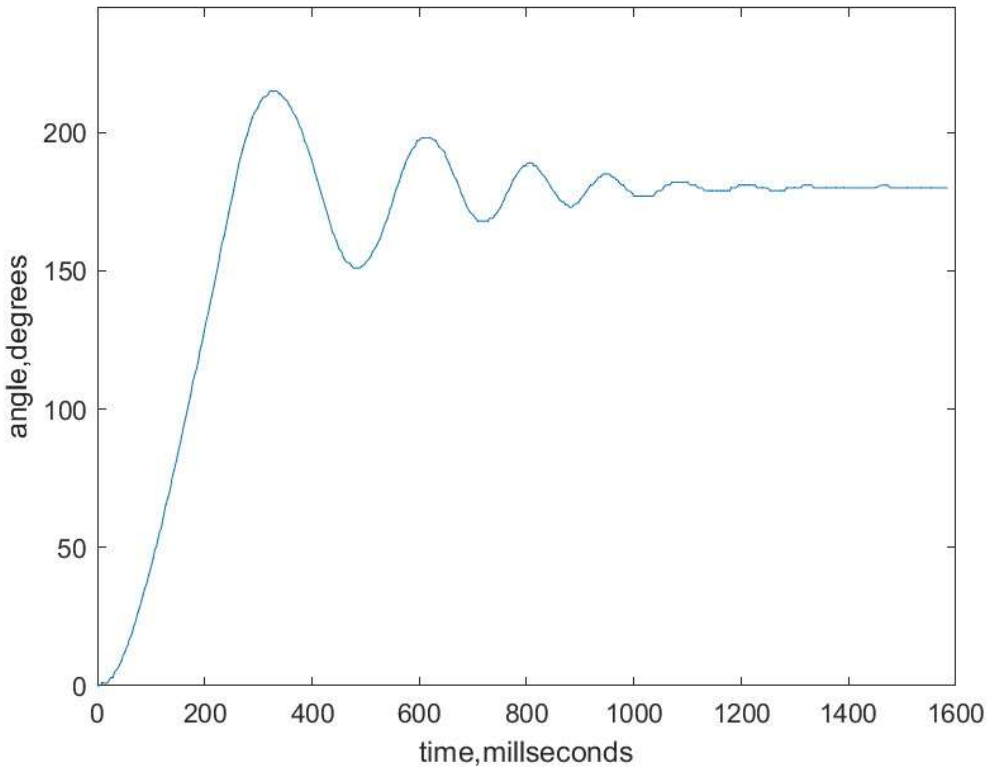
Corresponding ki, kd, kp

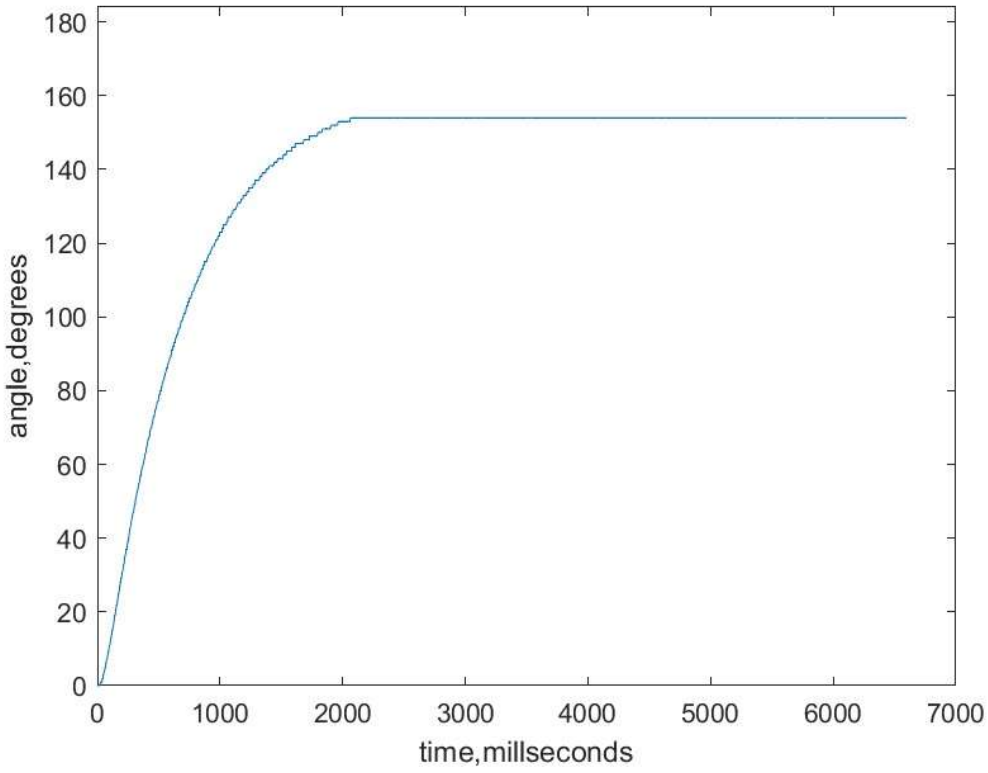
0, 0, 1,
0, 0, 0.01,
0, 0, 0.05,
0.005, 0.1, 0.05,
0.005, 0.5, 0.05,
0.5, 0.1, 0.05,

