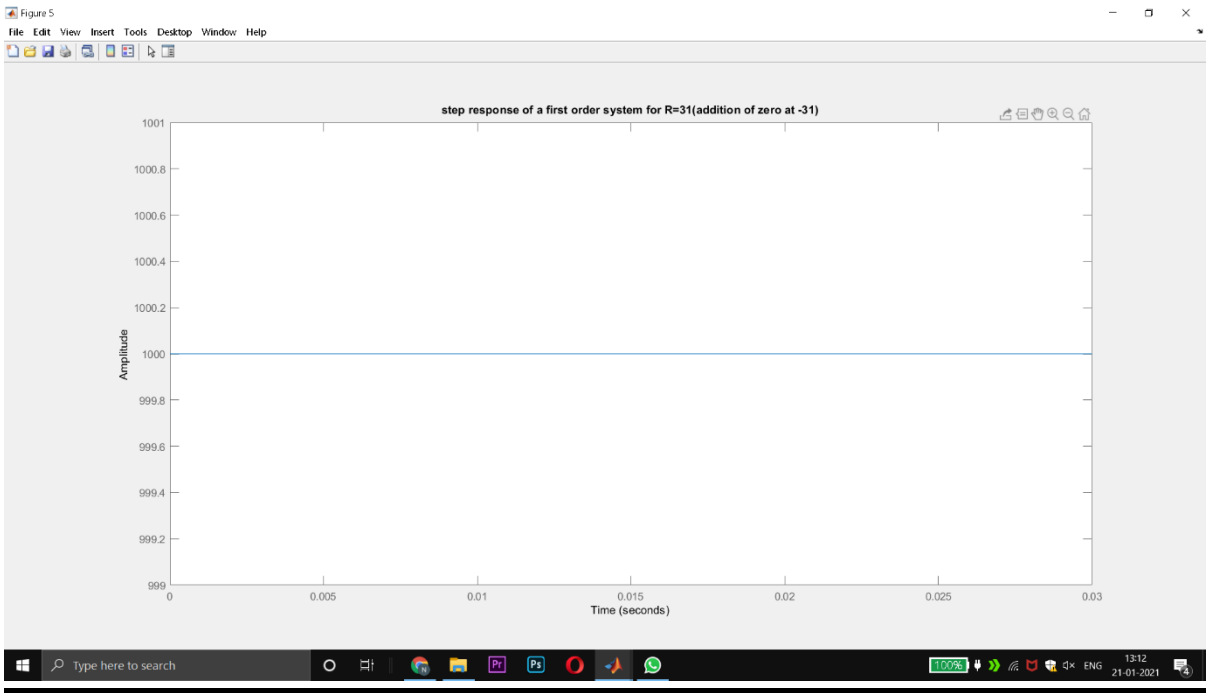


Figure 5
File Edit View Insert Tools Desktop Window Help
step response of a first order system for R=31(addition of zero at -31)
Amplitude
Time (seconds)
999
999.2
999.4
999.6
999.8
1000
1000.2
1000.4
1000.6
1000.8
1001
0
0.005
0.01
0.015
0.02
0.025
0.03
Type here to search
ENG
13:12
21-01-2021

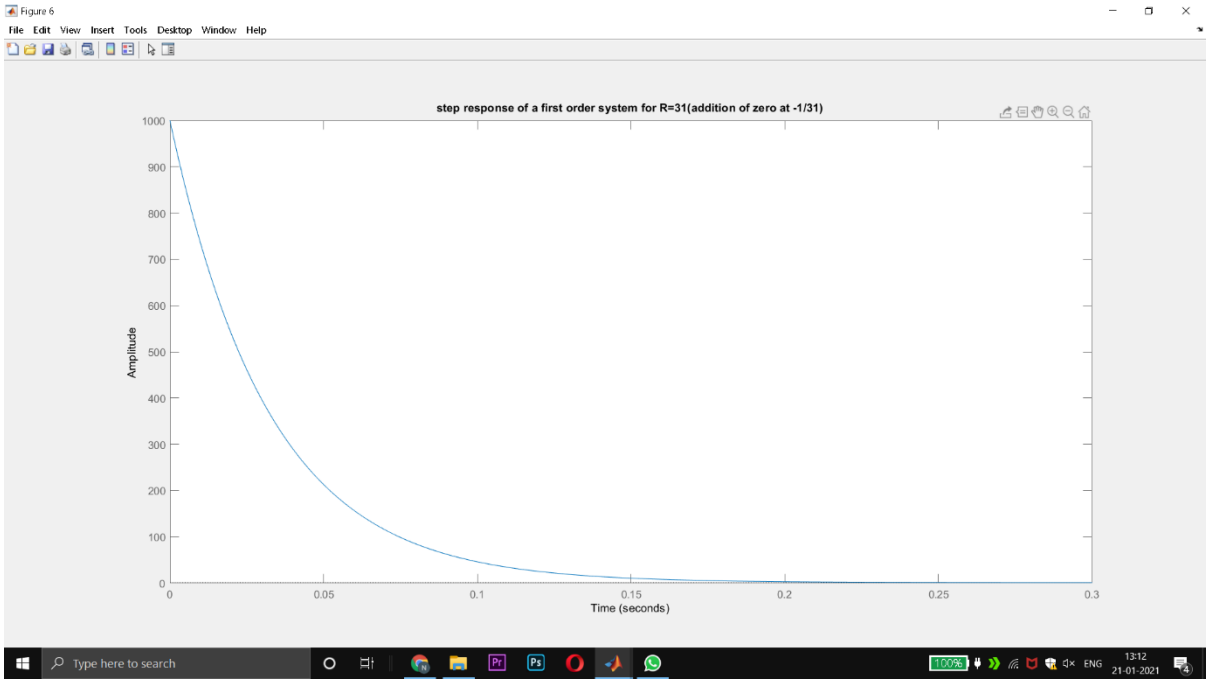


Figure 6
File Edit View Insert Tools Desktop Window Help
step response of a first order system for R=31(addition of zero at -1/31)
Amplitude
Time (seconds)
0
100
200
300
400
500
600
700
800
900
1000
0.05
0.1
0.15
0.2
0.25
0.3
Type here to search
ENG
13:12
21-01-2021

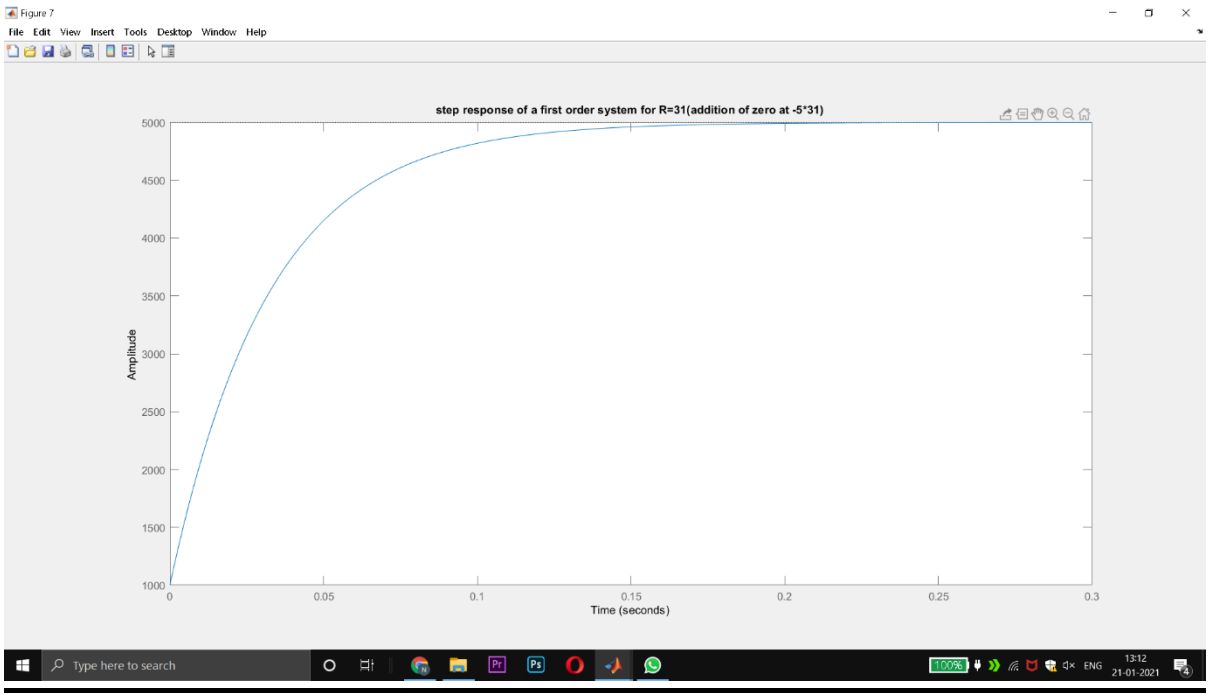


Figure 7
File Edit View Insert Tools Desktop Window Help
step response of a first order system for R=31(addition of zero at -5*31)
Amplitude
Time (seconds)
1000
1500
2000
2500
3000
3500
4000
4500
5000
0.05
0.1
0.15
0.2
0.25
0.3
Type here to search
ENG
13:12
21-01-2021

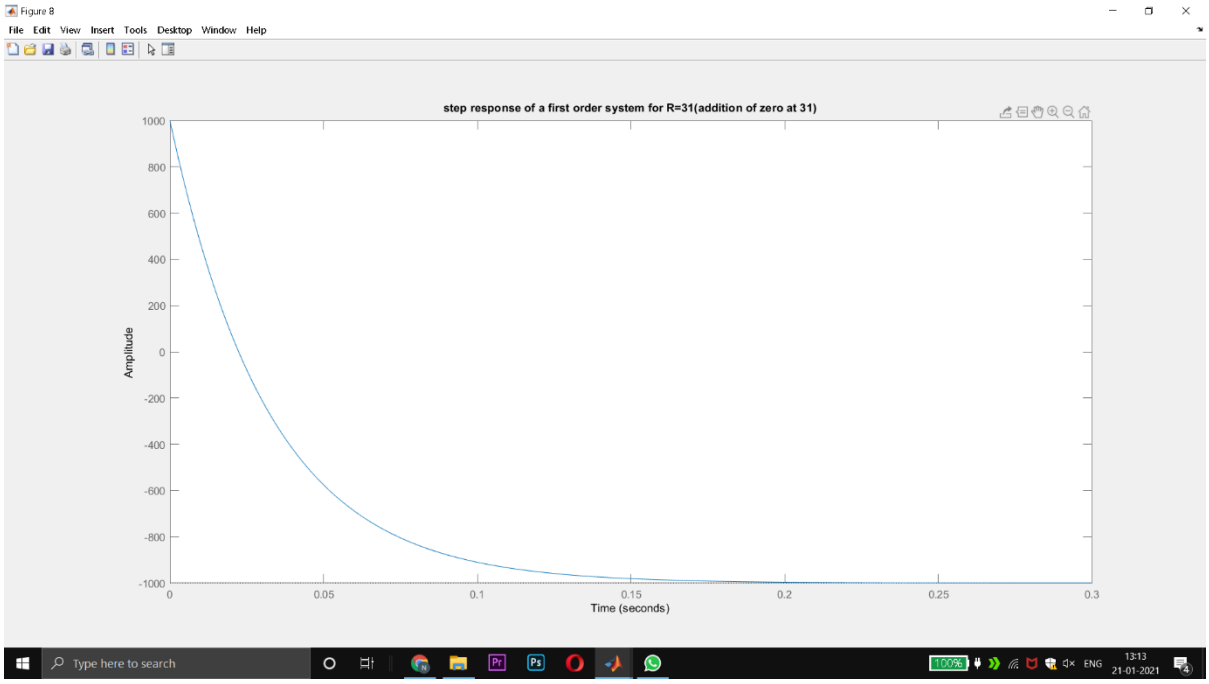


Figure 8
File Edit View Insert Tools Desktop Window Help
step response of a first order system for R=31(addition of zero at 31)
Amplitude
Time (seconds)
1000
800
600
400
200
0
-200
-400
-600
-800
-1000
0
0.05
0.1
0.15
0.2
0.25
0.3
Type here to search
ENG
13:13
21-01-2021

