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

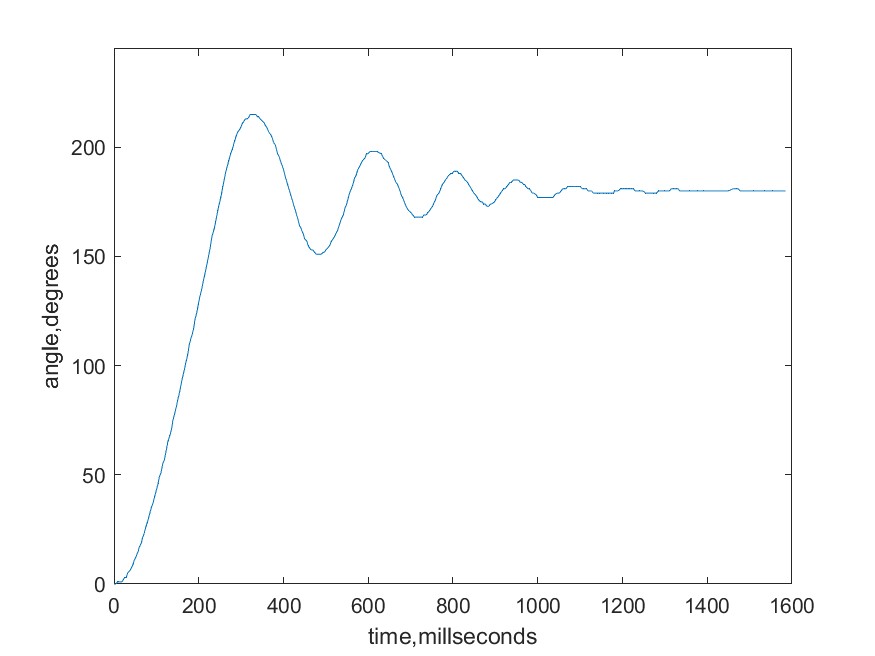
Rise time for row 1,3,4,5,6(degrees):

