THE UNIVERSITY OF TEXAS AT ARLINGTON, TEXAS
DEPARTMENT OF ELECTRICAL ENGINEERING

EE 5321 - 001

OPTIMAL CONTROL

HW # 1
ASSIGNMENT

by

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Presented to

Prof. Michael Niestroy

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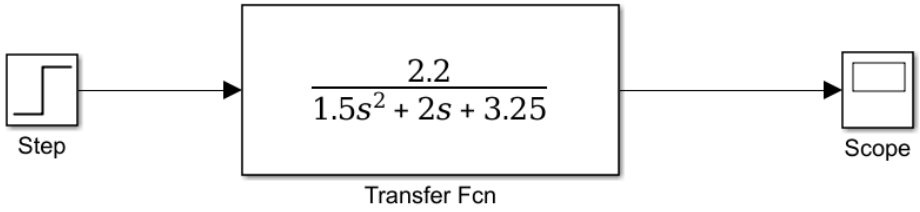
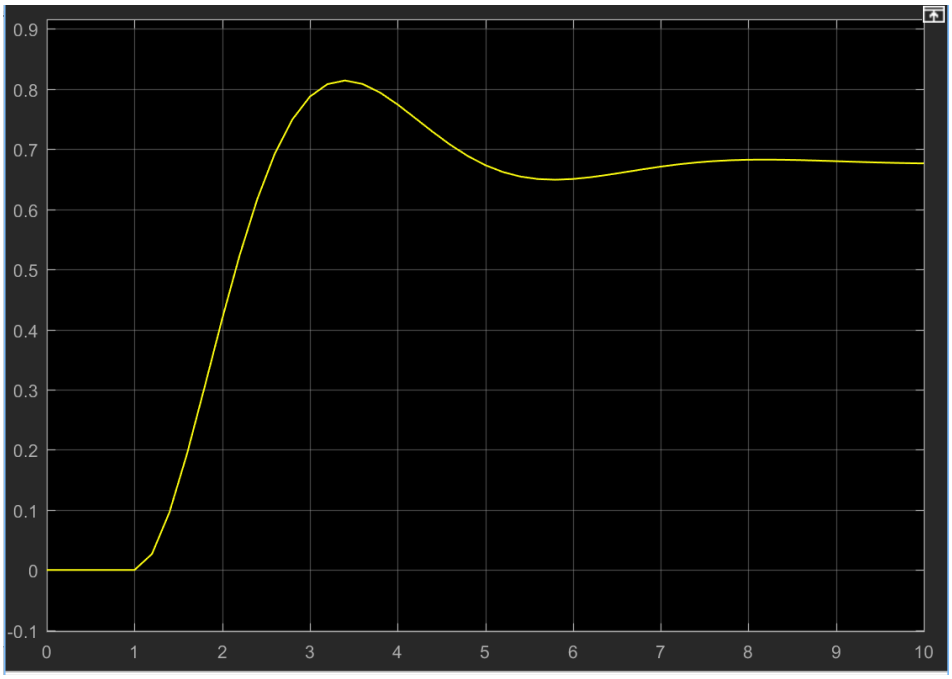
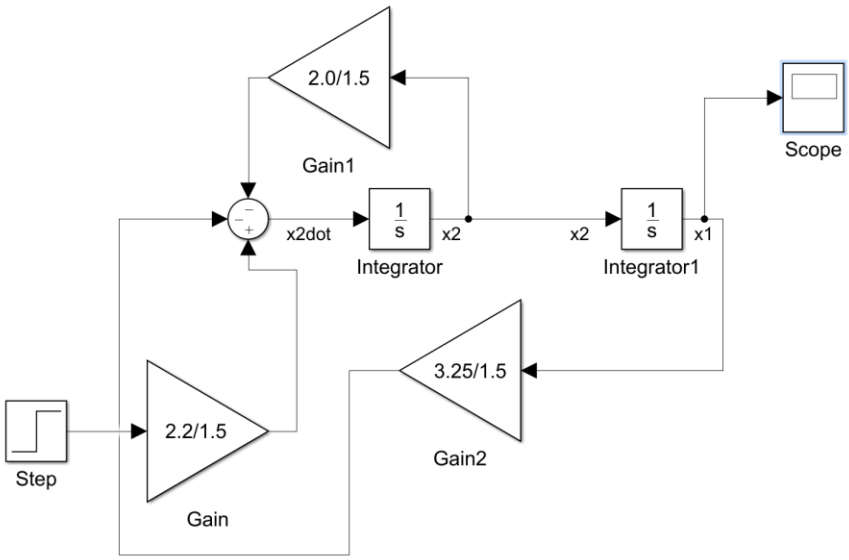
Problem 1:

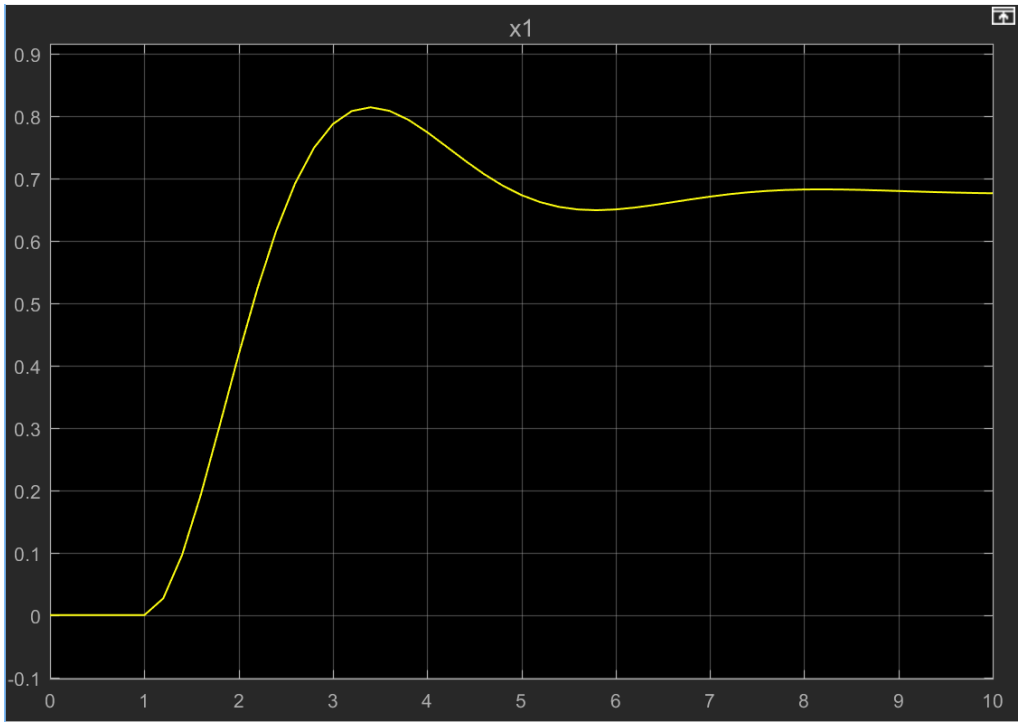
a)


$\frac{2.2}{1.5s^2 + 2s + 3.25}$
Step
Transfer Fcn
Scope

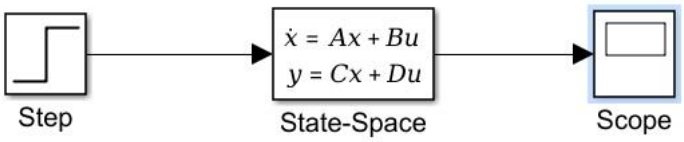

0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
0
1
2
3
4
5
6
7
8
9
10

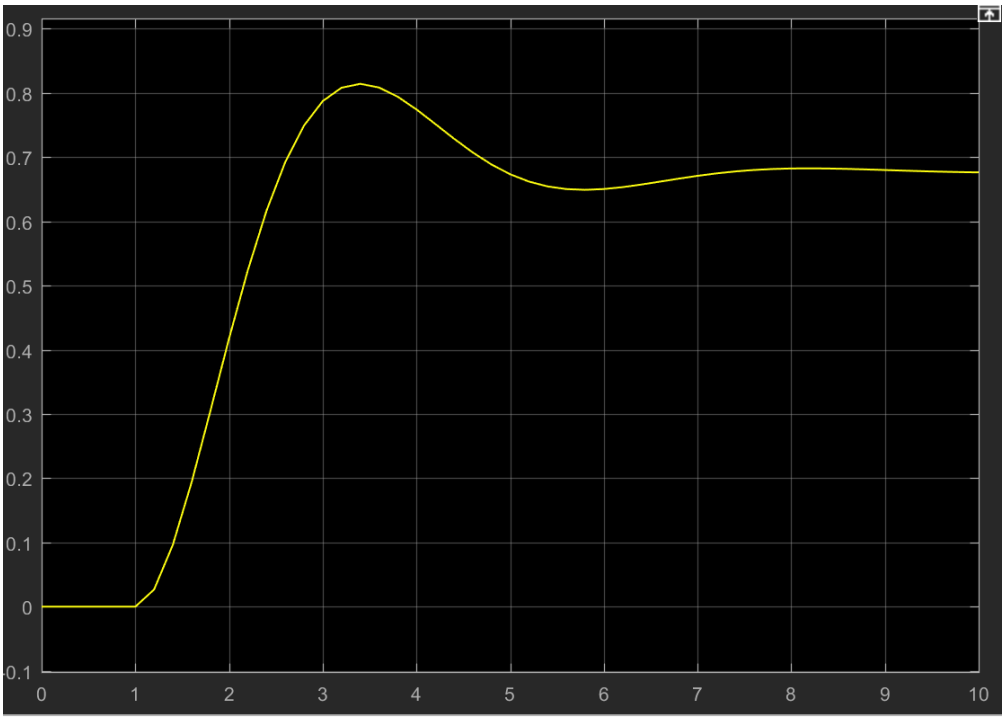
b)


