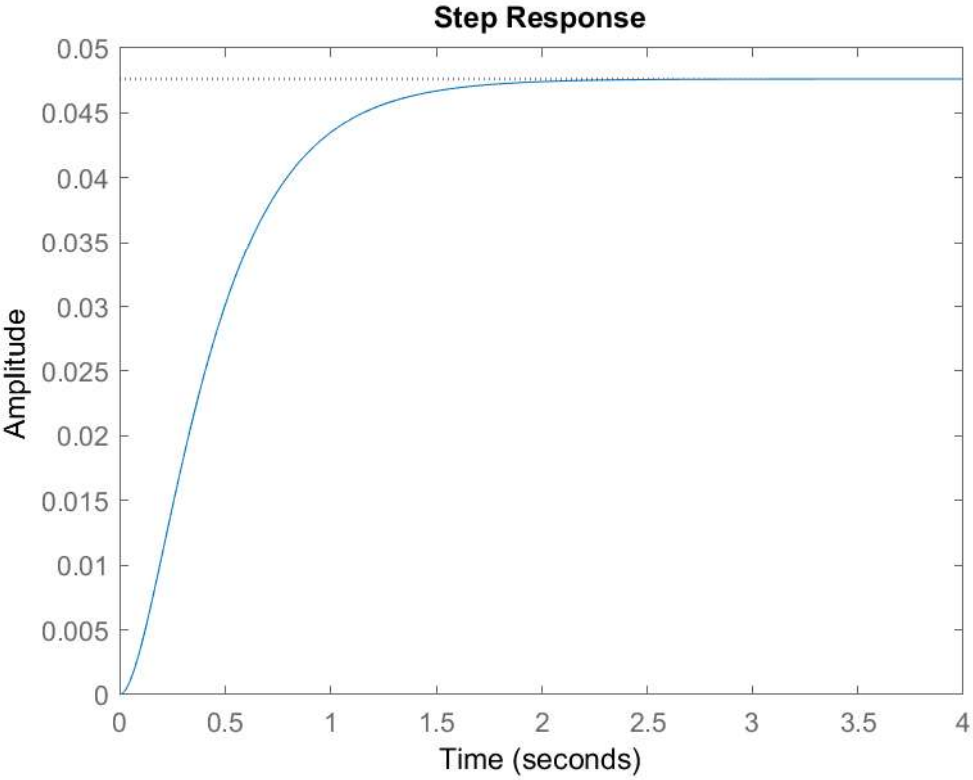
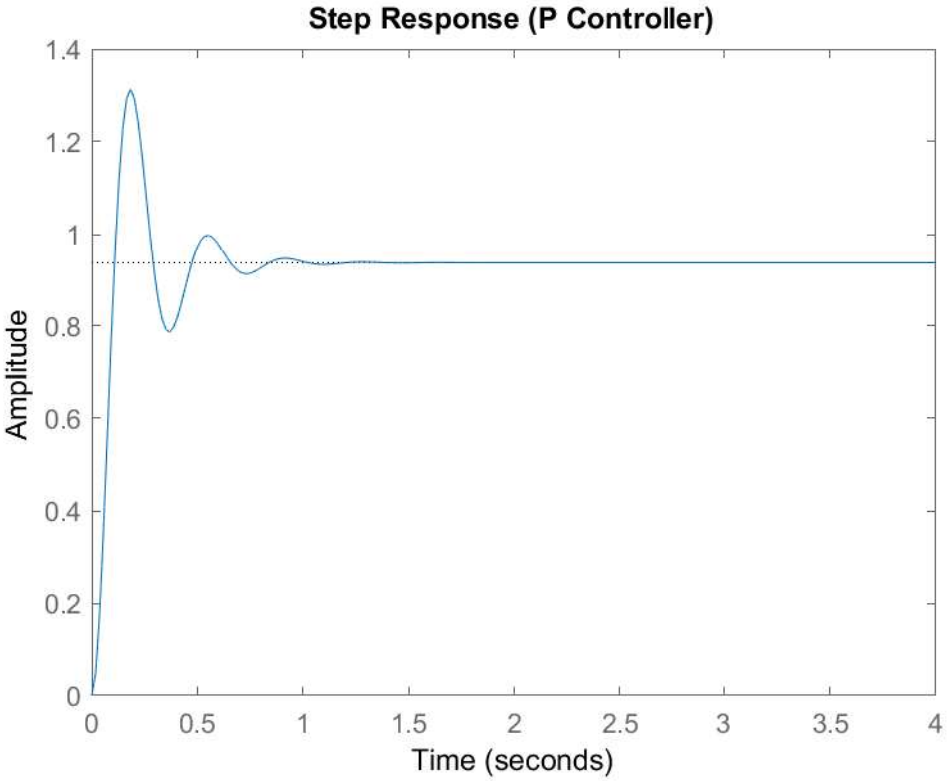
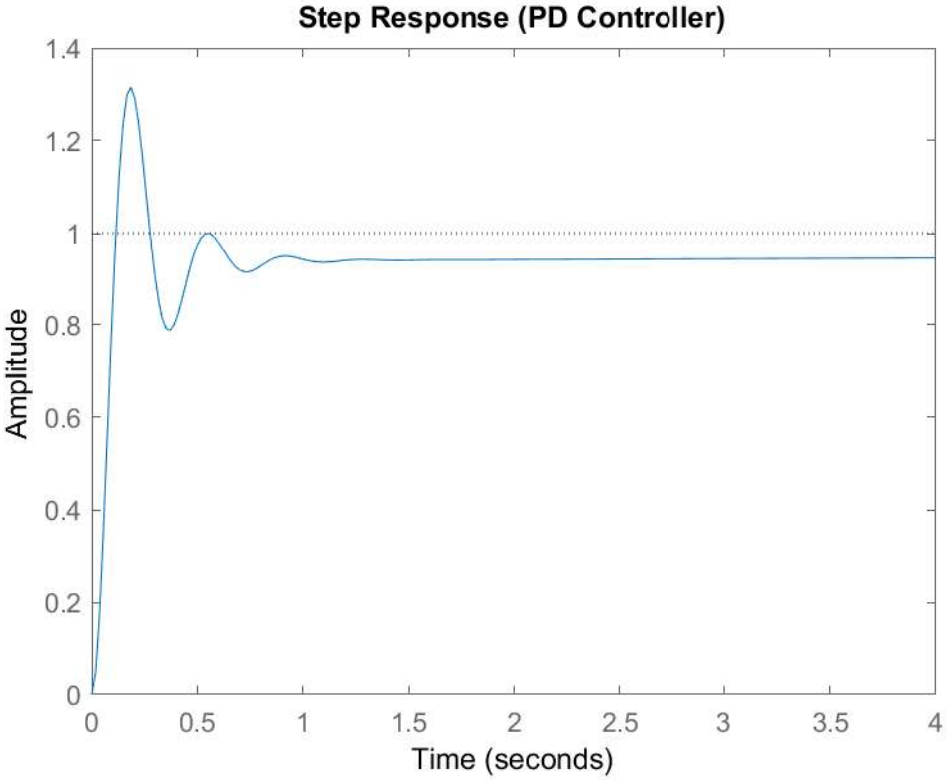
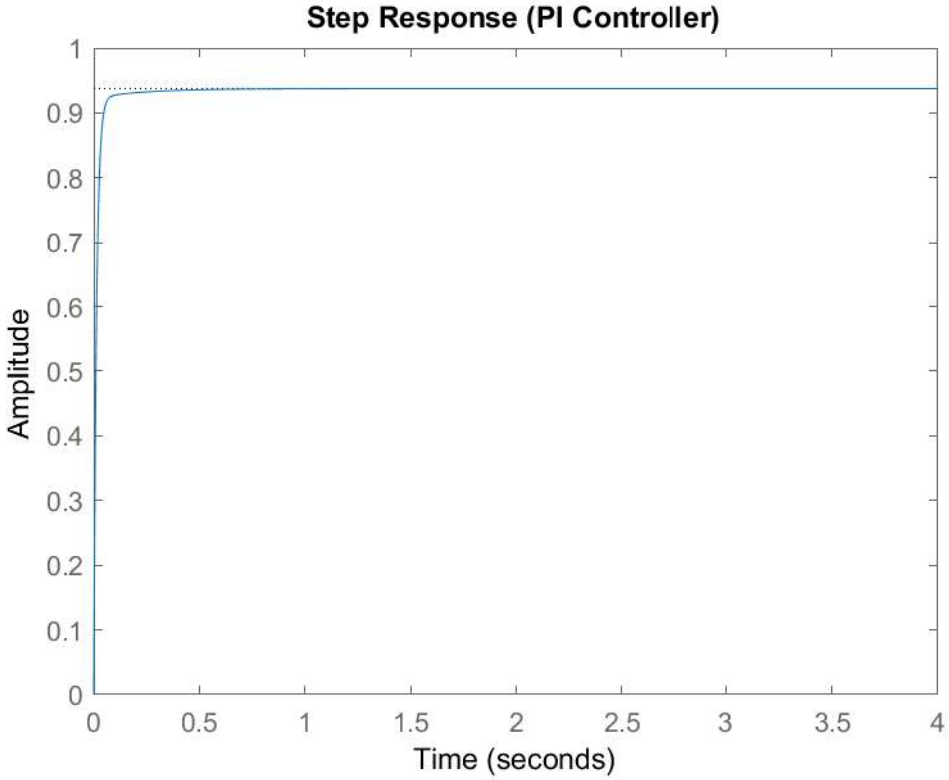
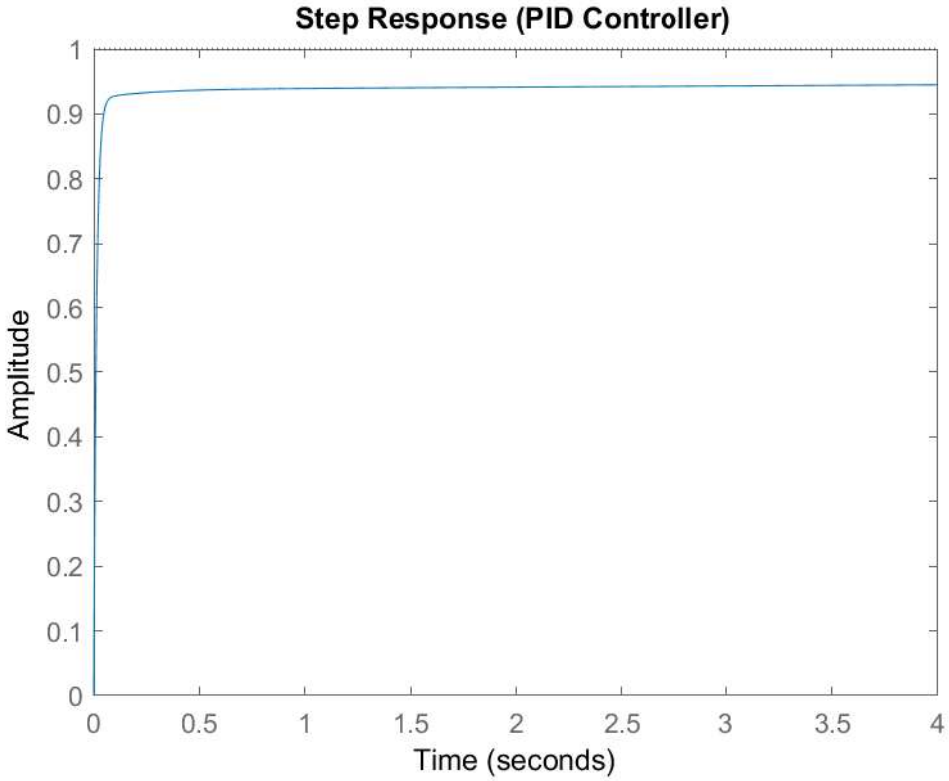
```
%% Effects of P,PI,PD,PID Controllers
a = 1;
b = [1 10 20];
sys = tf(a,b);
t = feedback(sys,1)
figure(1)
step(t,4);
kp = 300;
kd = 10;
ki = 70;
%% Introduction of P Controller
d = pid(kp);
sys1 = sys*d;
t1 = feedback(sys1,1)
figure(2)
step(t1,4);
%% Introduction of PD Controller
d = pid(kp,kd);
sys2 = sys*d;
t2 = feedback(sys2,1)
figure(3)
step(t2,4);
%% Introduction of PI Controller
d = pid(kp,0,ki);
sys3 = sys*d;
t3 = feedback(sys3,1)
figure(4)
step(t3,4);
%% Introduction of PID Controller
d = pid(kp,kd,ki);
sys4 = sys*d;
t4 = feedback(sys4,1)
figure(5)
step(t4,4);
%% Comparision Graph
figure(6)
step(t,4)
hold on;
step(t1,4)
hold on;
step(t2,4)
hold on;
step(t3,4)
hold on;
step(t4,4)
hold on;
```