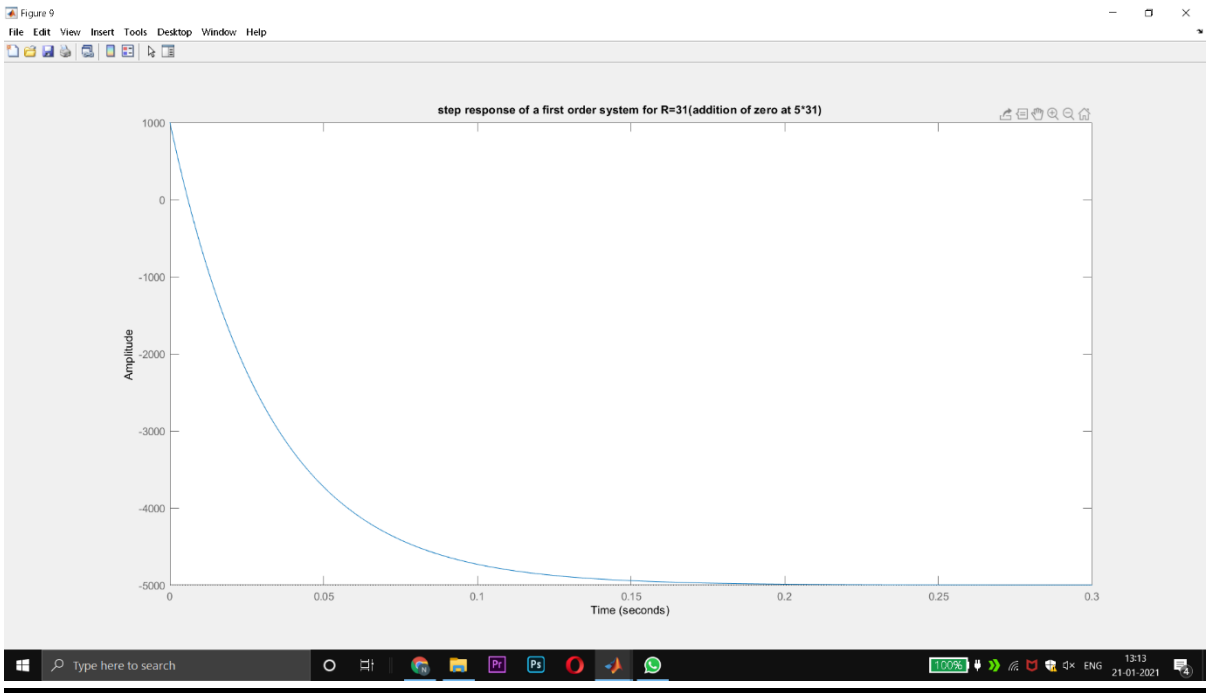
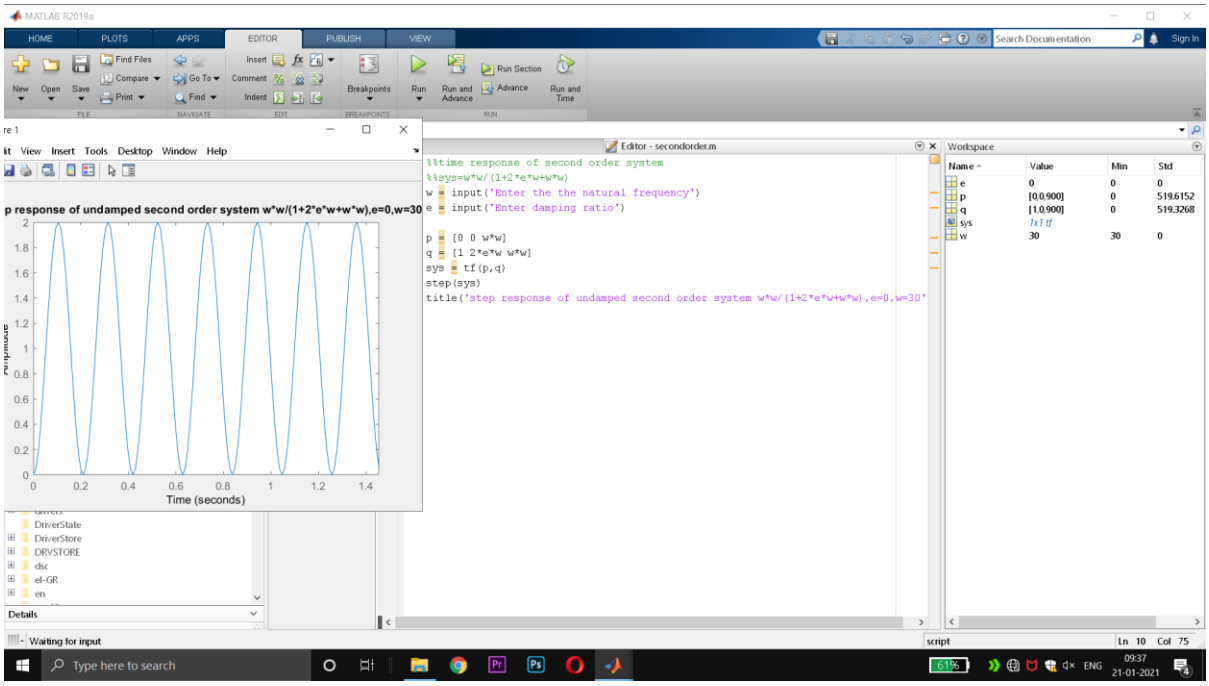
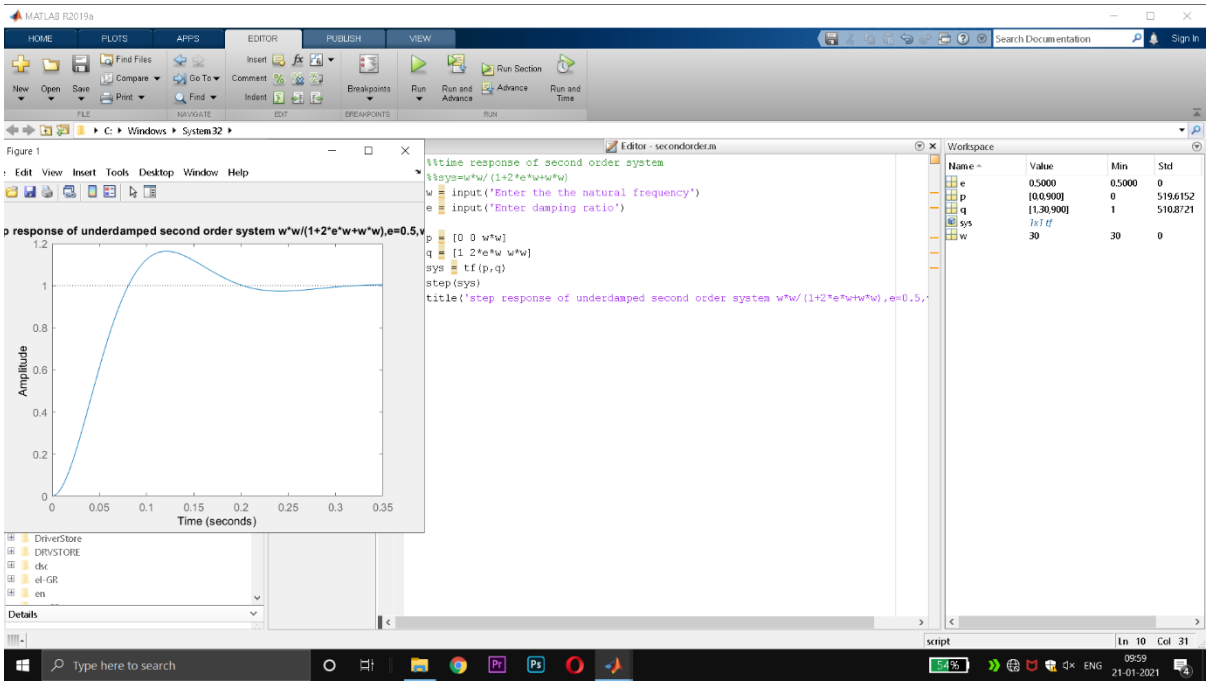


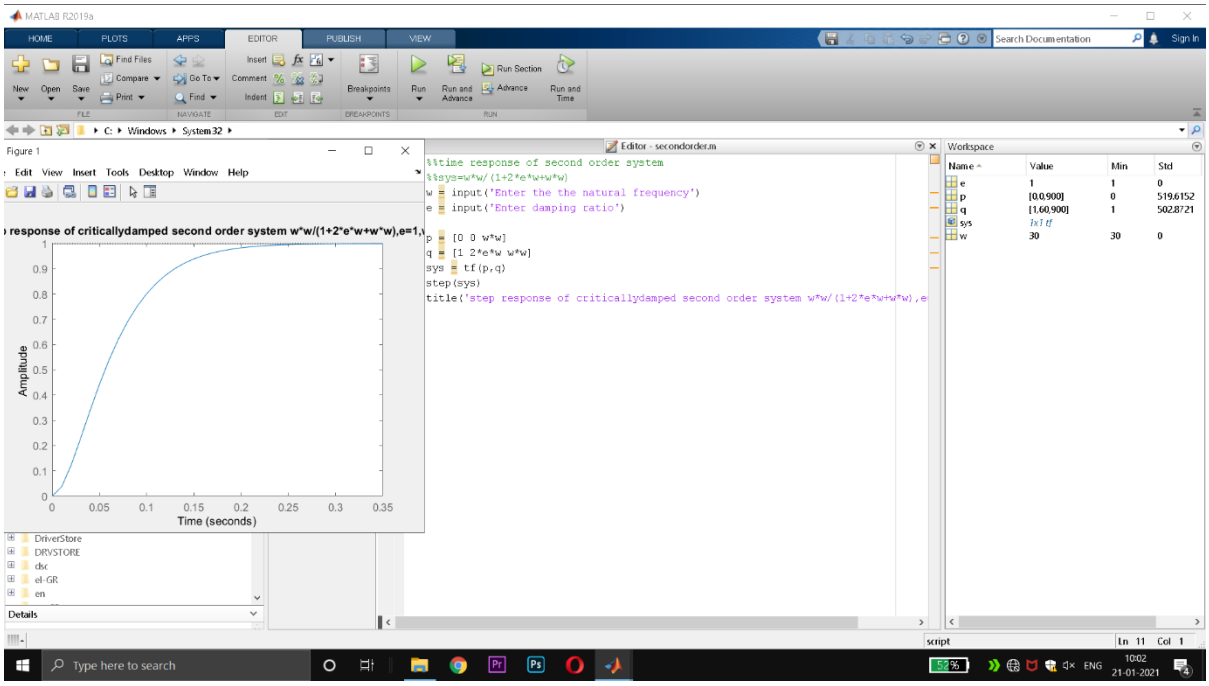
Figure 9
File Edit View Insert Tools Desktop Window Help
step response of a first order system for R=31(addition of zero at 5*31)
Amplitude
Time (seconds)
1000
0
-1000
-2000
-3000
-4000
-5000
0
0.05
0.1
0.15
0.2
0.25
0.3
Type here to search
ENG
13:13
21-01-2021

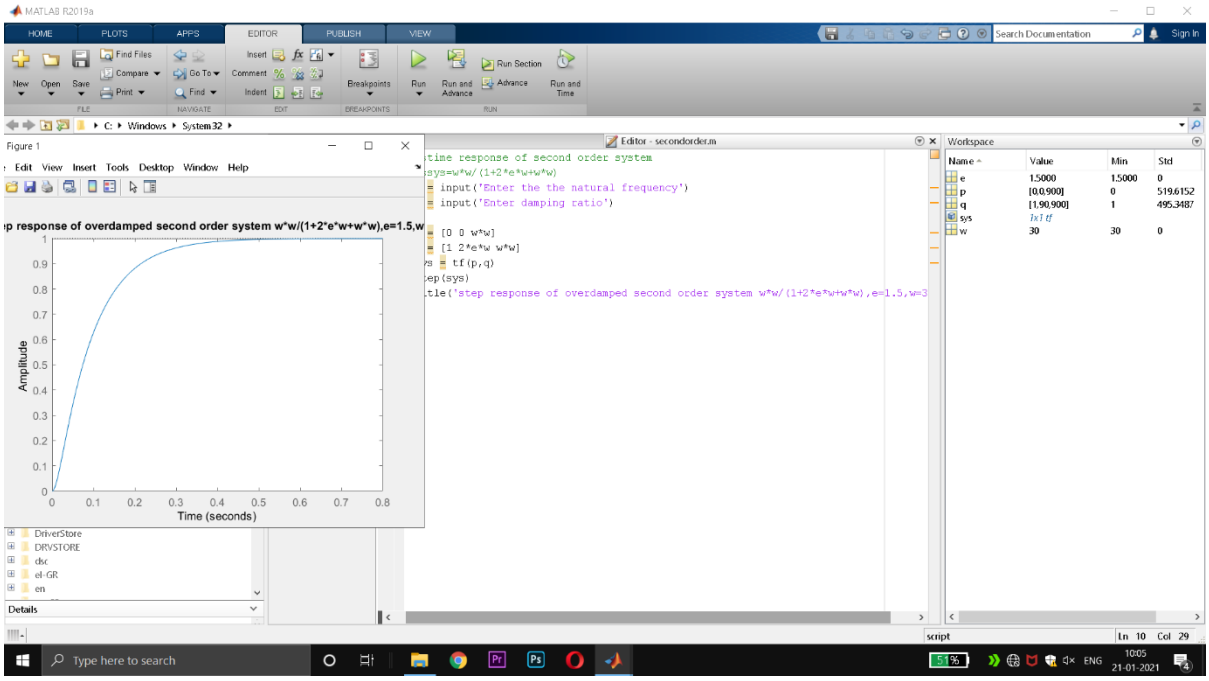
TIME RESPONSE OF SECOND ORDER SYSTEM

STEP RESPONSE:

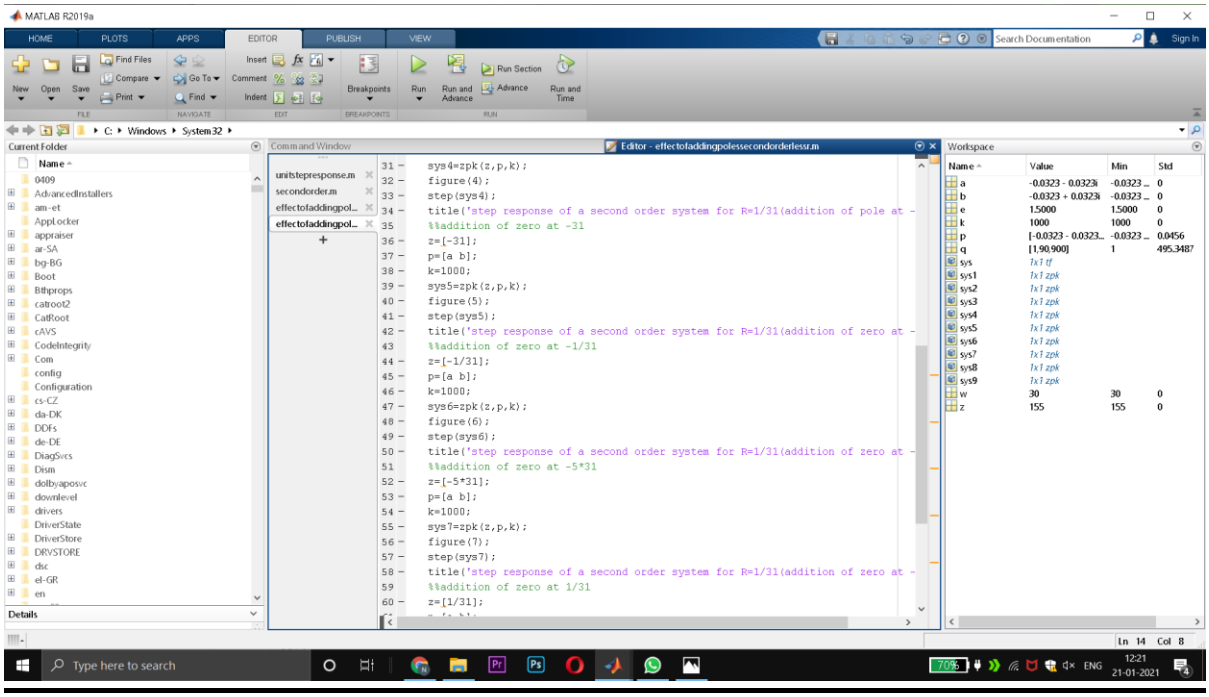


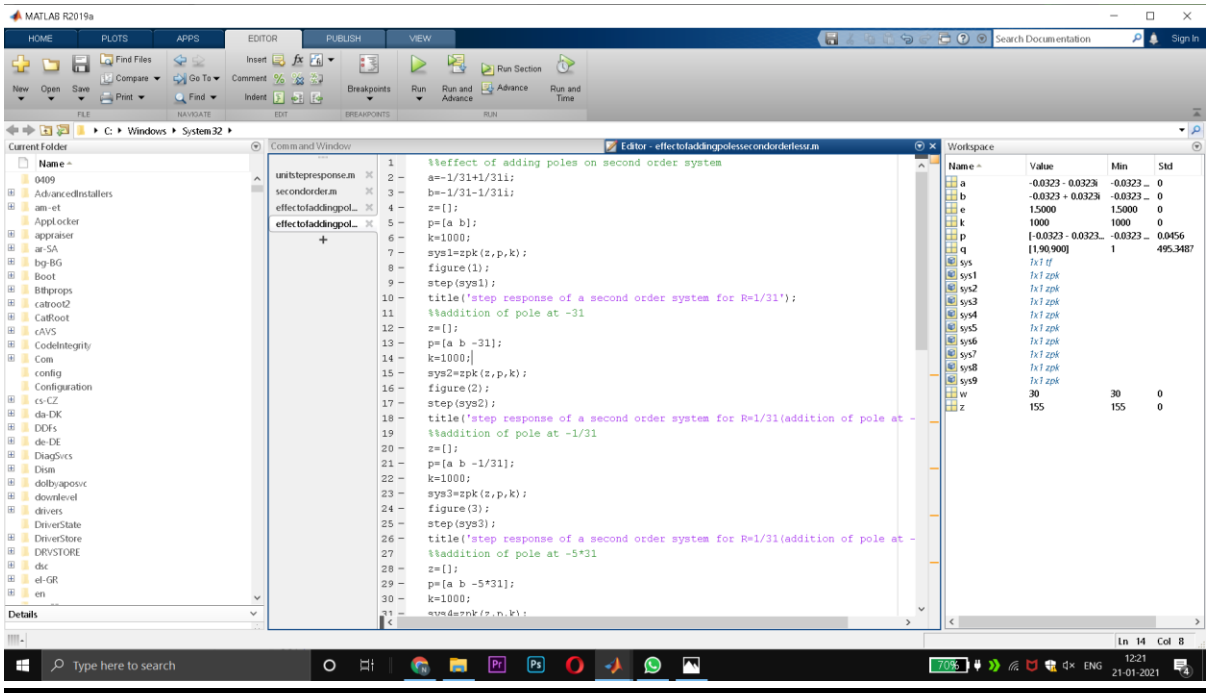


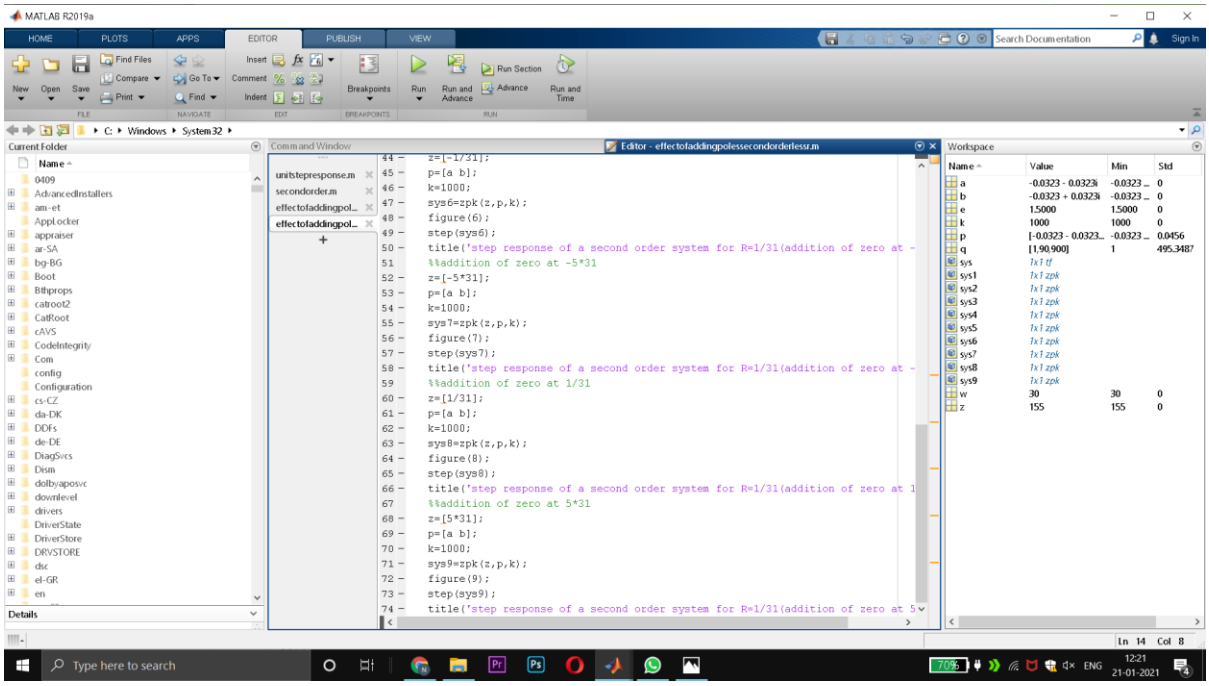

MATLAB R2019a
Figure 1
Edit View Insert Tools Desktop Window Help
response of criticallydamped second order system w*w/(1+2*e*w+w*w),e=1,
Amplitude
Time (seconds)
Editor - secondorder.m
%%time response of second order system
%%sys=w*w/(1+2*e*w+w*w)
w = input('Enter the the natural frequency')
e = input('Enter damping ratio')
p = [0 0 w*w]
q = [1 2*e*w w*w]
sys = tf(p,q)
step(sys)
title('step response of criticallydamped second order system w*w/(1+2*e*w+w*w),e
Workspace
Name Value Min Std
e 1 1 0
p [0,0,900] 0 519.6152
q [1,60,900] 1 502.8721
sys 1x1 tf
w 30 30 0
script
Ln 11 Col 1
Type here to search
ENG
10:02
21-01-2021


MATLAB R2019a
Figure 1
Edit View Insert Tools Desktop Window Help
response of overdamped second order system w*w/(1+2*e*w+w*w),e=1.5,w
Amplitude
Time (seconds)
Editor - secondorder.m
time response of second order system
sys=w*w/(1+2*e*w+w*w)
input('Enter the the natural frequency')
input('Enter damping ratio')
[0 0 w*w]
[1 2*e*w w*w]
tf(p,q)
step(sys)
title('step response of overdamped second order system w*w/(1+2*e*w+w*w),e=1.5,w=3
Workspace
Name Value Min Std
e 1.5000 1.5000 0
p [0,0,900] 0 519.6152
q [1,90,900] 1 495.3487
sys 1x1 tf
w 30 30 0
script
Ln 10 Col 29
Type here to search
ENG
10:05
21-01-2021

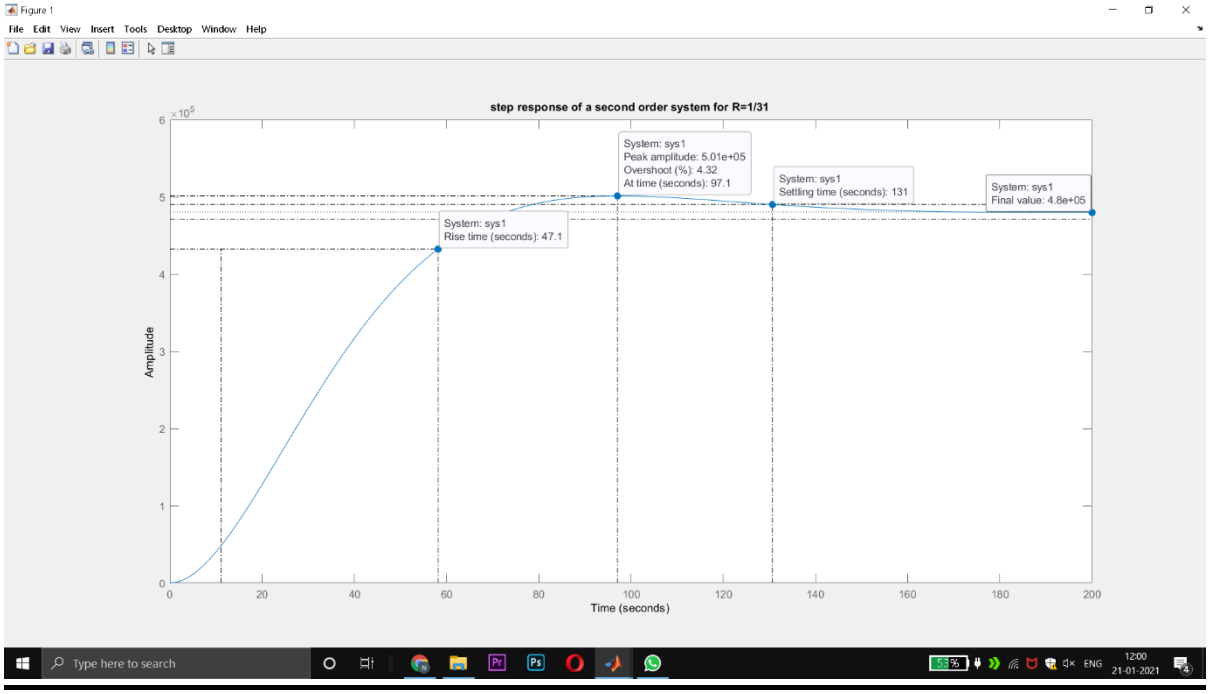
Effect of adding Poles and Zeroes:







For a=1/31 Pole pairs (-a+ia),(-a-ia)



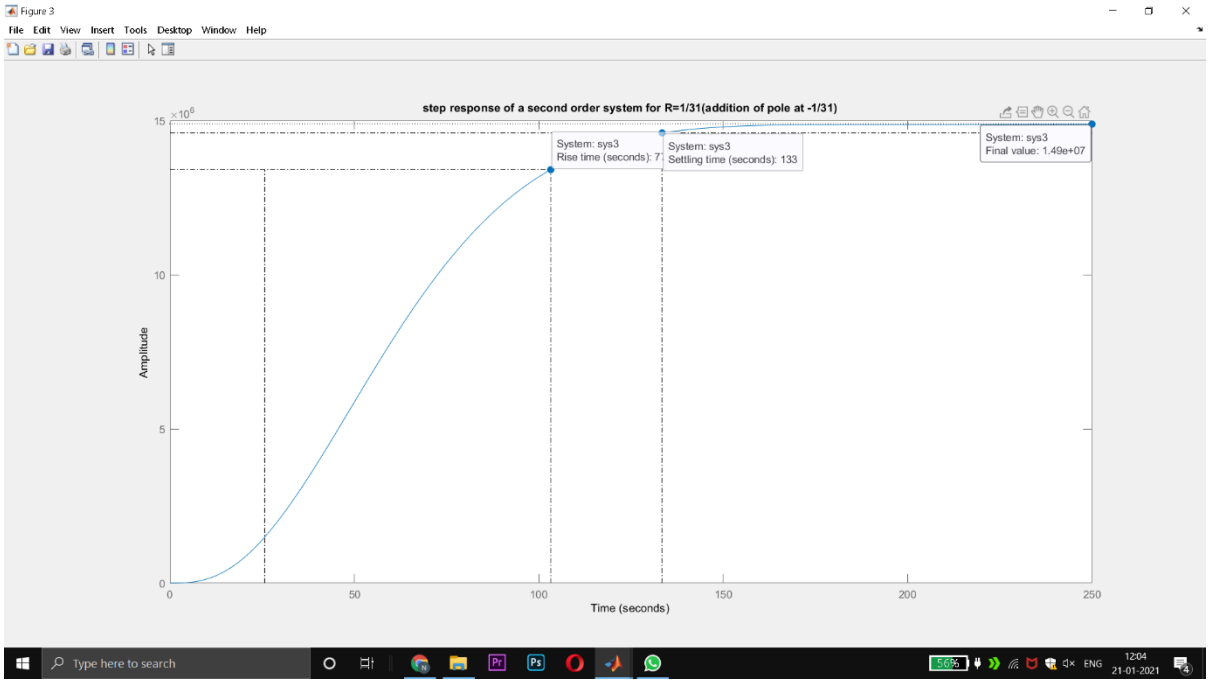


Figure 3
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=1/31(addition of pole at -1/31)
×10^6
15
10
5
0
Amplitude
0
50
100
150
200
250
Time (seconds)
System: sys3
Rise time (seconds): 7
System: sys3
Settling time (seconds): 133
System: sys3
Final value: 1.49e+07
Type here to search
ENG
12:04
21-01-2021

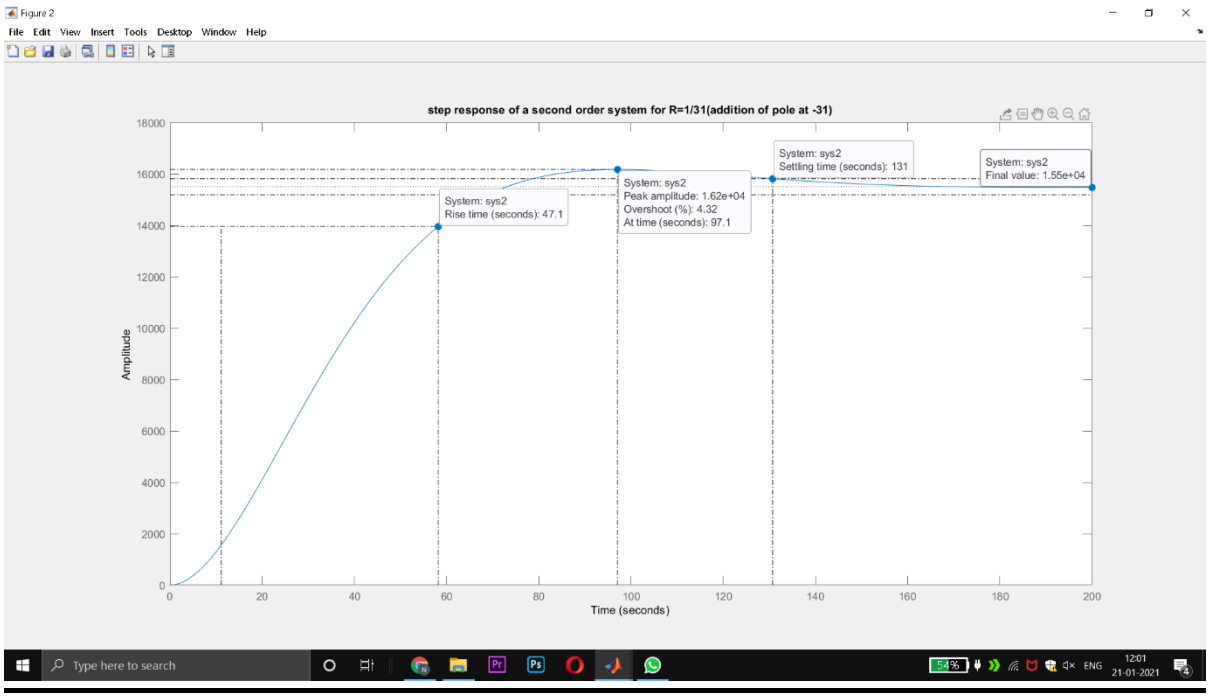


Figure 2
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=1/31(addition of pole at -31)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Amplitude
0
20
40
60
80
100
120
140
160
180
200
Time (seconds)
System: sys2
Rise time (seconds): 47.1
System: sys2
Peak amplitude: 1.62e+04
Overshoot (%): 4.32
At time (seconds): 97.1
System: sys2
Settling time (seconds): 131
System: sys2
Final value: 1.55e+04
Type here to search
ENG
12:01
21-01-2021