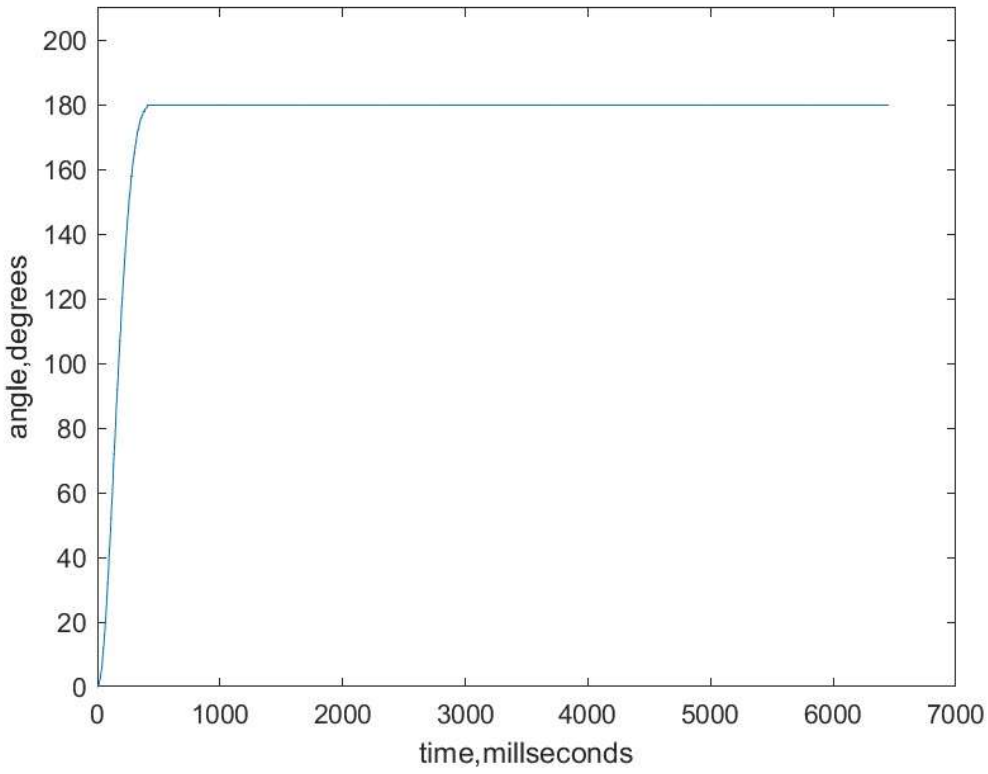
Corresponding performance

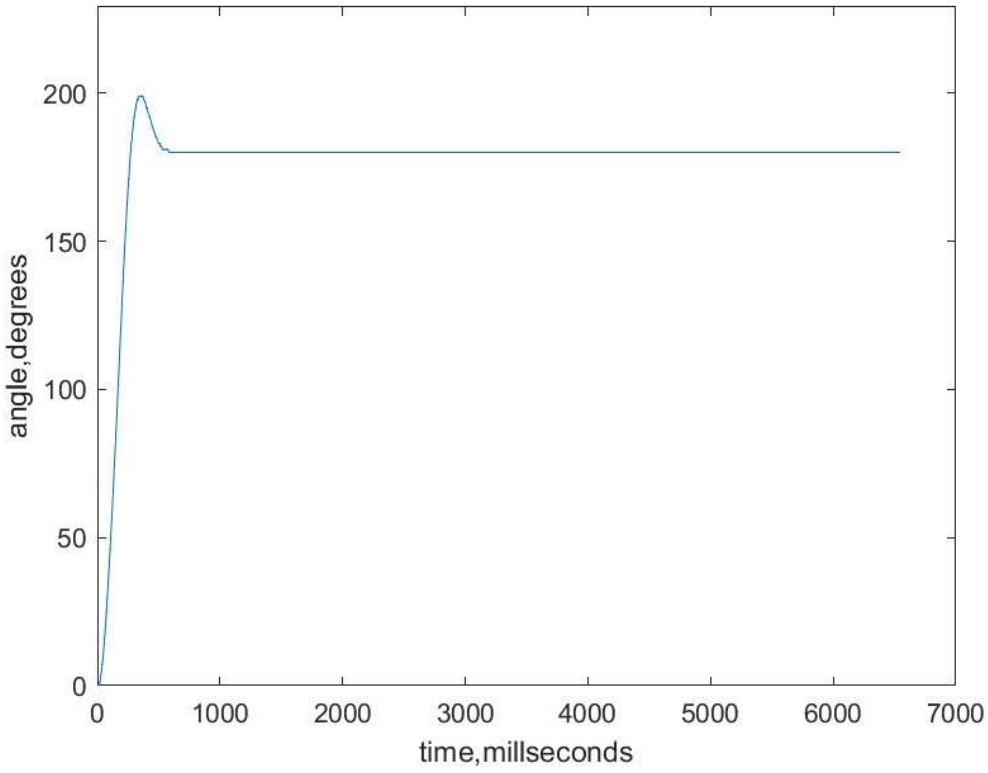
Overshoot for row 1,2,3,4,5,6(degrees):
35 0 0 19 28 36
Steady Error for row 1,2,3,4,5,6(degrees):
0 26 0 0 -1 0
Rise time for row 1,3,4,5,6(degrees):
257ms 534ms 273ms 259ms 544ms
Settling time for row 1,2,3,4,5,6:
1335ms 2064ms 273ms 582ms 606ms 6580ms