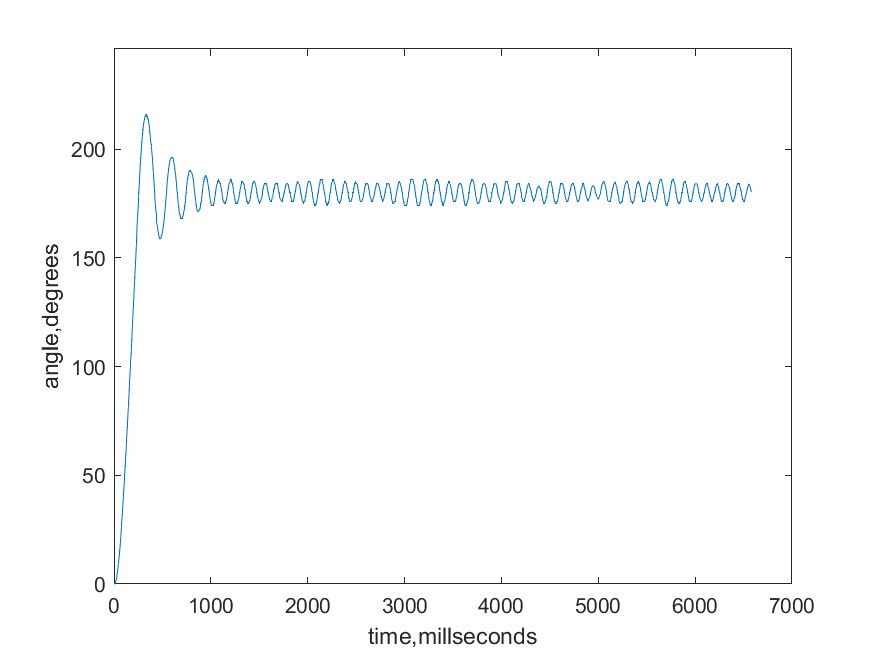
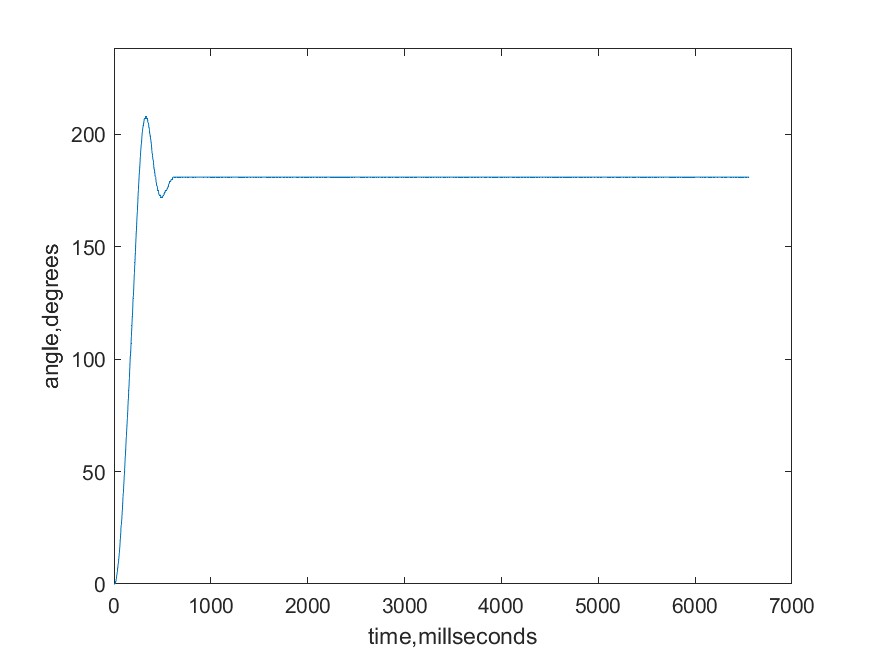
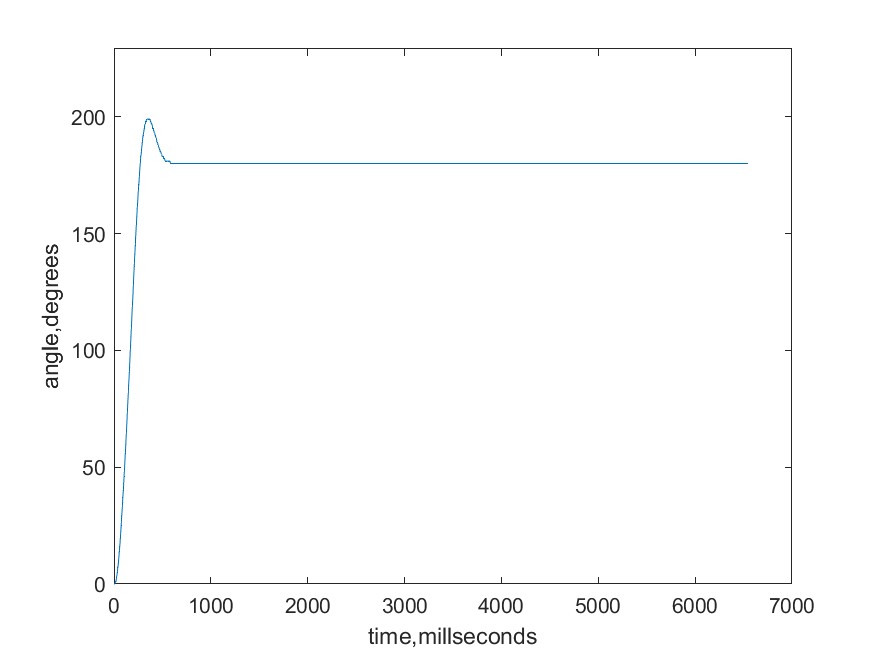
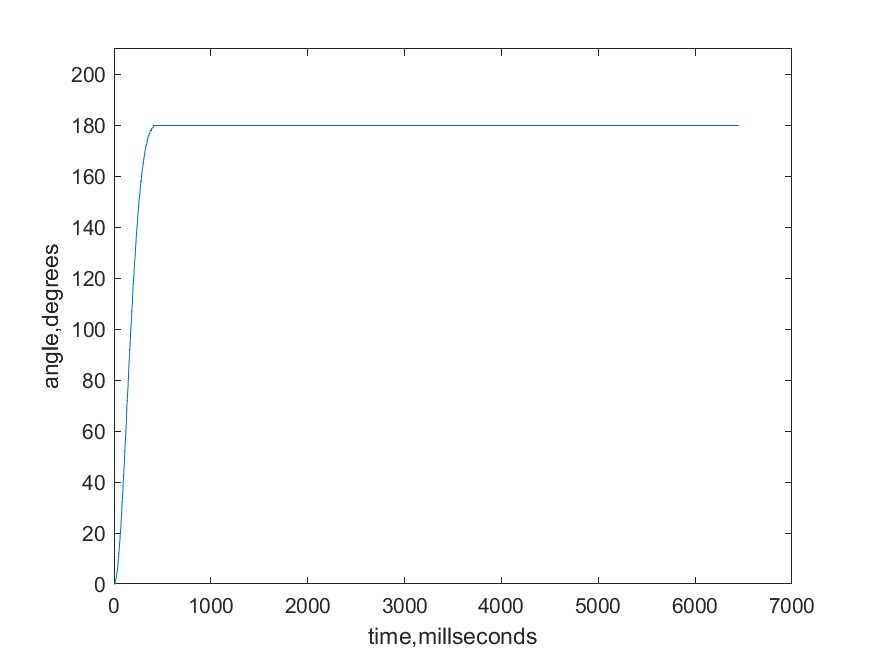
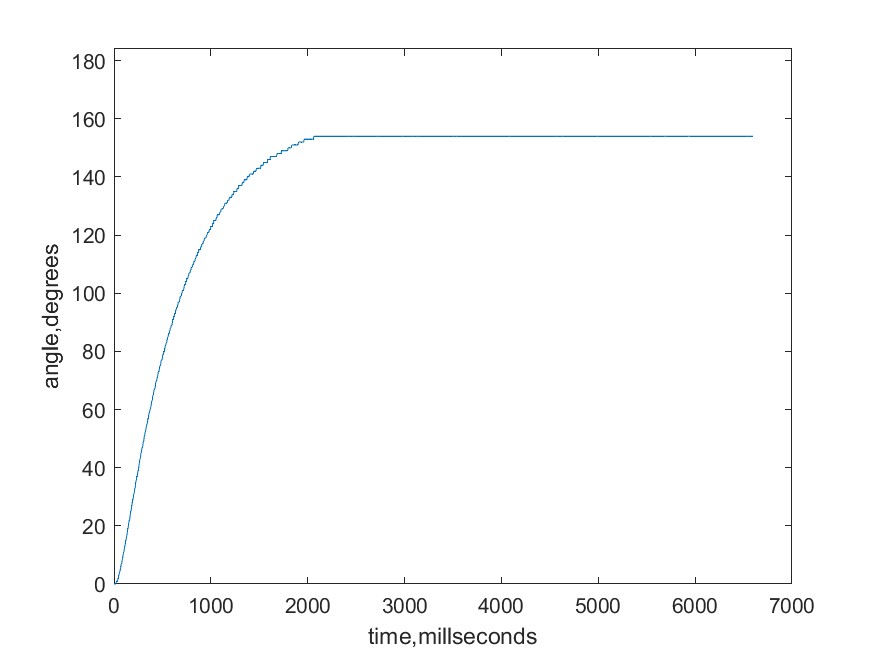
257ms 534ms 273ms 259ms 544ms