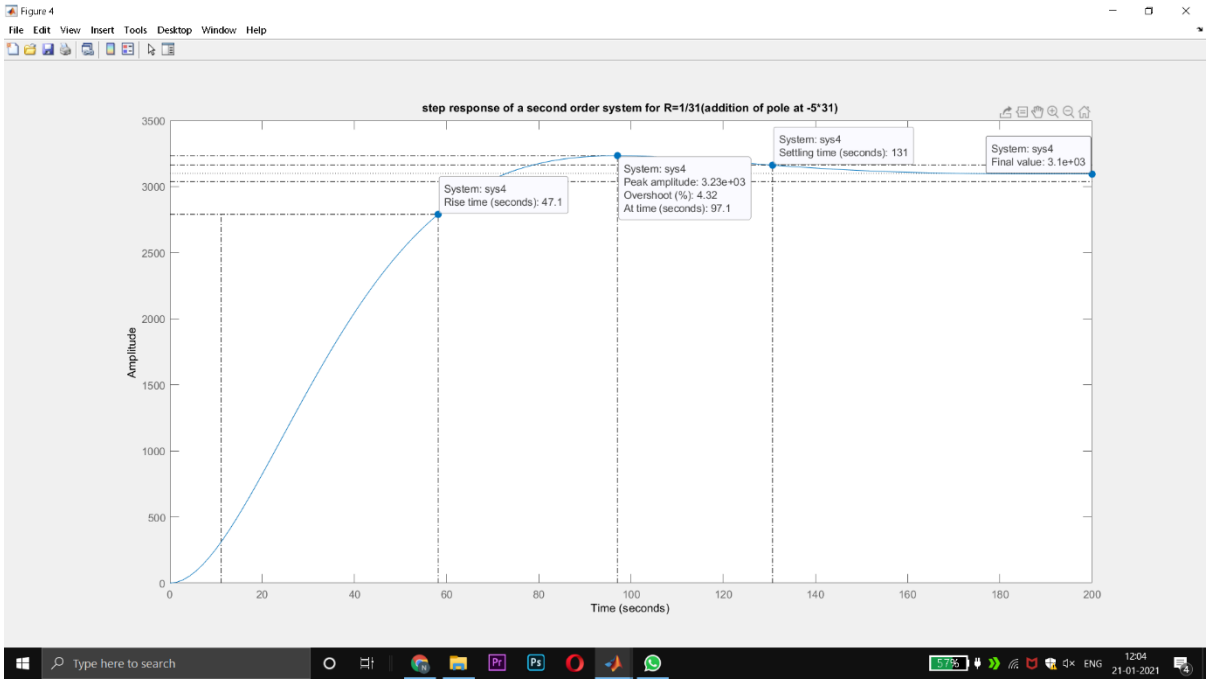


Figure 4
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=1/31(addition of pole at -5*31)
System: sys4
Rise time (seconds): 47.1
System: sys4
Peak amplitude: 3.23e+03
Overshoot (%): 4.32
At time (seconds): 97.1
System: sys4
Settling time (seconds): 131
System: sys4
Final value: 3.1e+03
Amplitude
Time (seconds)
Type here to search
ENG
12:04
21-01-2021

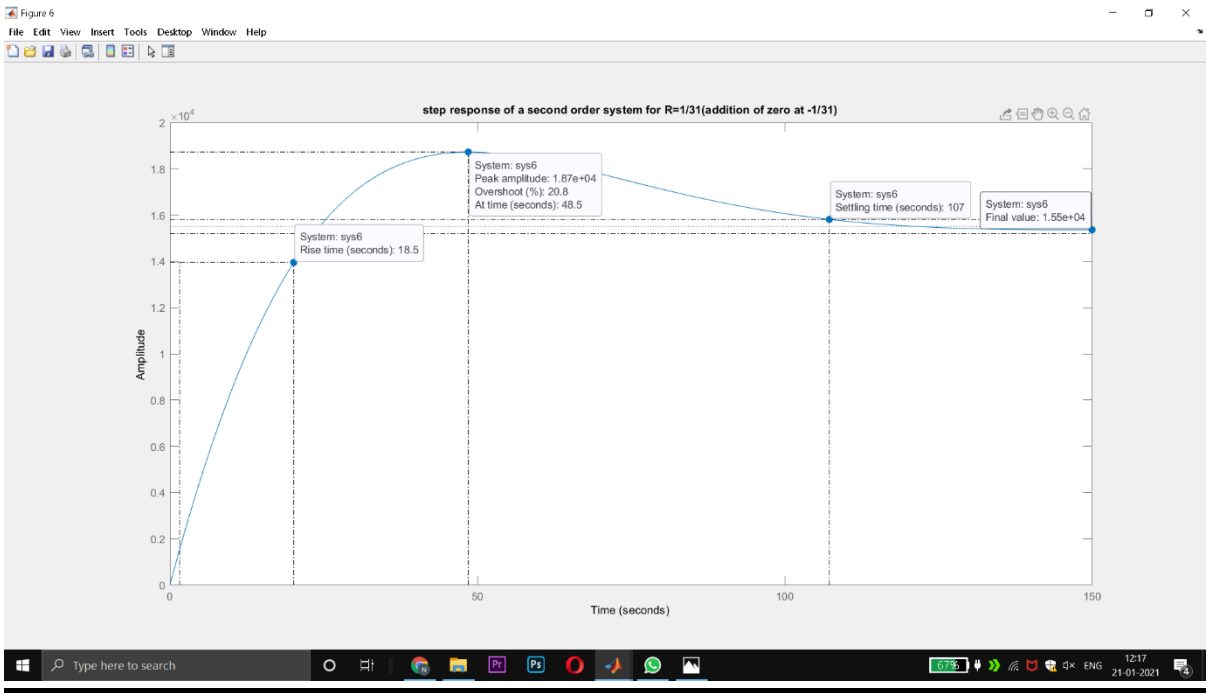


Figure 6
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=1/31(addition of zero at -1/31)
×10^4
System: sys6
Peak amplitude: 1.87e+04
Overshoot (%): 20.8
At time (seconds): 48.5
System: sys6
Rise time (seconds): 18.5
System: sys6
Settling time (seconds): 107
System: sys6
Final value: 1.55e+04
Amplitude
Time (seconds)
Type here to search
ENG
12:17
21-01-2021

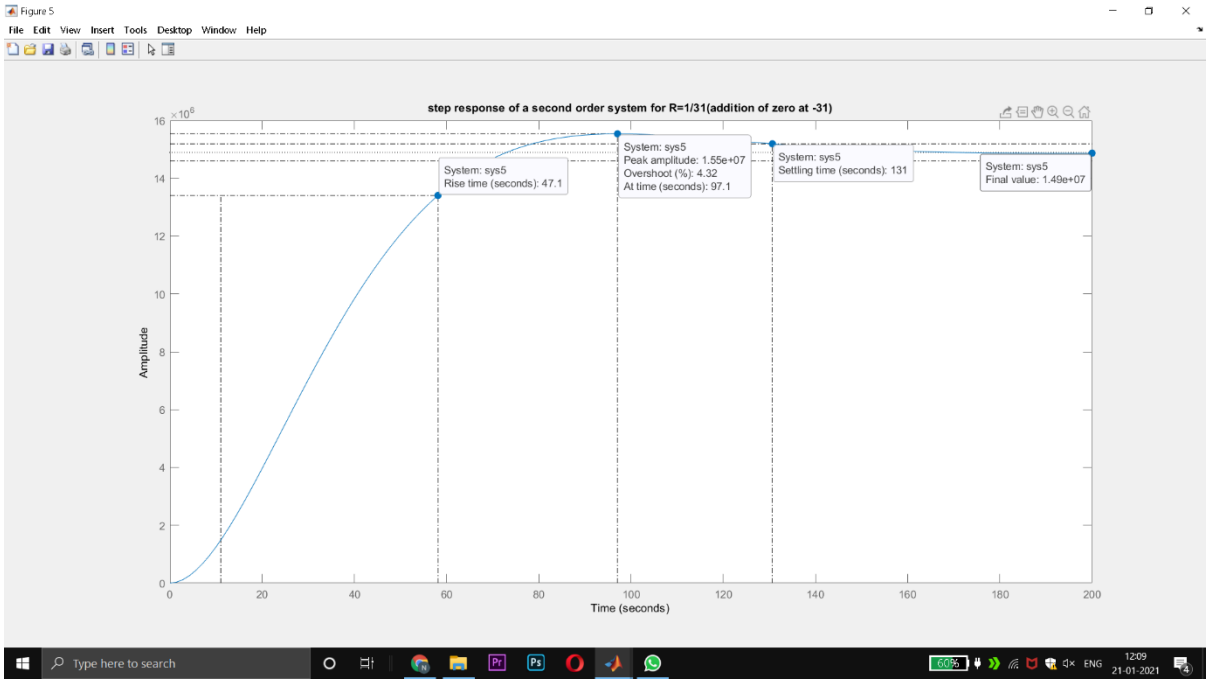


Figure 5
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=1/31(addition of zero at -31)
×10^6
Amplitude
Time (seconds)
System: sys5
Rise time (seconds): 47.1
System: sys5
Peak amplitude: 1.55e+07
Overshoot (%): 4.32
At time (seconds): 97.1
System: sys5
Settling time (seconds): 131
System: sys5
Final value: 1.49e+07
Type here to search
ENG
12:09
21-01-2021

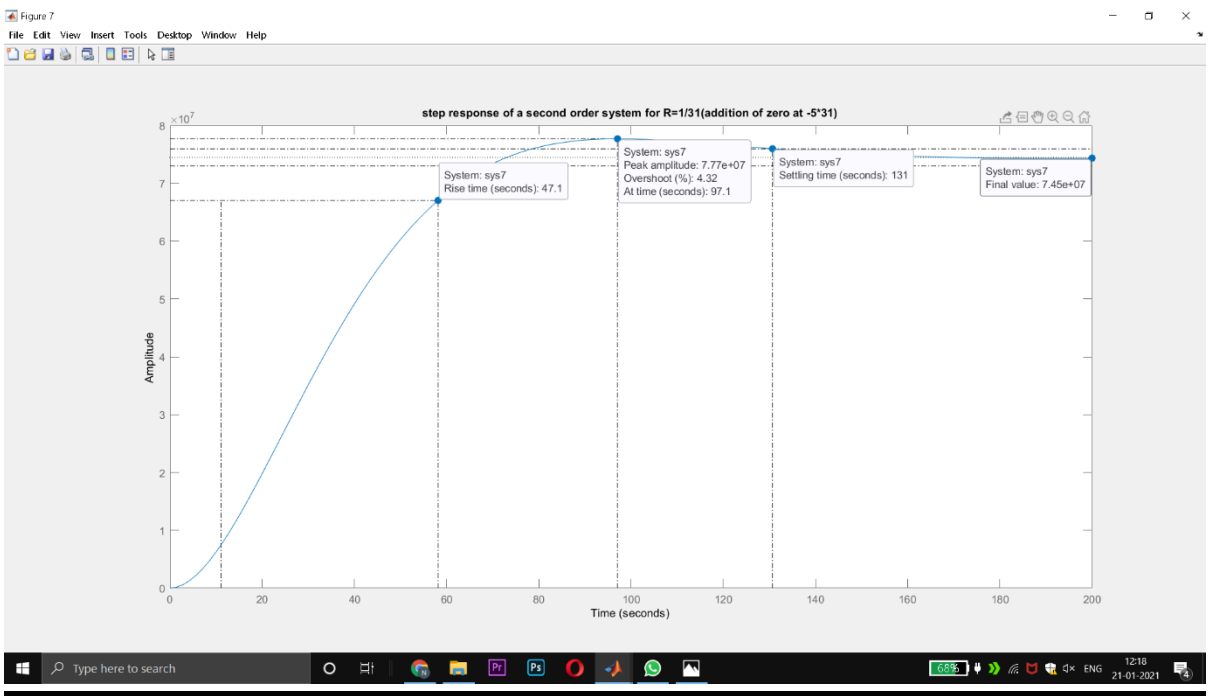


Figure 7
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=1/31(addition of zero at -5*31)
×10^7
Amplitude
Time (seconds)
System: sys7
Rise time (seconds): 47.1
System: sys7
Peak amplitude: 7.77e+07
Overshoot (%): 4.32
At time (seconds): 97.1
System: sys7
Settling time (seconds): 131
System: sys7
Final value: 7.45e+07
Type here to search
ENG
12:18
21-01-2021