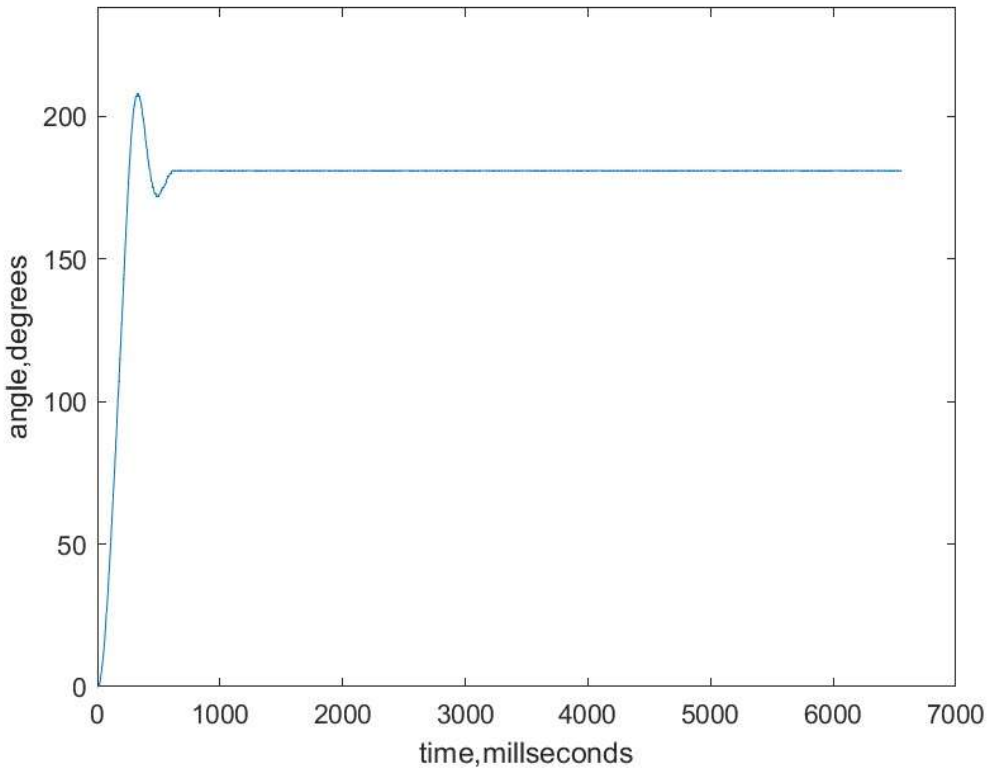
Real Data

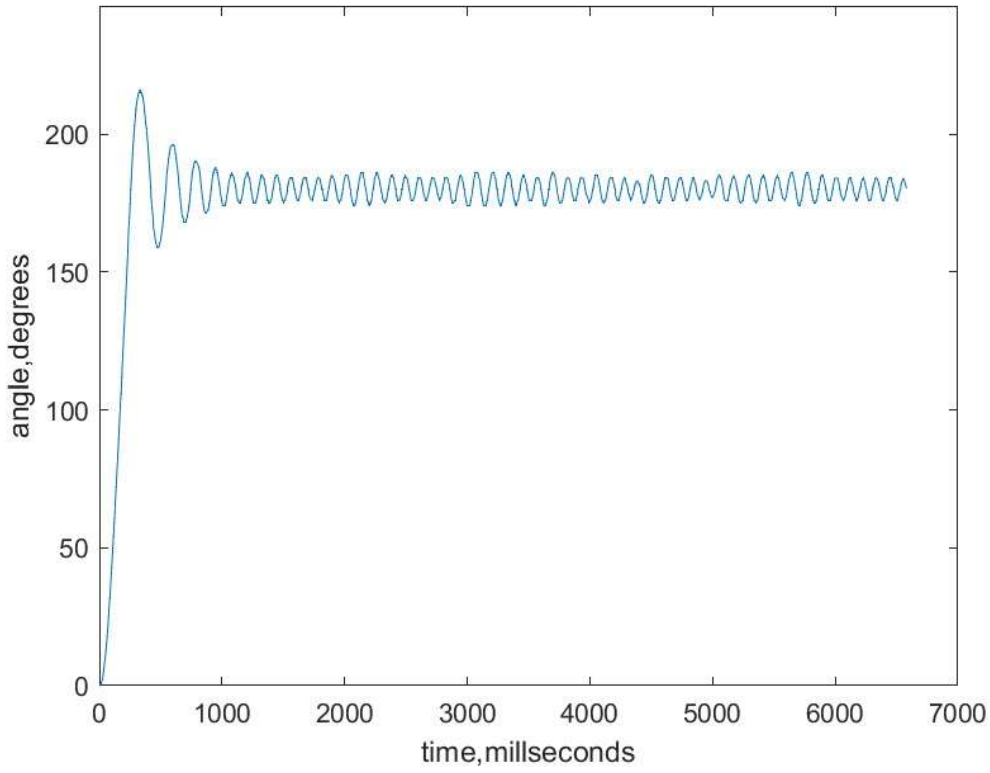



180
160
140
120
100
80
60
40
20
0
angle,degrees
0
1000
2000
3000
4000
5000
6000
7000
time,millseconds