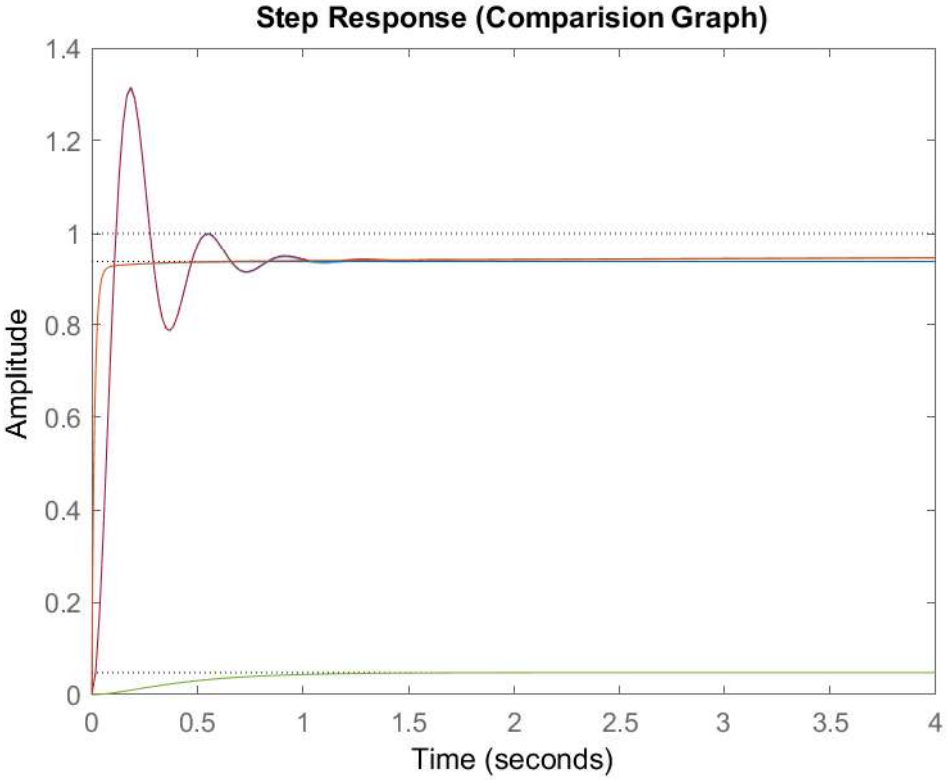

Step Response
Amplitude
Time (seconds)
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0
0.5
1
1.5
2
2.5
3
3.5
4


Step Response (P Controller)
Amplitude
Time (seconds)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
0
0.5
1
1.5
2
2.5
3
3.5
4


Step Response (PD Controller)
Amplitude
Time (seconds)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
0
0.5
1
1.5
2
2.5
3
3.5
4


Step Response (PI Controller)
Amplitude
Time (seconds)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
0.5
1
1.5
2
2.5
3
3.5
4


Step Response (PID Controller)
Amplitude
Time (seconds)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
0.5
1
1.5
2
2.5
3
3.5
4


Step Response (Comparision Graph)
Amplitude
Time (seconds)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
0
0.5
1
1.5
2
2.5
3
3.5
4

```
>> Untitled

t =

         1
  ---------------
  s^2 + 10 s + 21

Continuous-time transfer function.


t1 =

        300
  ----------------
  s^2 + 10 s + 320

Continuous-time transfer function.


t2 =

          300 s + 10
  -------------------------
  s^3 + 10 s^2 + 320 s + 10

Continuous-time transfer function.


t3 =

     70 s + 300
  ----------------
  s^2 + 80 s + 320

Continuous-time transfer function.


t4 =

     70 s^2 + 300 s + 10
  -------------------------
  s^3 + 80 s^2 + 320 s + 10

Continuous-time transfer function.

>> stepinfo(t)

ans =

  struct with fields:
```

```
        RiseTime: 0.8330
    SettlingTime: 1.4902
     SettlingMin: 0.0430
     SettlingMax: 0.0476
       Overshoot: 0
      Undershoot: 0
            Peak: 0.0476
        PeakTime: 3.5394

>> stepinfo(t1)

ans =

  struct with fields:

        RiseTime: 0.0727
    SettlingTime: 0.7724
     SettlingMin: 0.7871
     SettlingMax: 1.3131
       Overshoot: 40.0588
      Undershoot: 0
            Peak: 1.3131
        PeakTime: 0.1842

>> stepinfo(t2)

ans =

  struct with fields:

        RiseTime: 0.0770
    SettlingTime: NaN
     SettlingMin: 0.7879
     SettlingMax: 1.3155
       Overshoot: 31.5493
      Undershoot: 0
            Peak: 1.3155
        PeakTime: 0.1848

>> stepinfo(t3)

ans =

  struct with fields:

        RiseTime: 0.0307
    SettlingTime: 0.0633
     SettlingMin: 0.8444
     SettlingMax: 0.9314
       Overshoot: 0
```

```
      Undershoot: 0
            Peak: 0.9314
        PeakTime: 0.2060

>> stepinfo(t4)

ans =

  struct with fields:

        RiseTime: 0.0458
    SettlingTime: NaN
     SettlingMin: 0.9002
     SettlingMax: 0.9362
       Overshoot: 0
      Undershoot: 0
            Peak: 0.9362
        PeakTime: 0.4491

>>
```