2.0/1.5
Gain1
Scope
x2dot
1
s
x2
Integrator
x2
1
s
x1
Integrator1
3.25/1.5
Gain2
2.2/1.5
Gain
Step


x1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
0
1
2
3
4
5
6
7
8
9
10

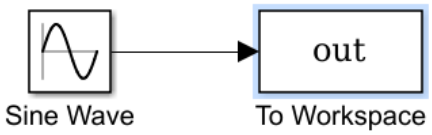
C)


$\dot{x} = Ax + Bu$
$y = Cx + Du$
Step
State-Space
Scope


0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
0
1
2
3
4
5
6
7
8
9
10

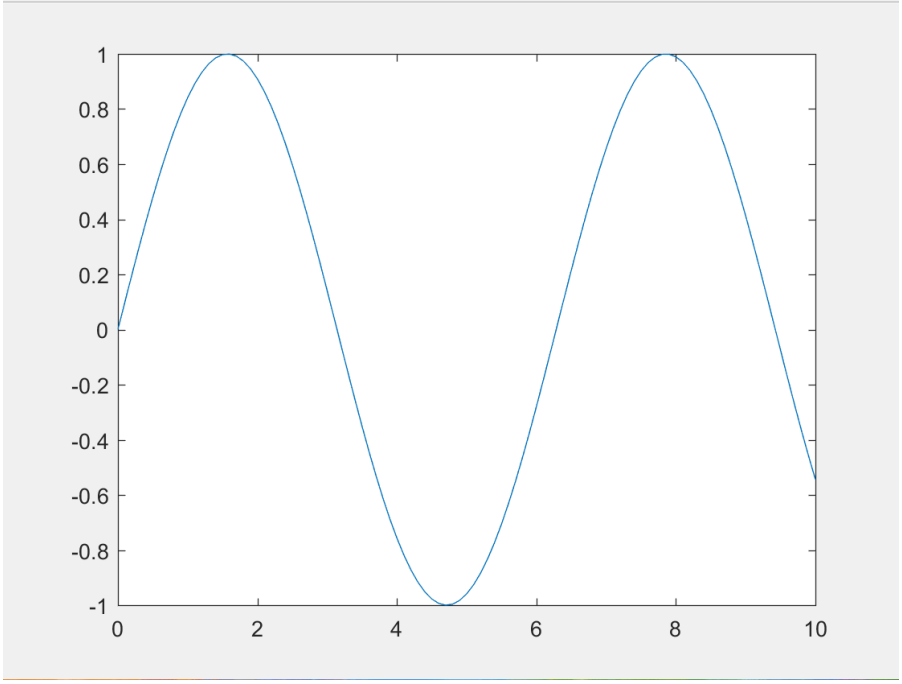
Problem 2:

a)



MATLAB CODE:

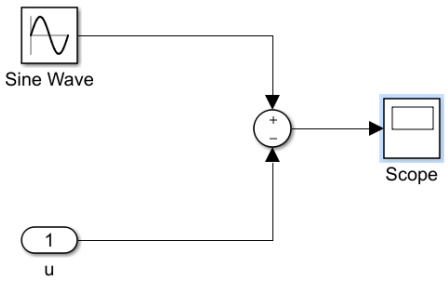
```
clc
t=[0:0.1:10]';
[t,y]=sim('Hw1P2a',10,[]);
plot(t,out)
```