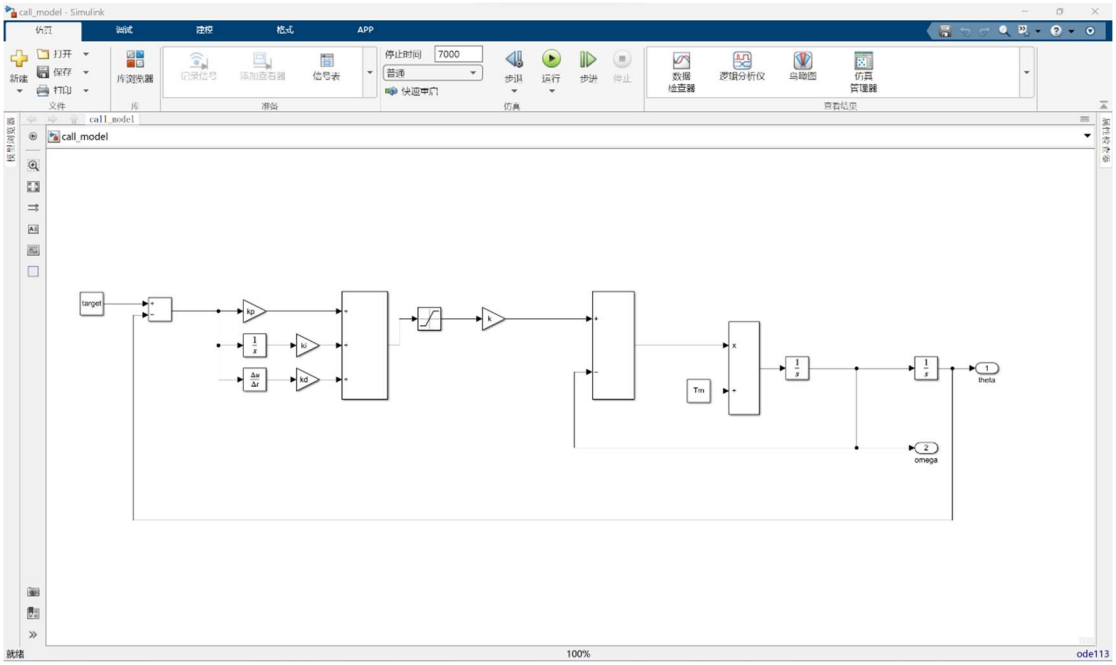

200
180
160
140
120
100
80
60
40
20
0
angle,degrees
0
1000
2000
3000
4000
5000
6000
7000
time,millseconds


200
150
100
50
0
angle,degrees
0
1000
2000
3000
4000
5000
6000
7000
time,millseconds

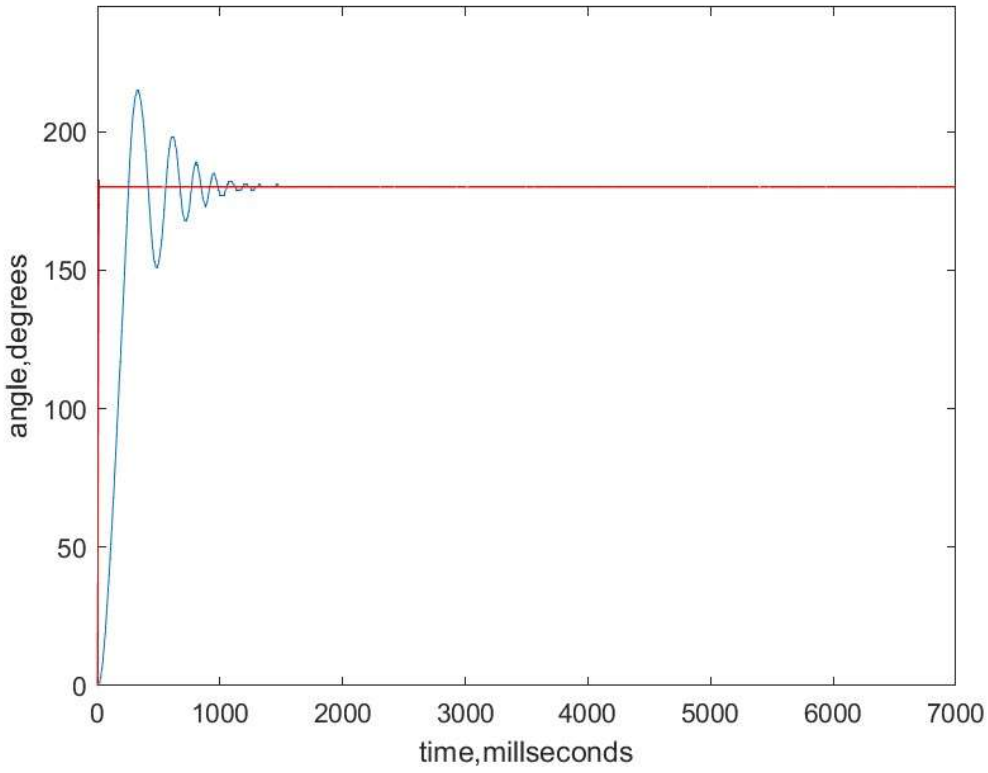

200
150
100
50
0
angle,degrees
0
1000
2000
3000
4000
5000
6000
7000
time,millseconds