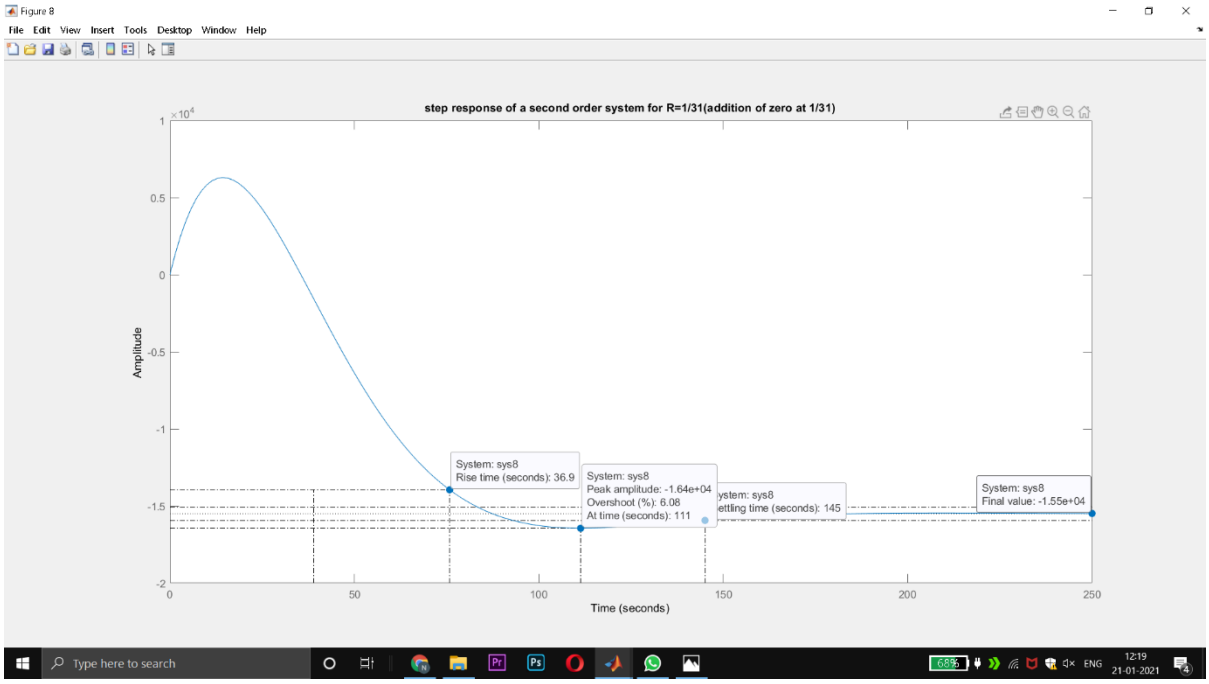


Figure 8
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=1/31(addition of zero at 1/31)
×10^4
Amplitude
Time (seconds)
System: sys8
Rise time (seconds): 36.9
System: sys8
Peak amplitude: -1.64e+04
Overshoot (%): 6.08
At time (seconds): 111
System: sys8
Settling time (seconds): 145
System: sys8
Final value: -1.55e+04
Type here to search
ENG
12:19
21-01-2021

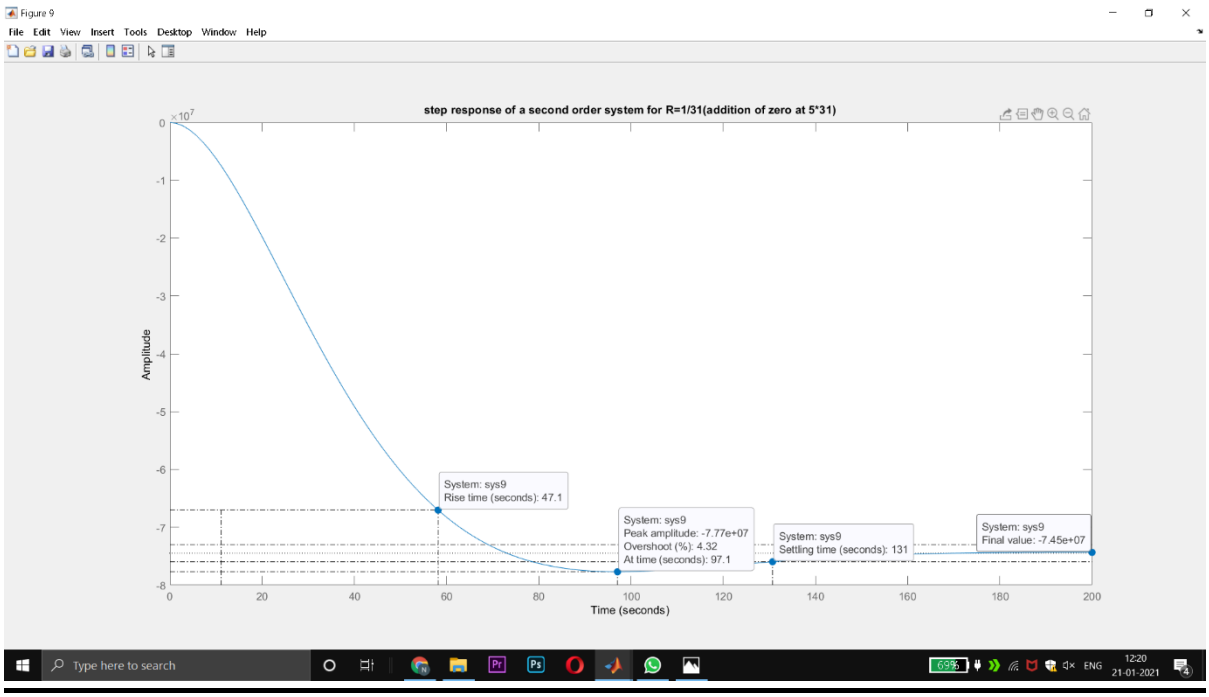
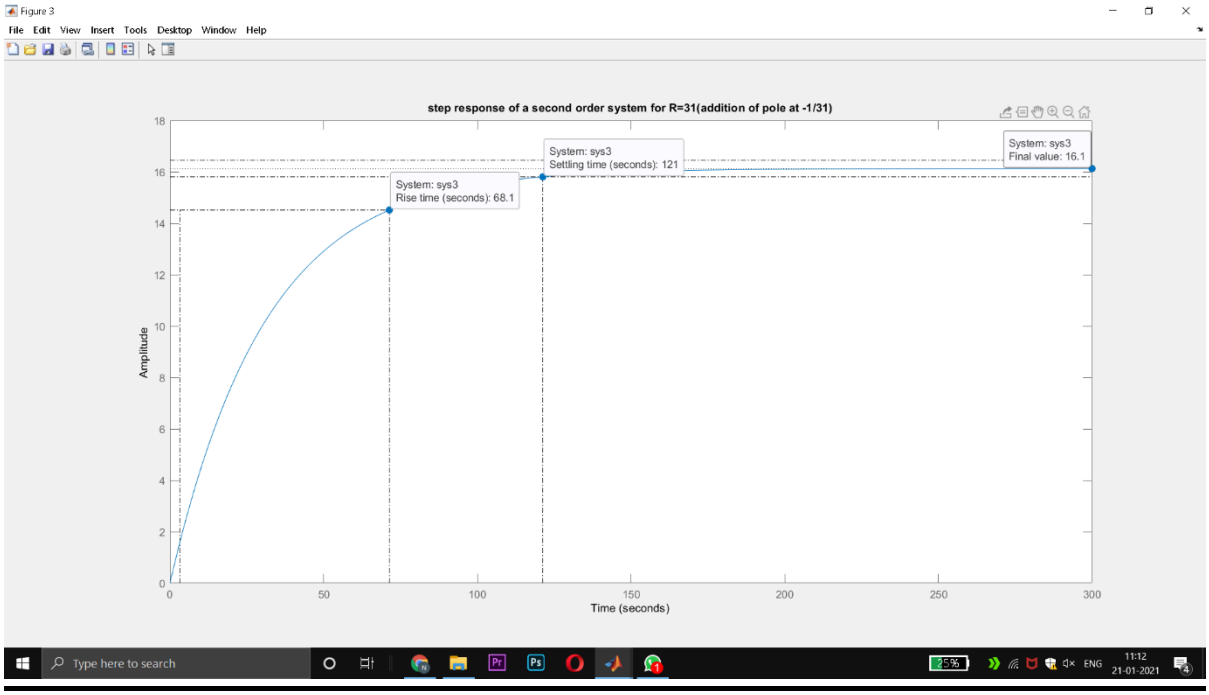
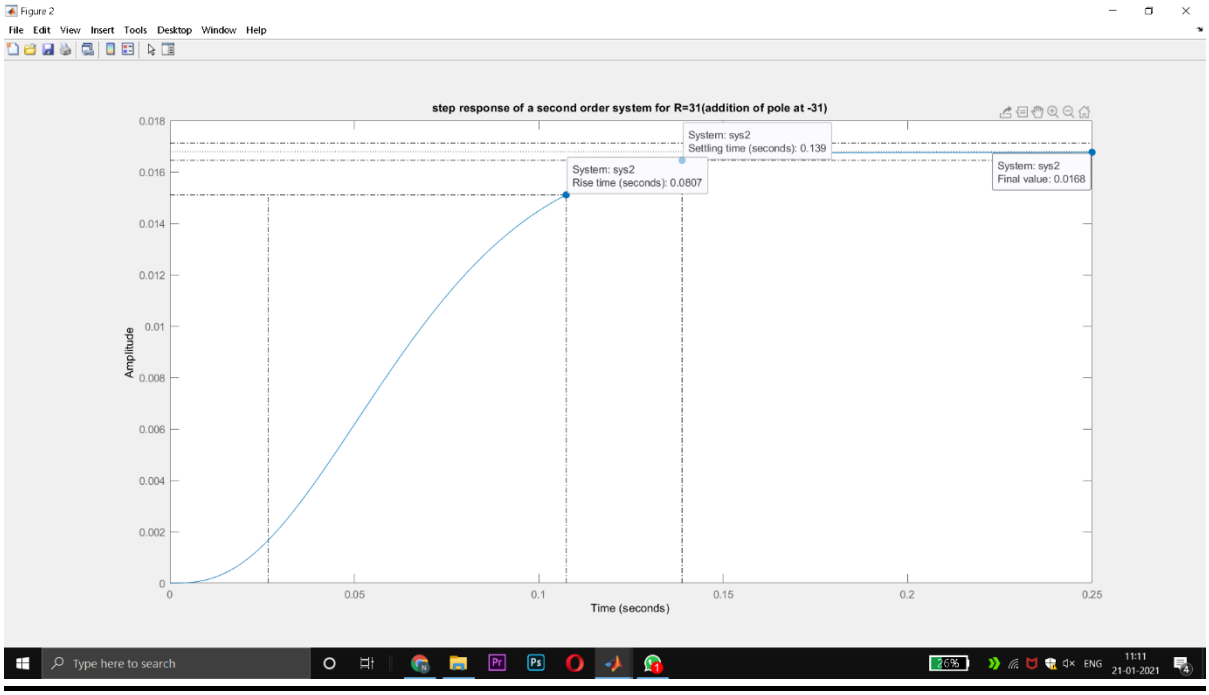


Figure 9
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=1/31(addition of zero at 5*31)
×10^7
Amplitude
Time (seconds)
System: sys9
Rise time (seconds): 47.1
System: sys9
Peak amplitude: -7.77e+07
Overshoot (%): 4.32
At time (seconds): 97.1
System: sys9
Settling time (seconds): 131
System: sys9
Final value: -7.45e+07
Type here to search
ENG
12:20
21-01-2021

For a=31 Pole pairs (-a+ai), (-a-ai)





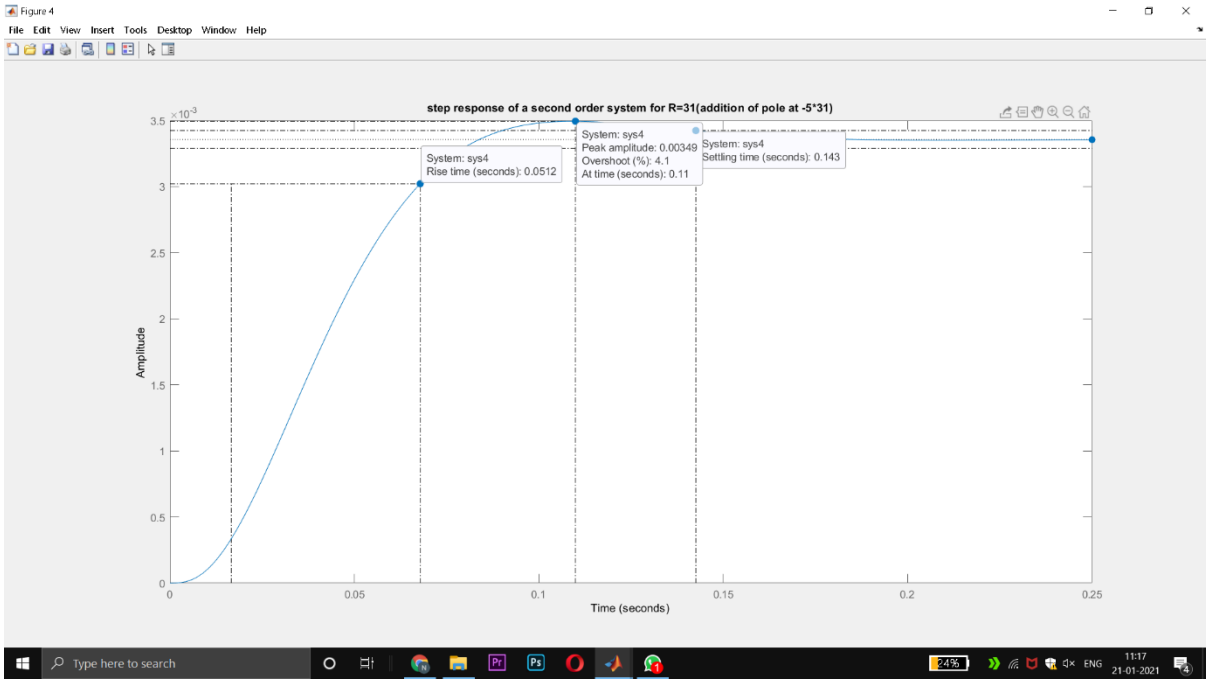


Figure 4
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=31(addition of pole at -5*31)
×10^-3
System: sys4
Rise time (seconds): 0.0512
System: sys4
Peak amplitude: 0.00349
Overshoot (%): 4.1
At time (seconds): 0.11
System: sys4
Settling time (seconds): 0.143
Amplitude
Time (seconds)
Type here to search
24%
ENG
11:17
21-01-2021

