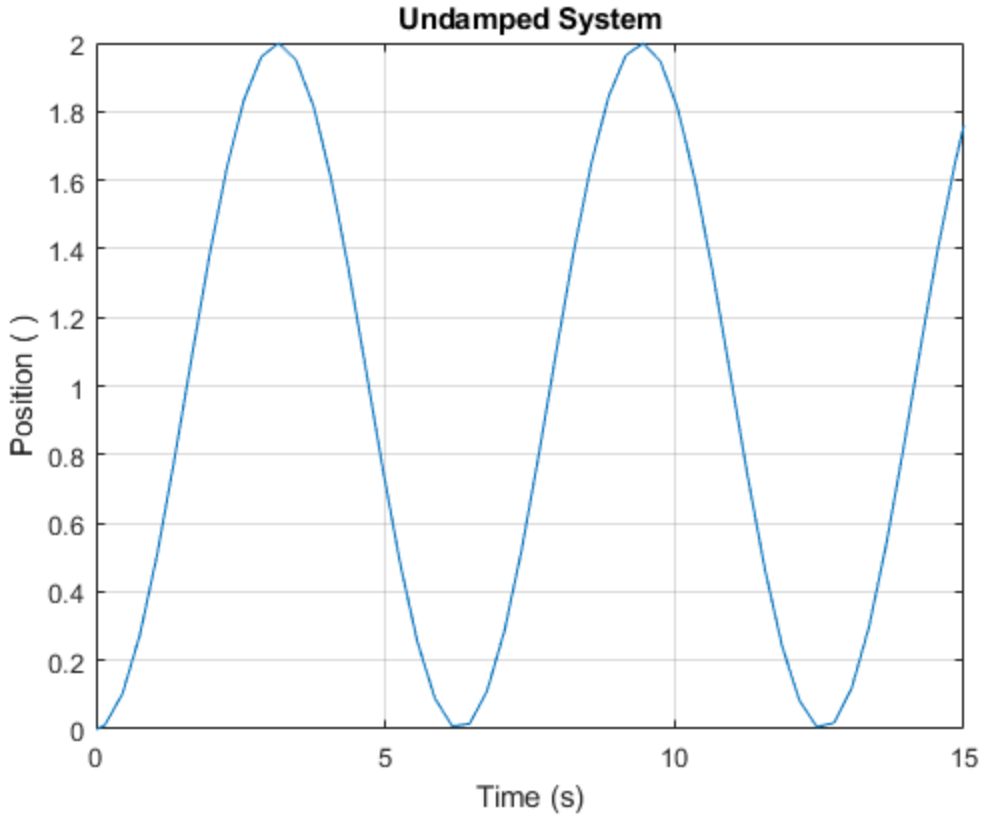
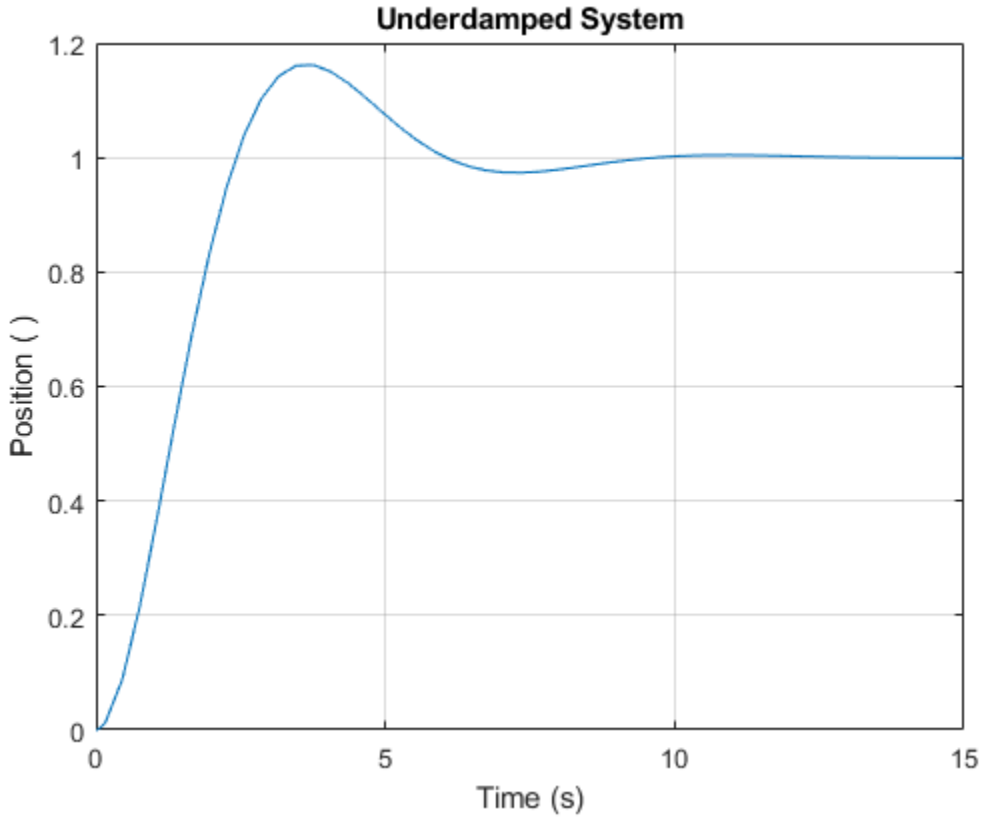
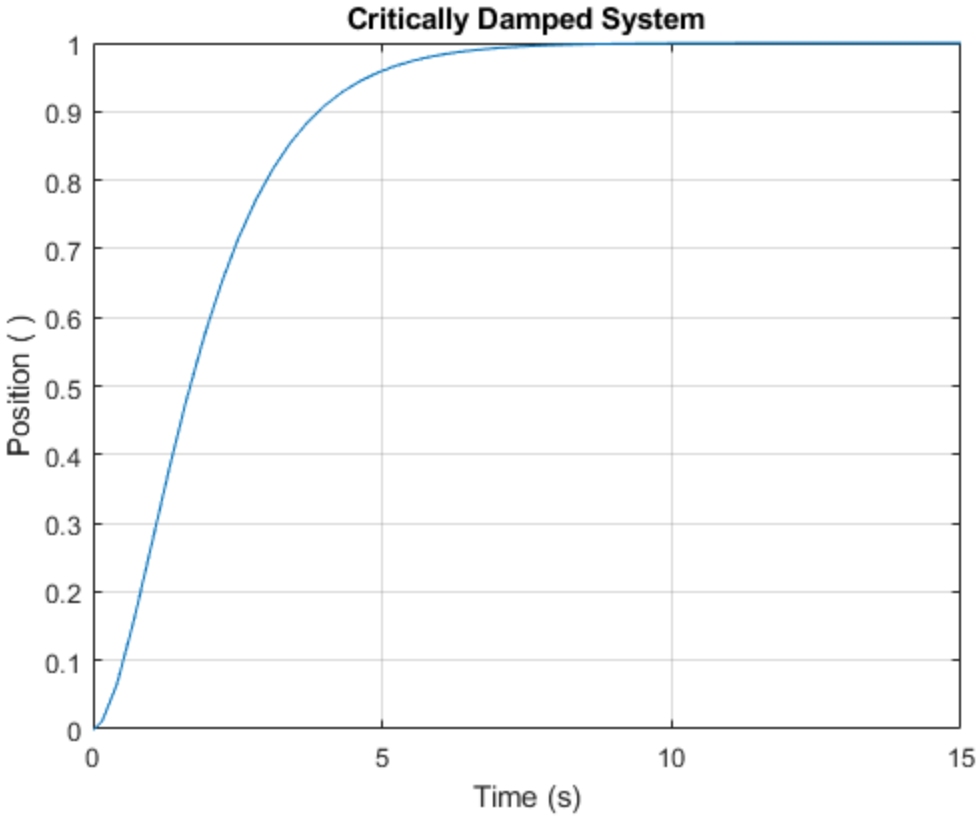
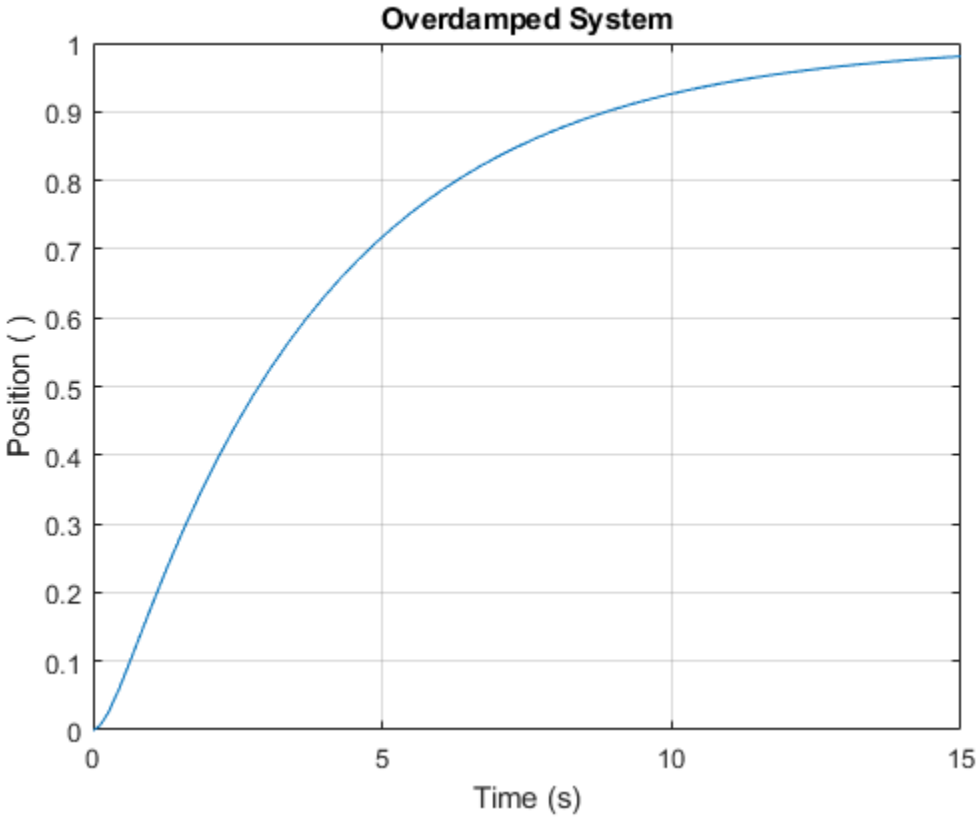
```
%Problem 2

clear all
close all

J = 3;
k = 3;
bv = [0,3,6,12]; % Undamped, under,crital,over
tfinal = 15;
dt = .01;
timespan = linspace(0,tfinal,tfinal/dt);

b = bv(1);
sim('Problem2')
figure(1)
plot(tout,theta_0)
xlabel('Time (s)')
ylabel('Position ( )')
title('Undamped System')
grid on

b = bv(2);
sim('Problem2')
figure(2)
plot(tout,theta_0)
xlabel('Time (s)')
ylabel('Position ( )')
title('Underdamped System')
grid on

b = bv(3);
sim('Problem2')
figure(3)
plot(tout,theta_0)
xlabel('Time (s)')
ylabel('Position ( )')
title('Critically Damped System')
grid on

b = bv(4);
sim('Problem2')
figure(4)
plot(tout,theta_0)
xlabel('Time (s)')
ylabel('Position ( )')
title('Overdamped System')
grid on
```


Undamped System
Position ( )
Time (s)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
0
5
10
15


Underdamped System
Position ( )
Time (s)
0
0.2
0.4
0.6
0.8
1
1.2
0
5
10
15


Critically Damped System
Position ( )
Time (s)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
5
10
15


Overdamped System
Position ( )
Time (s)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
5
10
15

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