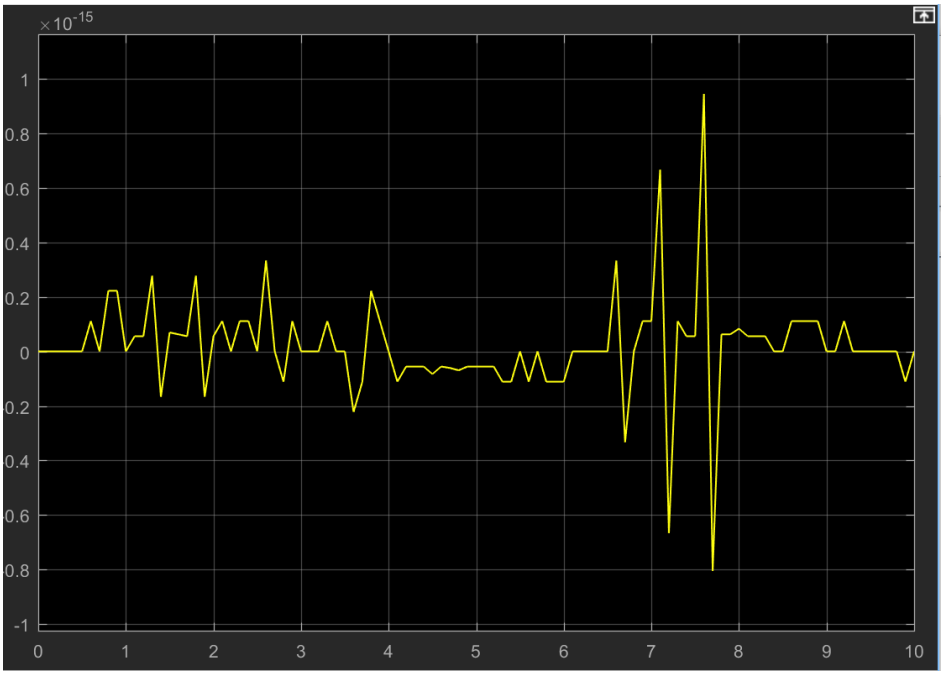


b) MATLAB CODE:

```
clc
t=[0:0.1:10]';
[t,y]=sim('Hw1P2a',10,[]);
u=cos(t);

[t,y]=sim('Hw1P2b',10,[],[t u]);
```



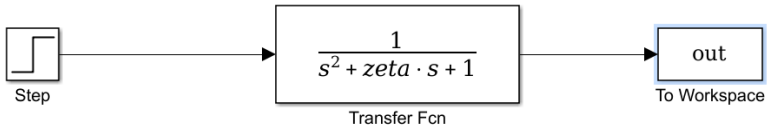


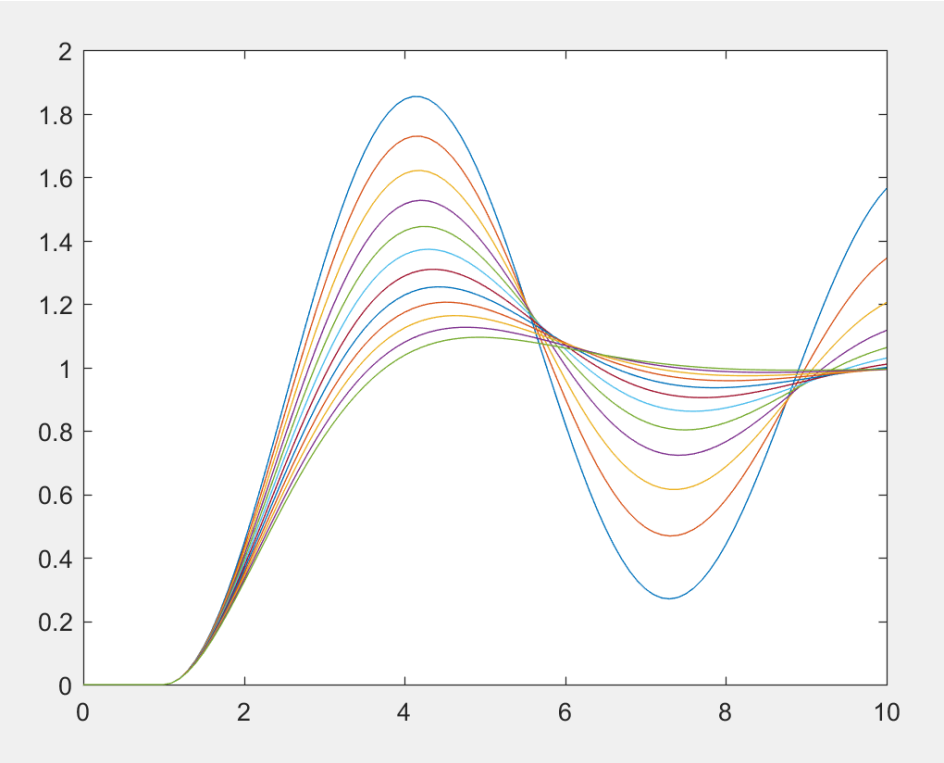
Problem 3:

a) MATLAB CODE:

```
zeta=[0.1:0.1:1.2];

for zeta = 0.1:0.1:1.2
t=0:0.1:10;
[t,y]=sim('Hw1P3a',10,[]);
plot(t,out)
hold on
end
```





b)

MATLAB CODE:

```
clc;
clear all
u1=ones(101,1);
u2=-ones(100,1);
zeta=0.7;
u=[u1;u2];
t=[0:0.1:20]';
[t,y]=sim('Hw1P3b',20,[],[t u]);
plot(t,out)
```