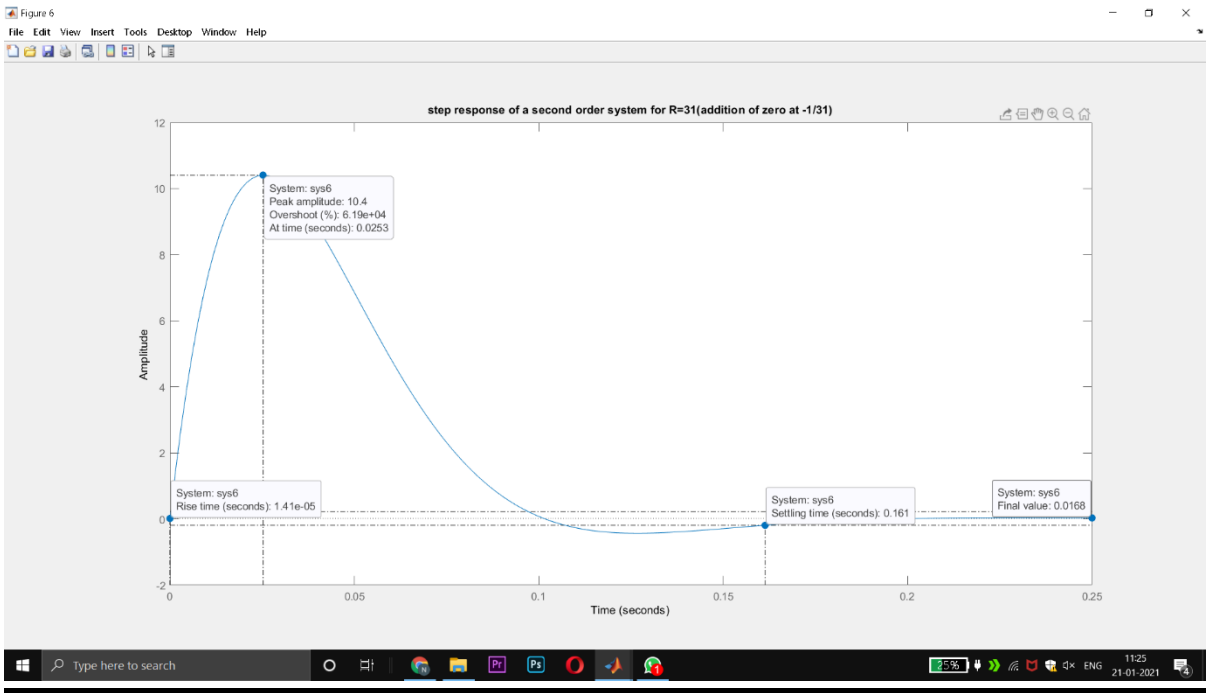


Figure 6
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=31(addition of zero at -1/31)
System: sys6
Peak amplitude: 10.4
Overshoot (%): 6.19e+04
At time (seconds): 0.0253
System: sys6
Rise time (seconds): 1.41e-05
System: sys6
Settling time (seconds): 0.161
System: sys6
Final value: 0.0168
Amplitude
Time (seconds)
Type here to search
25%
ENG
11:25
21-01-2021

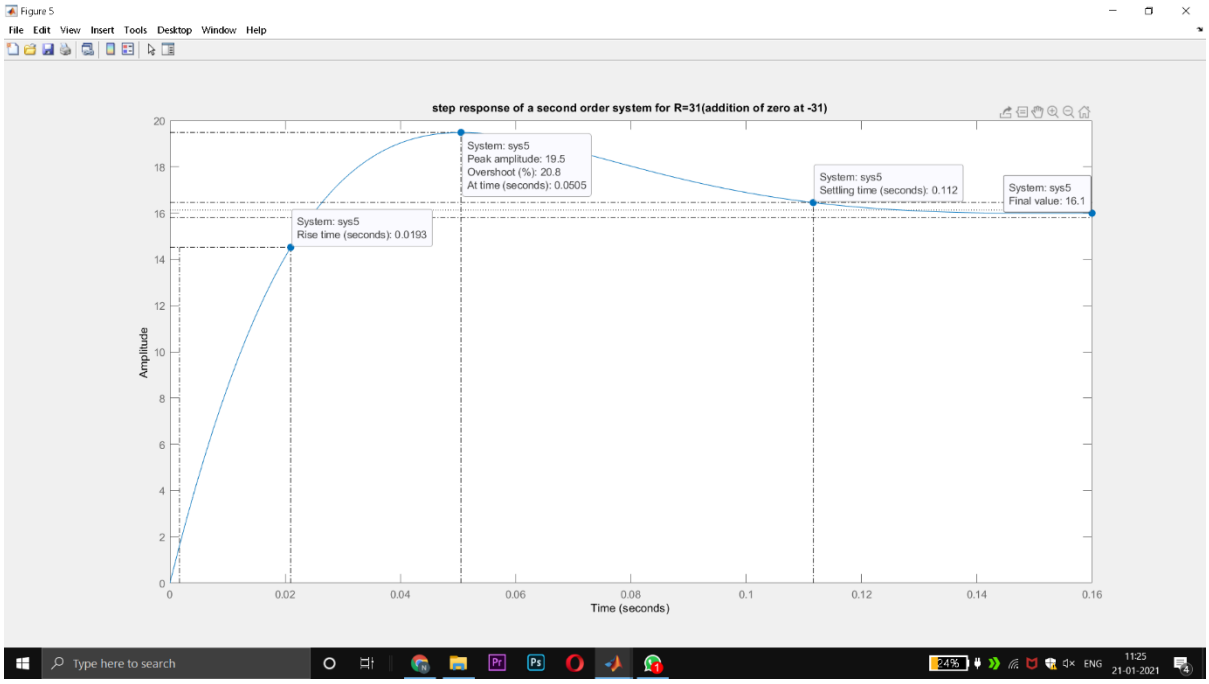


Figure 5
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=31(addition of zero at -31)
System: sys5
Peak amplitude: 19.5
Overshoot (%): 20.8
At time (seconds): 0.0505
System: sys5
Settling time (seconds): 0.112
System: sys5
Final value: 16.1
System: sys5
Rise time (seconds): 0.0193
Amplitude
Time (seconds)
Type here to search
ENG
11:25
21-01-2021

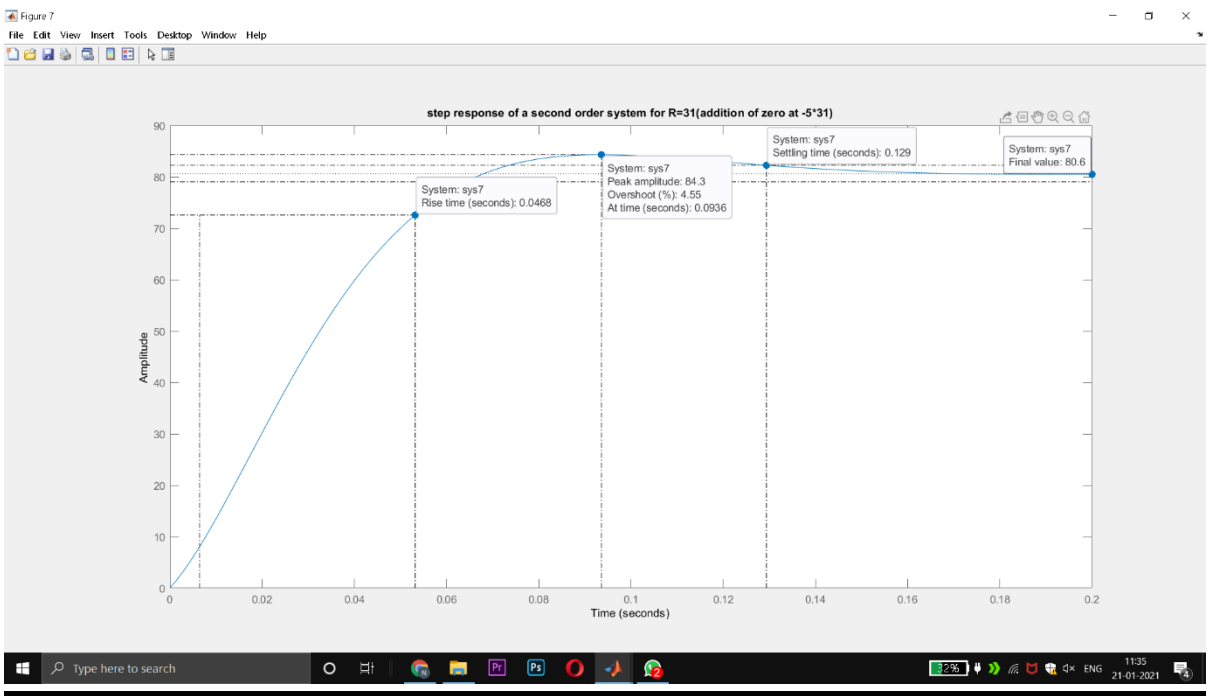


Figure 7
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=31(addition of zero at -5*31)
System: sys7
Settling time (seconds): 0.129
System: sys7
Final value: 80.6
System: sys7
Peak amplitude: 84.3
Overshoot (%): 4.55
At time (seconds): 0.0936
System: sys7
Rise time (seconds): 0.0468
Amplitude
Time (seconds)
Type here to search
ENG
11:35
21-01-2021

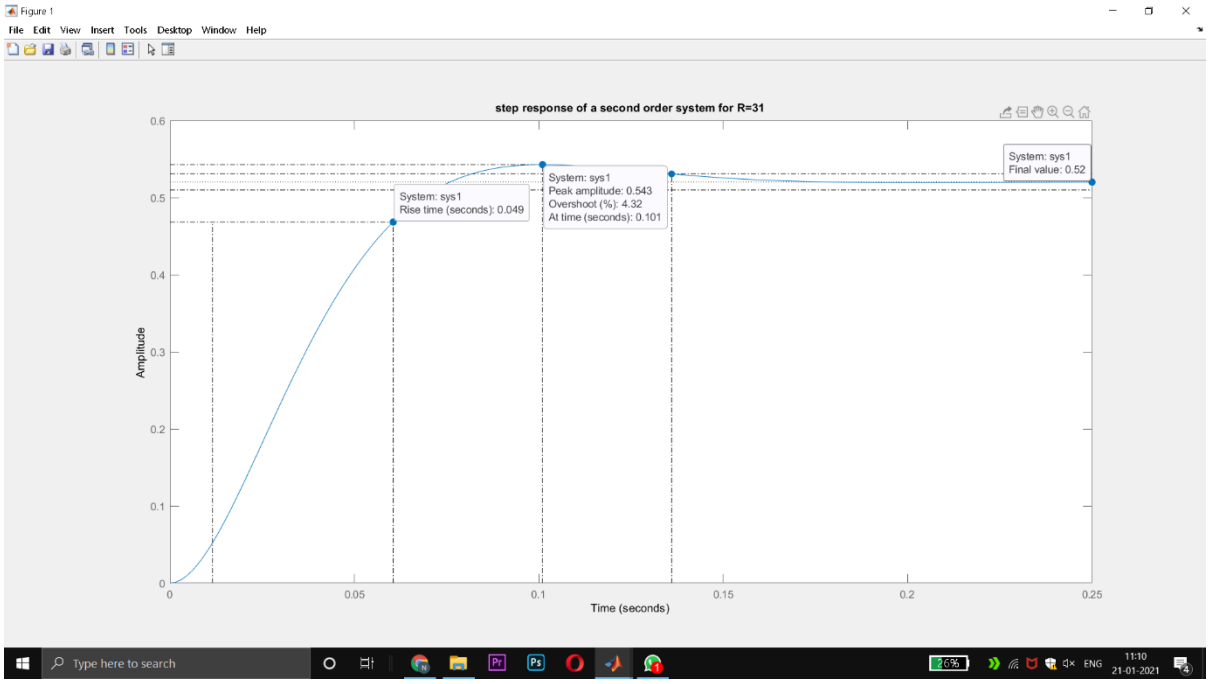


Figure 1
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=31
System: sys1
Rise time (seconds): 0.049
System: sys1
Peak amplitude: 0.543
Overshoot (%): 4.32
At time (seconds): 0.101
System: sys1
Final value: 0.52
Amplitude
Time (seconds)
Type here to search
ENG
11:10
21-01-2021