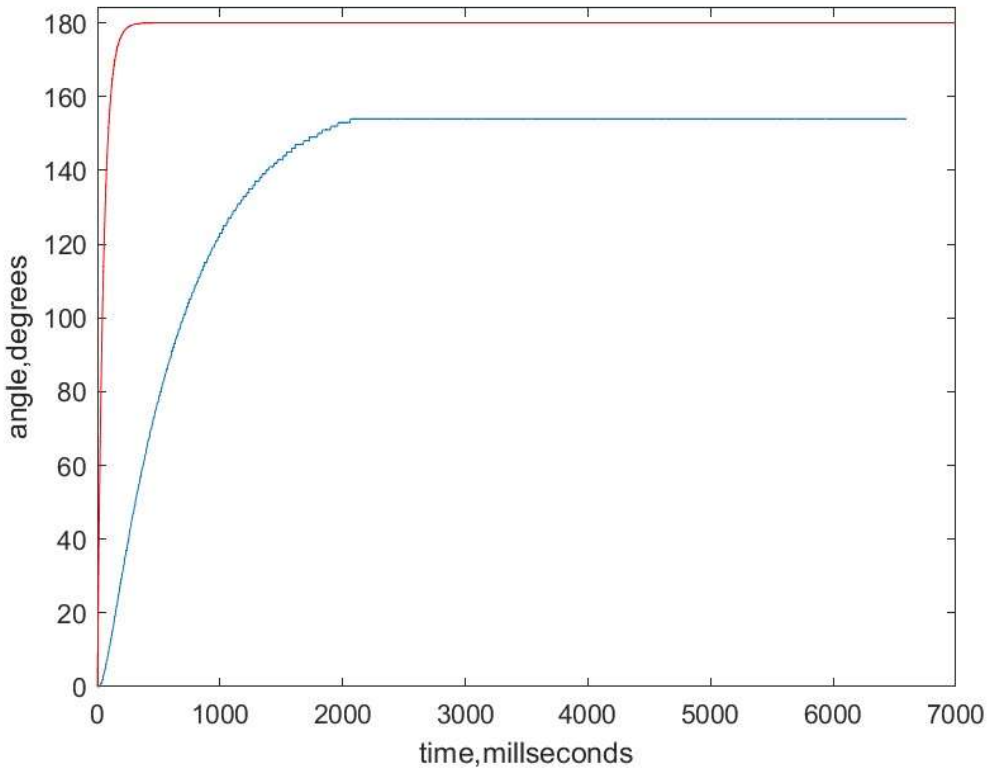


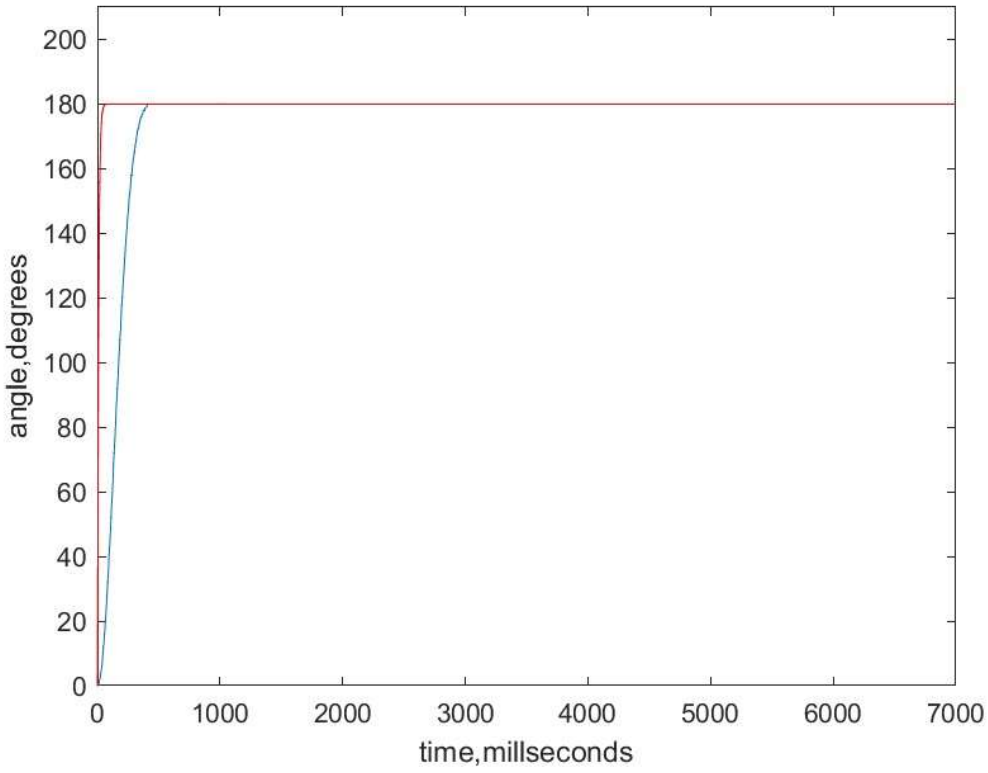
Model

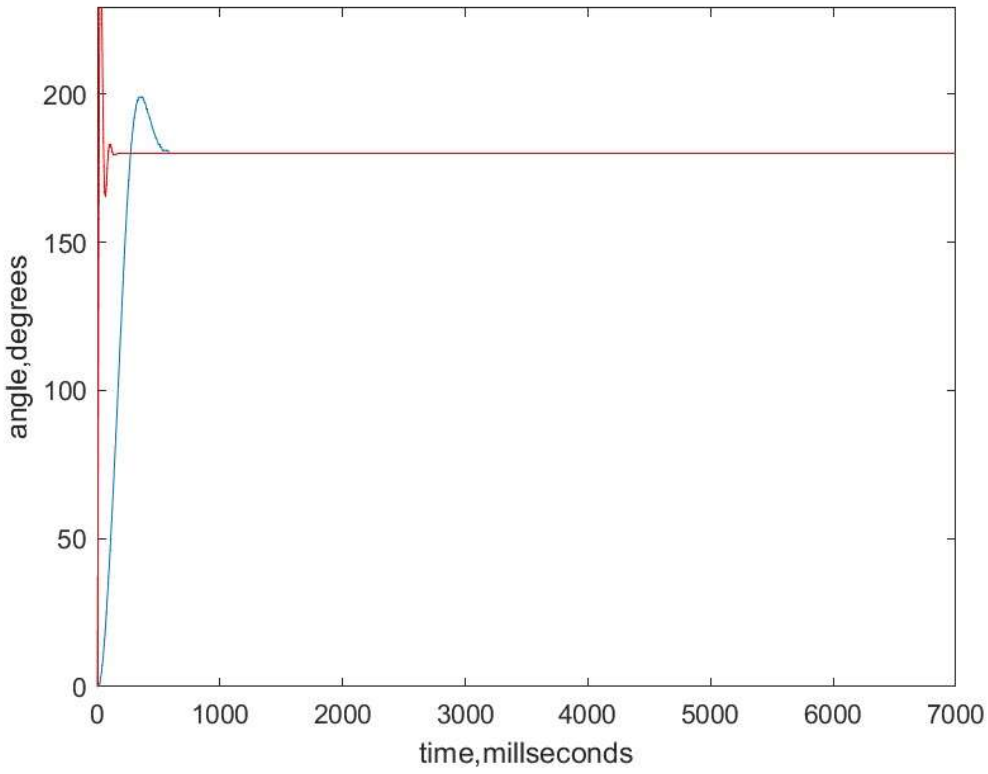


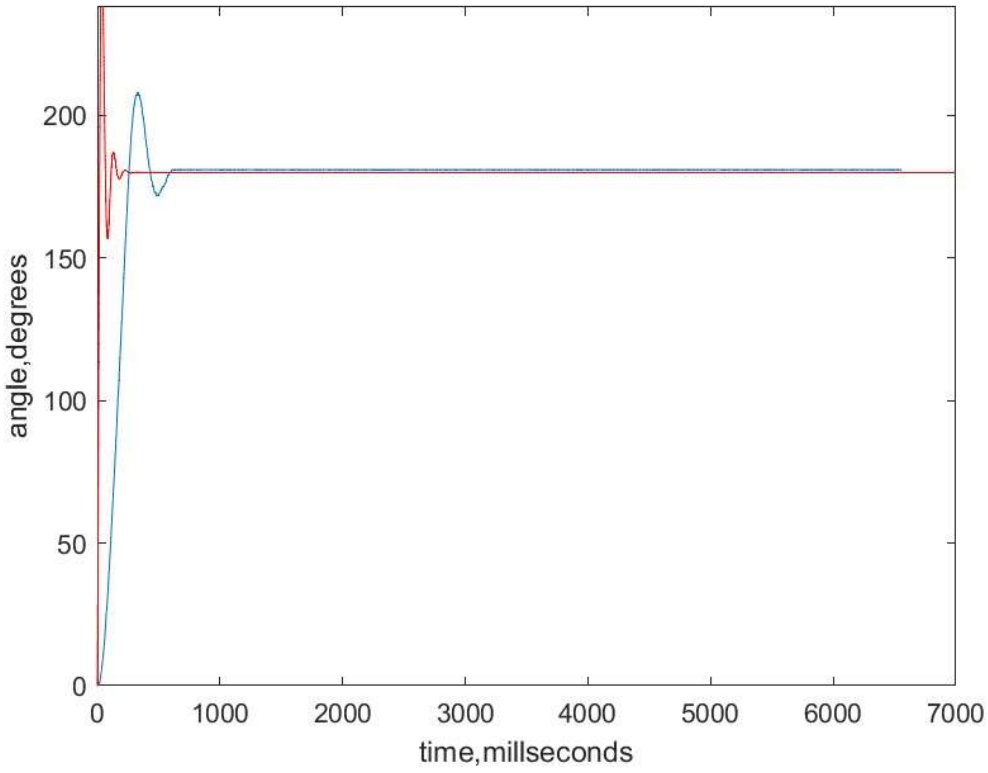
Sim(Red) vs Real

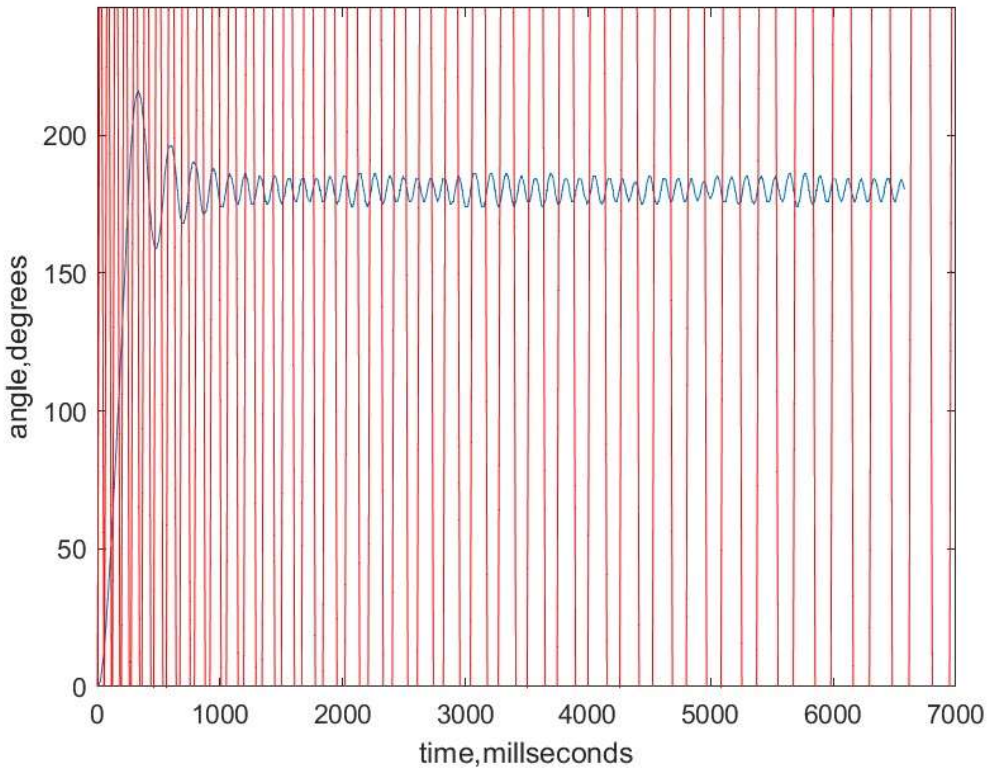

200
150
100
50
0
angle,degrees
0
1000
2000
3000
4000
5000
6000
7000
time,millseconds


180
160
140
120
100
80
60
40
20
0
angle,degrees
0
1000
2000
3000
4000
5000
6000
7000
time,millseconds


200
180
160
140
120
100
80
60
40
20
0
angle,degrees
0
1000
2000
3000
4000
5000
6000
7000
time,millseconds


200
150
100
50
0
angle,degrees
0
1000
2000
3000
4000
5000
6000
7000
time,millseconds


angle,degrees
time,millseconds
0
50
100
150
200
0
1000
2000
3000
4000
5000
6000
7000


angle,degrees
time,millseconds
0
50
100
150
200
0
1000
2000
3000
4000
5000
6000
7000

Conclusion:

Kp rises, rise time decrease, overshoot rise, steady error decrease.
Ki rises, rise time decrease, overshoot rise, steady error decrease, settling time lengthen.
Kd rises, rise time increase, overshoot decrease, settling time lengthen.
The motor has a huge friction.