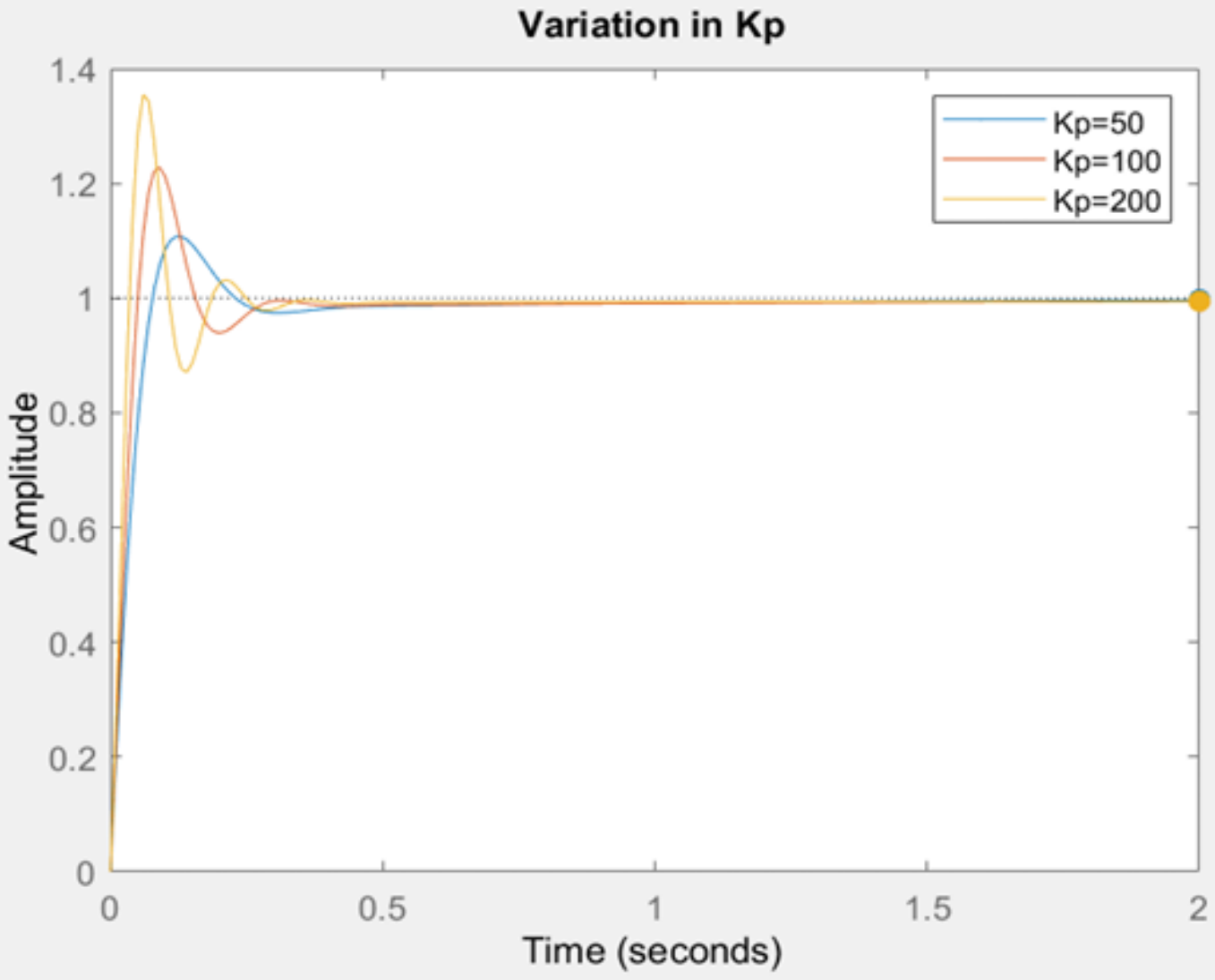
MATLAB implementation:

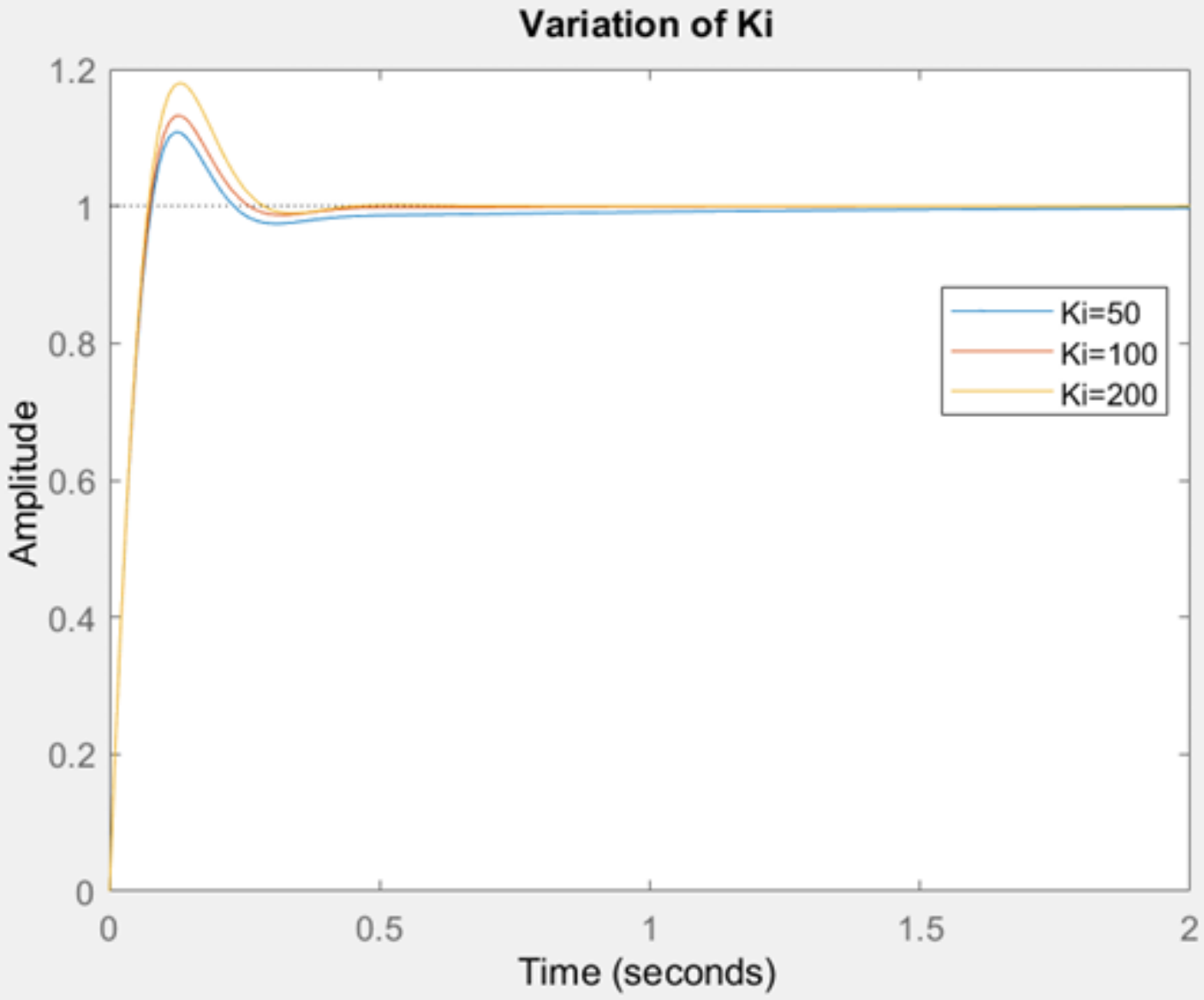
VARIATION OF Kp:

```
s=tf('s');
 P=10/(s^2+10*s+20);
 Kp=50;
 Ki=50;
 Kd=2;
 C=pid(Kp,Ki,Kd)
 T=feedback(C*P,1)
 t=0:0.01:2;
 step(T,t)
 hold on
Kp1=100;
C1=pid(Kp1,Ki,Kd)
 T1=feedback(C1*P,1)
 t=0:0.01:2;
 step(T1,t)
hold on
 Kp2=200;
C2=pid(Kp2,Ki,Kd)
 T2=feedback(C2*P,1)
 t=0:0.01:2;
 step(T2,t)
 legend
title('Variation in Kp');
```


Variation in Kp
Kp=50
Kp=100
Kp=200
Amplitude
Time (seconds)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
0
0.5
1
1.5
2