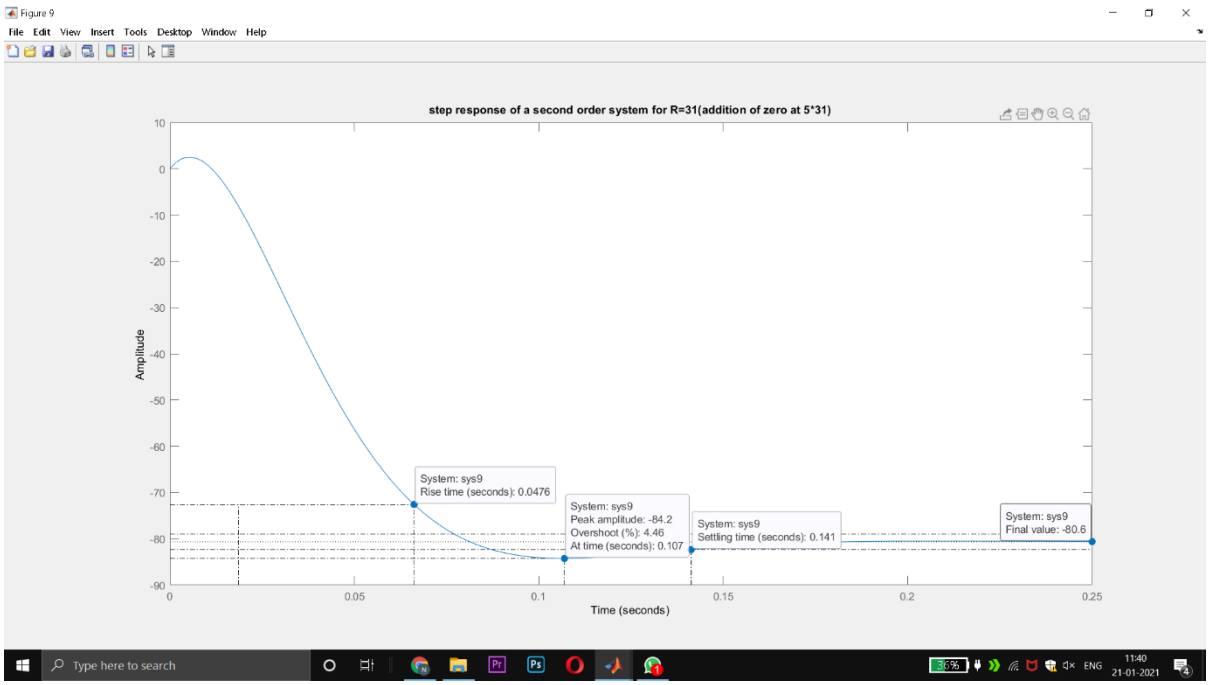
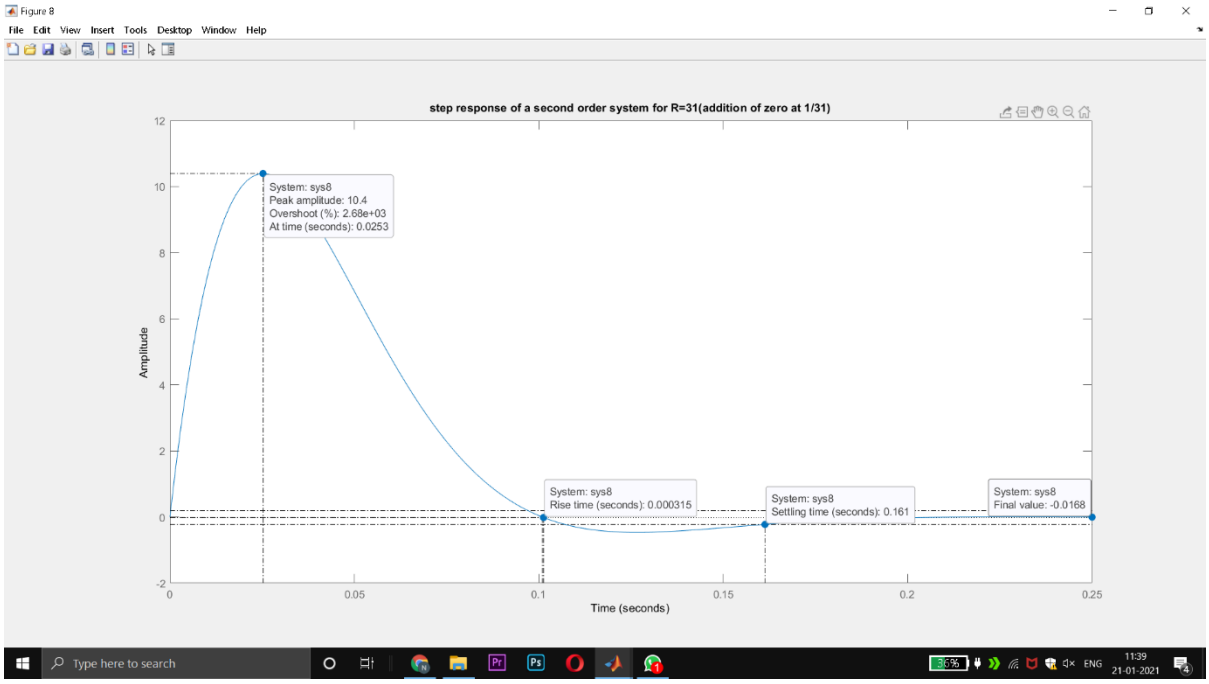
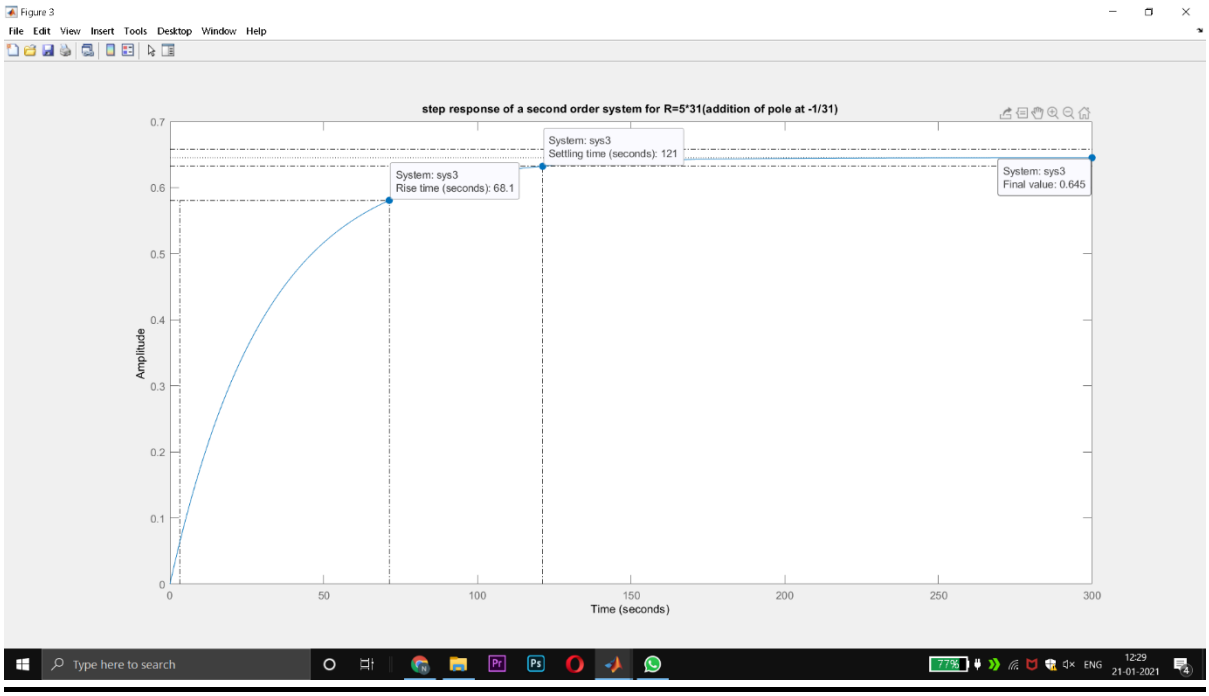


Figure 9
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=31(addition of zero at 5*31)
System: sys9
Rise time (seconds): 0.0476
System: sys9
Peak amplitude: -84.2
Overshoot (%): 4.46
At time (seconds): 0.107
System: sys9
Settling time (seconds): 0.141
System: sys9
Final value: -80.6
Amplitude
Time (seconds)
Type here to search
ENG
11:40
21-01-2021



For a=5x31 Pole pairs (-a+ai), (-a-ai)



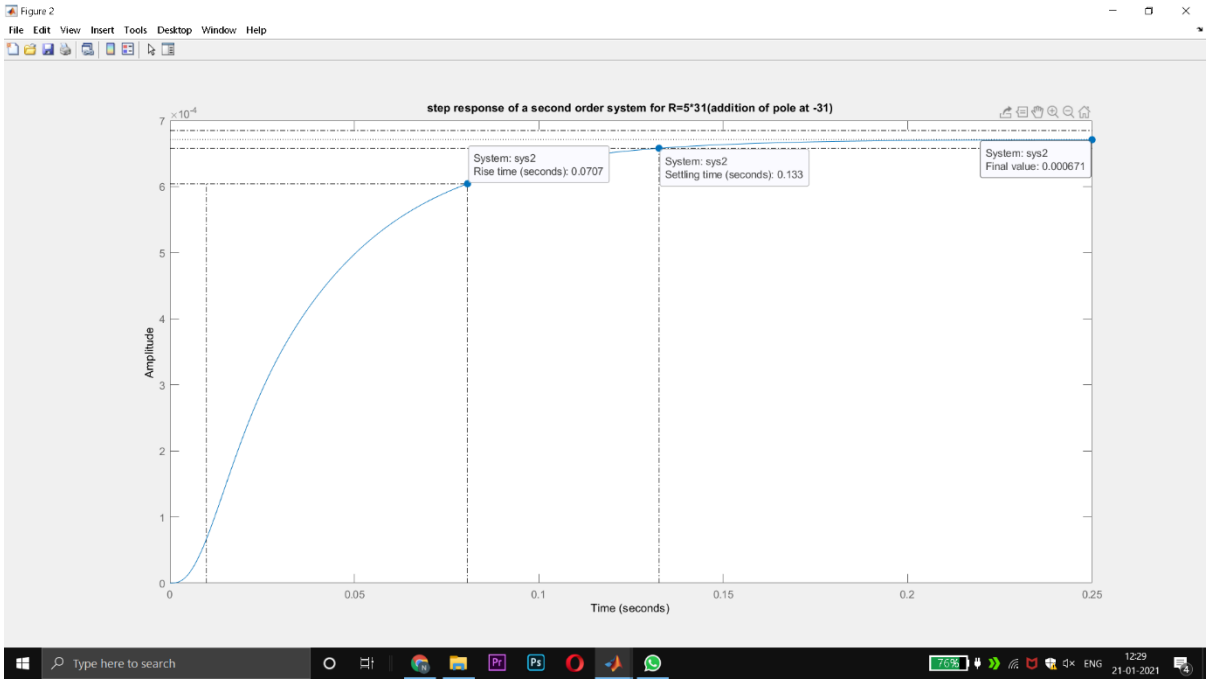


Figure 2
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=5*31(addition of pole at -31)
×10^-4
System: sys2
Rise time (seconds): 0.0707
System: sys2
Settling time (seconds): 0.133
System: sys2
Final value: 0.000671
Amplitude
Time (seconds)
Type here to search
ENG
12:29
21-01-2021

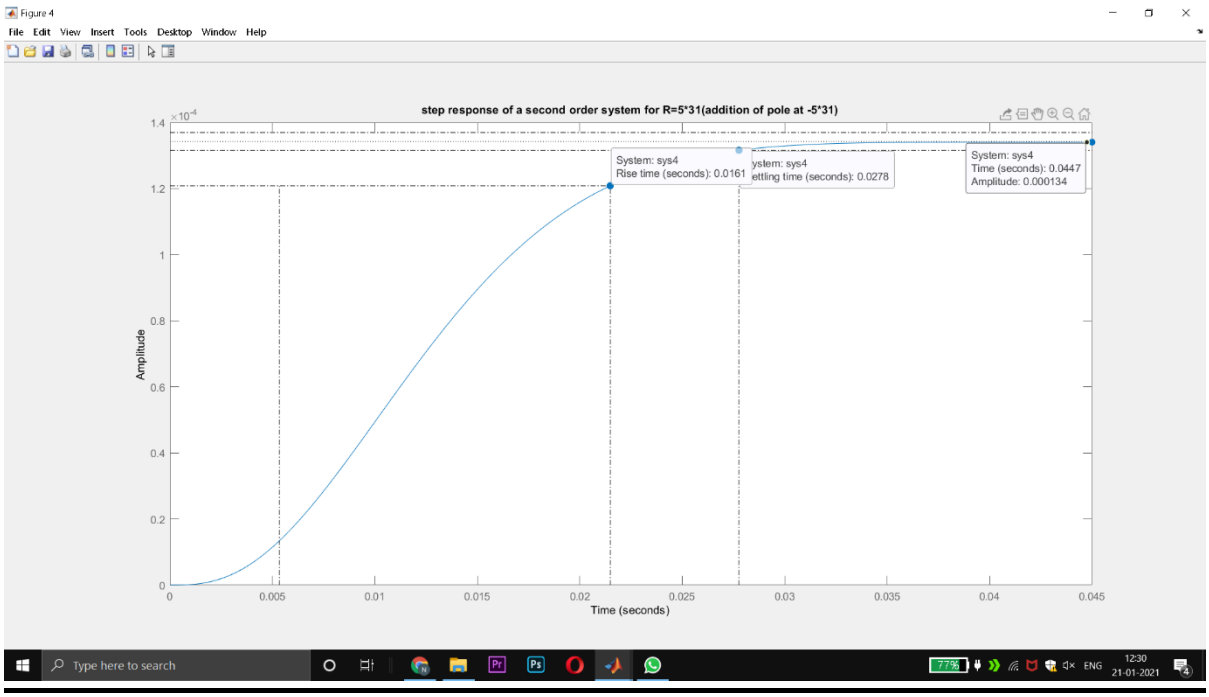


Figure 4
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=5*31(addition of pole at -5*31)
×10^-4
System: sys4
Rise time (seconds): 0.0161
ystem: sys4
ettling time (seconds): 0.0278
System: sys4
Time (seconds): 0.0447
Amplitude: 0.000134
Amplitude
Time (seconds)
Type here to search
ENG
12:30
21-01-2021

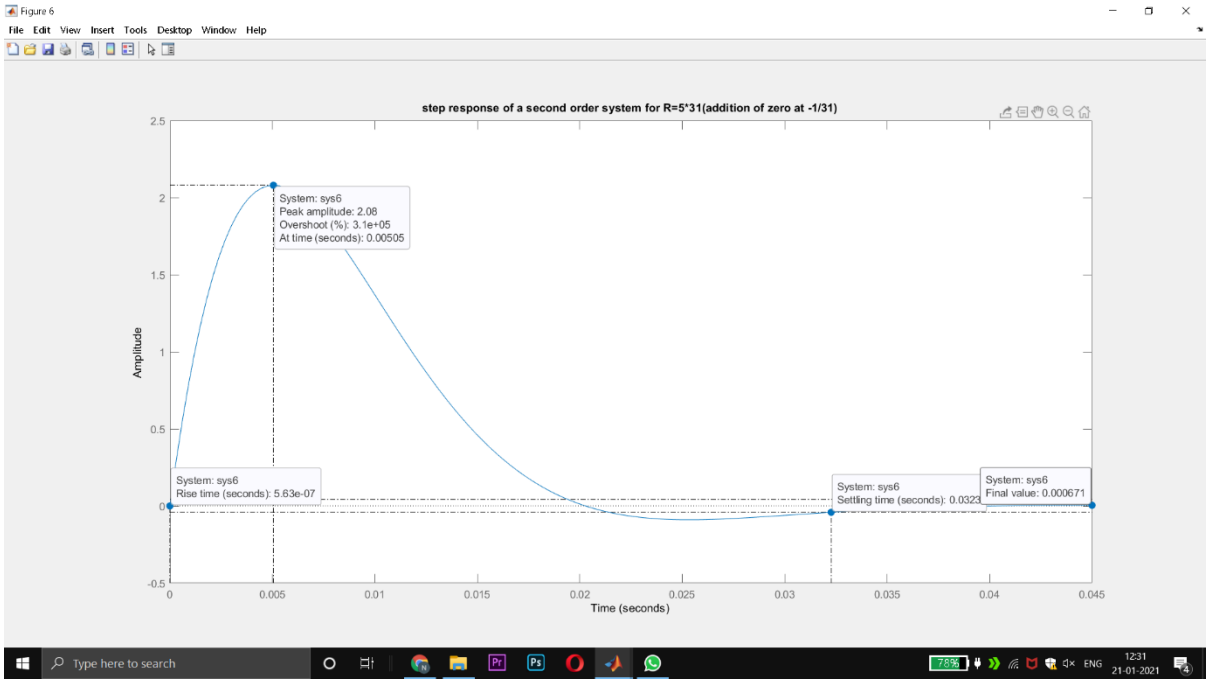


Figure 6
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=5*31(addition of zero at -1/31)
System: sys6
Peak amplitude: 2.08
Overshoot (%): 3.1e+05
At time (seconds): 0.00505
System: sys6
Rise time (seconds): 5.63e-07
System: sys6
Settling time (seconds): 0.0323
System: sys6
Final value: 0.000671
Amplitude
Time (seconds)
Type here to search
ENG
12:31
21-01-2021