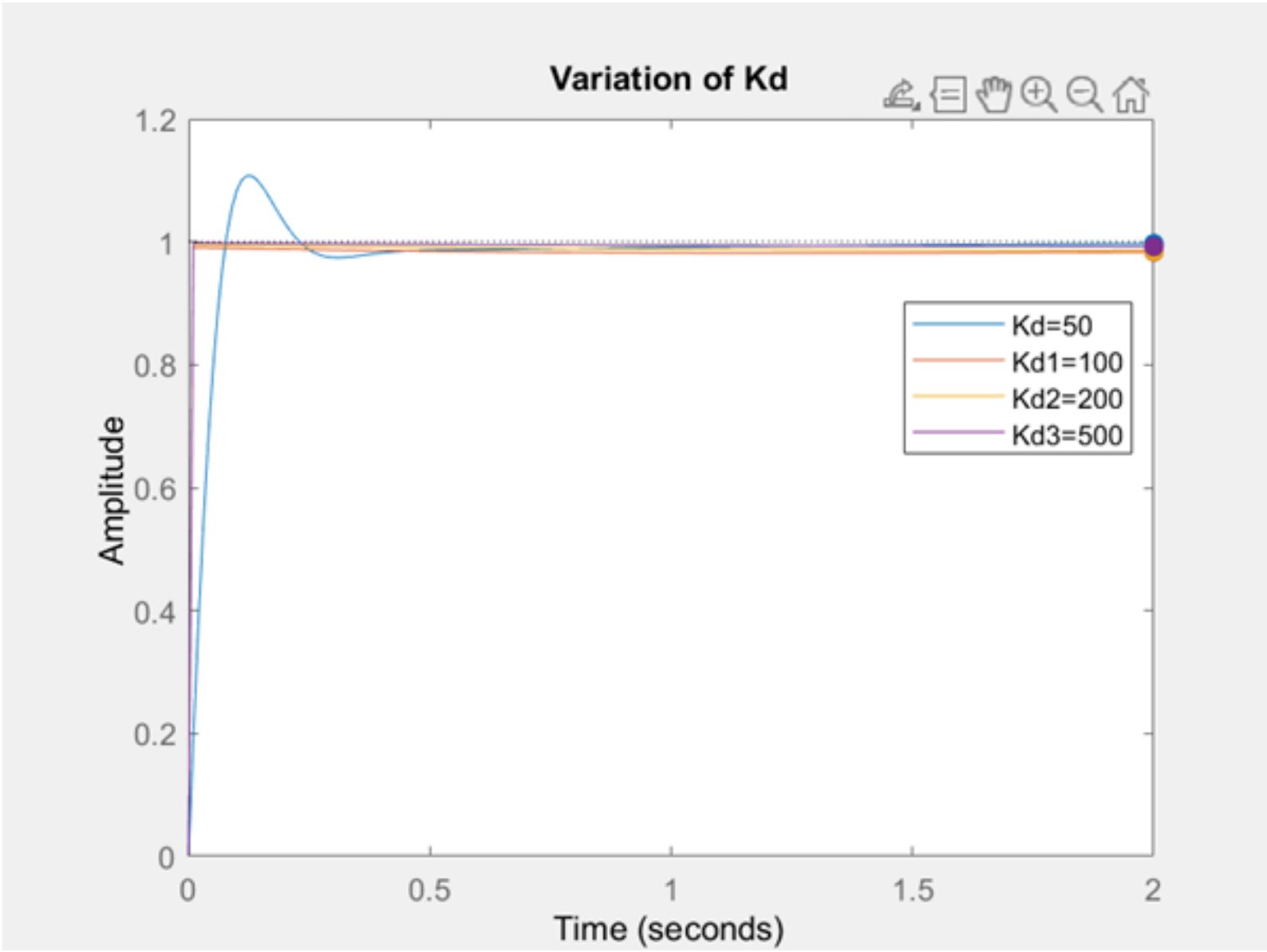
Variation of Ki:

```
s=tf('s');
 P=10/(s^2+10*s+20);
Kp=50;
 Ki=50;
 Kd=2;
 C=pid(Kp,Ki,Kd)
 T=feedback(C*P,1)
t=0:0.01:2;
 step(T,t)
 hold on
Ki1=100;
 C1=pid(Kp,Ki1,Kd)
 T1=feedback(C1*P,1)
 t=0:0.01:2;
 step(T1,t)
 hold on
 Ki2=200;
C2=pid(Kp,Ki2,Kd)
 T2=feedback(C2*P,1)
 t=0:0.01:2;
step(T2,t)
legend
title('Variation of Ki');
```


Variation of Ki
Amplitude
Time (seconds)
Ki=50
Ki=100
Ki=200
0
0.2
0.4
0.6
0.8
1
1.2
0
0.5
1
1.5
2

Variation of Kd:

```
s=tf('s');
 P=10/(s^2+10*s+20);
 Kp=50;
 Ki=50;
 Kd=2;
 C=pid(Kp,Ki,Kd)
 T=feedback(C*P,1)
 t=0:0.01:2;
step(T,t)
 hold on
Kd1=100;
 C1=pid(Kp,Ki,Kd1)
 T1=feedback(C1*P,1)
 t=0:0.01:2;
step(T1,t)
 hold on
 Kd2=200;
C2=pid(Kp,Ki,Kd2)
 T2=feedback(C2*P,1)
 t=0:0.01:2;
 step(T2,t)
 hold on
 Kd3=500;
 C3=pid(Kp,Ki,Kd3)
 T3=feedback(C3*P,1)
 T=0:0.01:2;
step(T3,t)
 legend
title('Variation of Kd');
```


Variation of Kd
Amplitude
Time (seconds)
0
0.2
0.4
0.6
0.8
1
1.2
0
0.5
1
1.5
2
Kd=50
Kd1=100
Kd2=200
Kd3=500