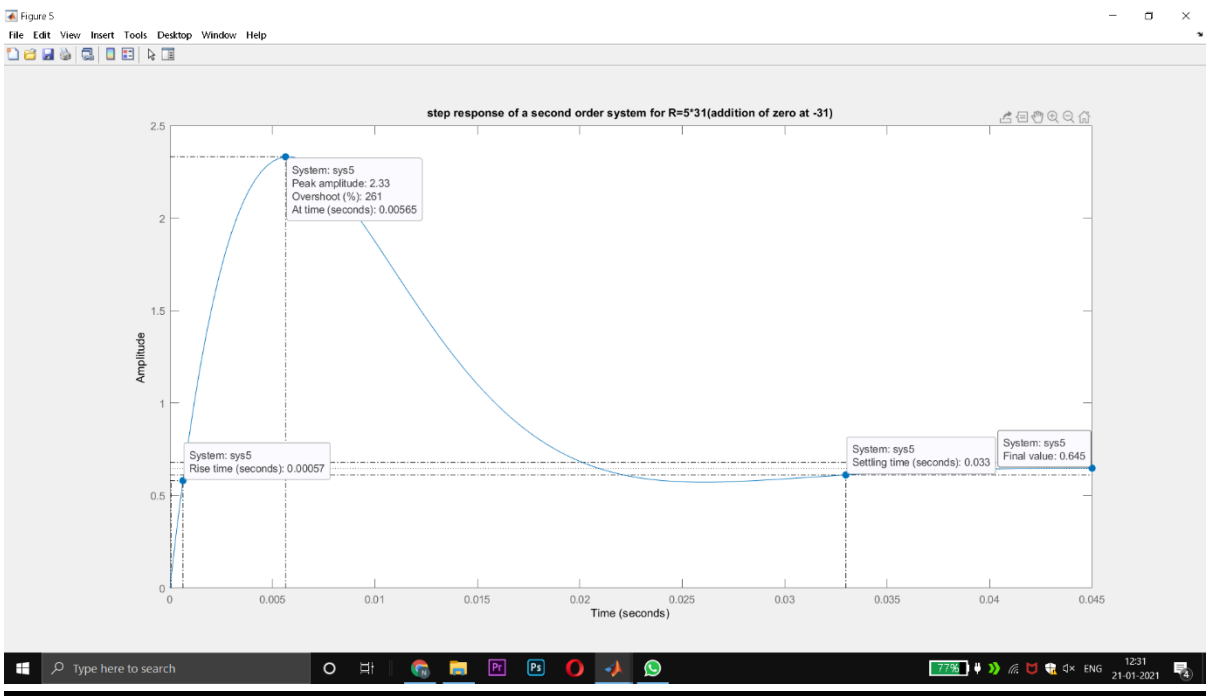


Figure 5
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=5*31(addition of zero at -31)
System: sys5
Peak amplitude: 2.33
Overshoot (%): 261
At time (seconds): 0.00565
System: sys5
Rise time (seconds): 0.00057
System: sys5
Settling time (seconds): 0.033
System: sys5
Final value: 0.645
Amplitude
Time (seconds)
Type here to search
ENG
12:31
21-01-2021

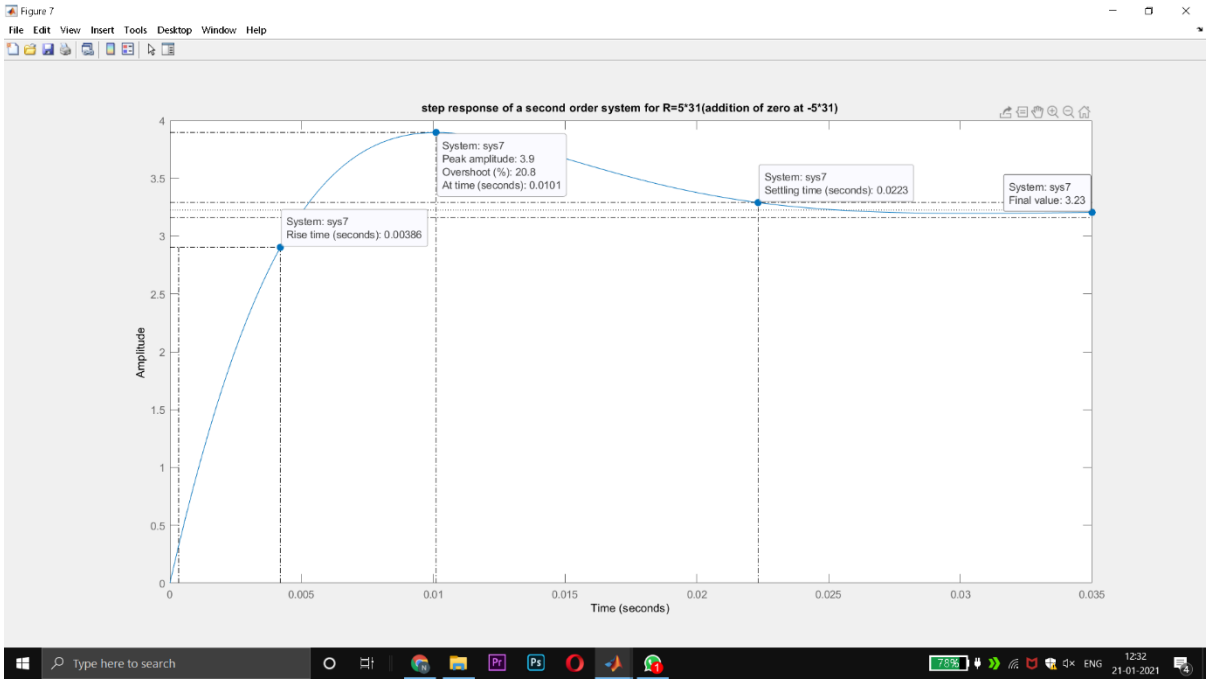


Figure 7
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=5*31(addition of zero at -5*31)
System: sys7
Peak amplitude: 3.9
Overshoot (%): 20.8
At time (seconds): 0.0101
System: sys7
Settling time (seconds): 0.0223
System: sys7
Final value: 3.23
System: sys7
Rise time (seconds): 0.00386
Amplitude
Time (seconds)
Type here to search
78%
ENG
12:32
21-01-2021

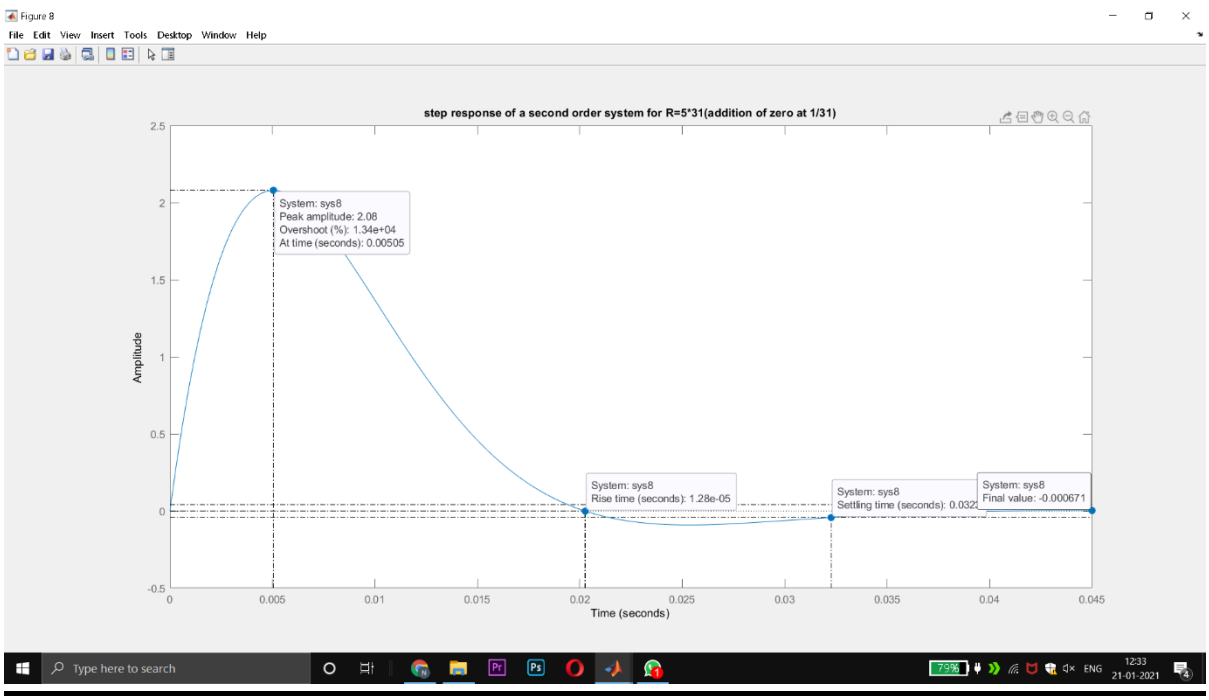


Figure 8
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=5*31(addition of zero at 1/31)
System: sys8
Peak amplitude: 2.08
Overshoot (%): 1.34e+04
At time (seconds): 0.00505
System: sys8
Rise time (seconds): 1.28e-05
System: sys8
Settling time (seconds): 0.032
System: sys8
Final value: -0.000671
Amplitude
Time (seconds)
Type here to search
78%
ENG
12:33
21-01-2021

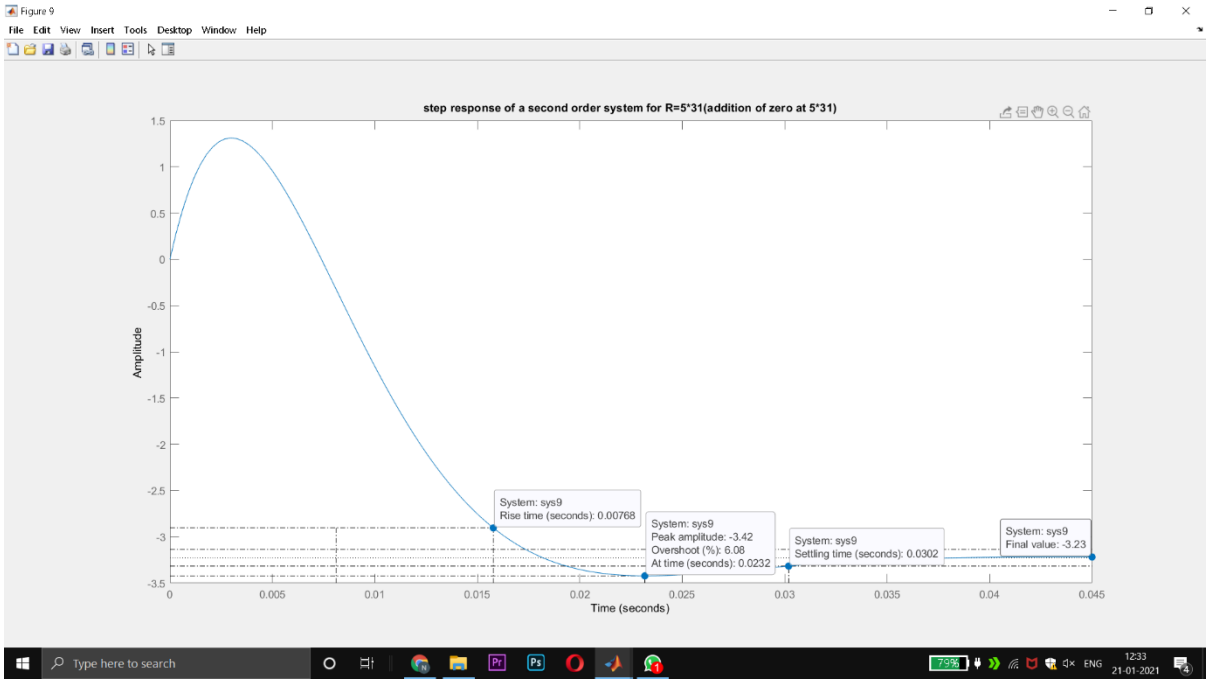


Figure 9
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=5*31(addition of zero at 5*31)
Amplitude
Time (seconds)
System: sys9
Rise time (seconds): 0.00768
System: sys9
Peak amplitude: -3.42
Overshoot (%): 6.08
At time (seconds): 0.0232
System: sys9
Settling time (seconds): 0.0302
System: sys9
Final value: -3.23
Type here to search
ENG
12:33
21-01-2021

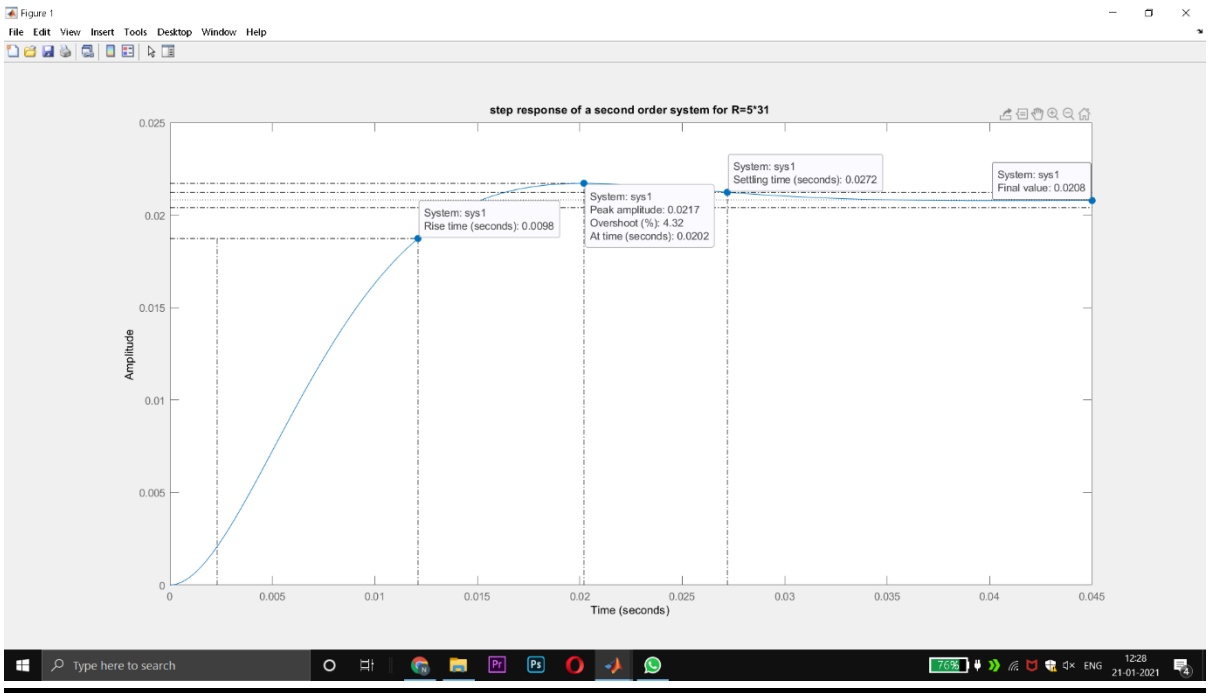


Figure 1
File Edit View Insert Tools Desktop Window Help
step response of a second order system for R=5*31
Amplitude
Time (seconds)
System: sys1
Rise time (seconds): 0.0098
System: sys1
Peak amplitude: 0.0217
Overshoot (%): 4.32
At time (seconds): 0.0202
System: sys1
Settling time (seconds): 0.0272
System: sys1
Final value: 0.0208
Type here to search
ENG
12:28
21-01-2021