Settling time for row 1,2,3,4,5,6:

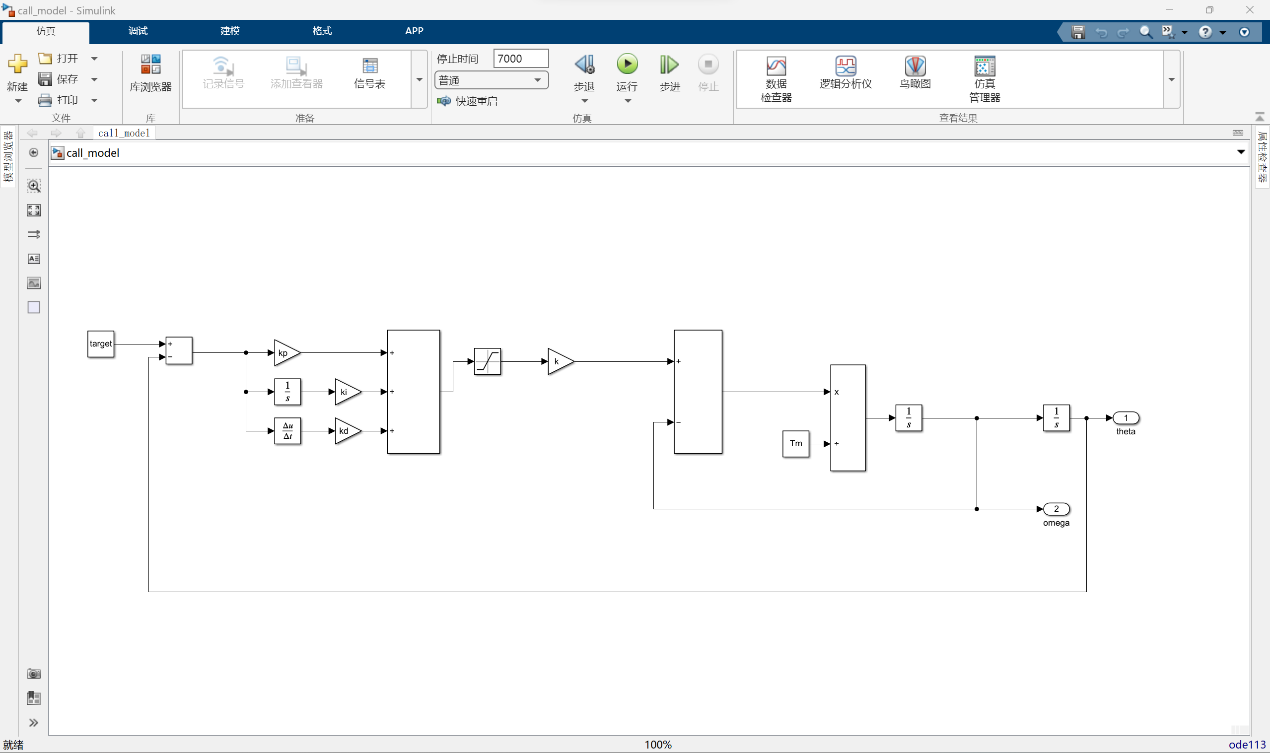
1335ms 2064ms 273ms 582ms 606ms 6580ms

Real Data

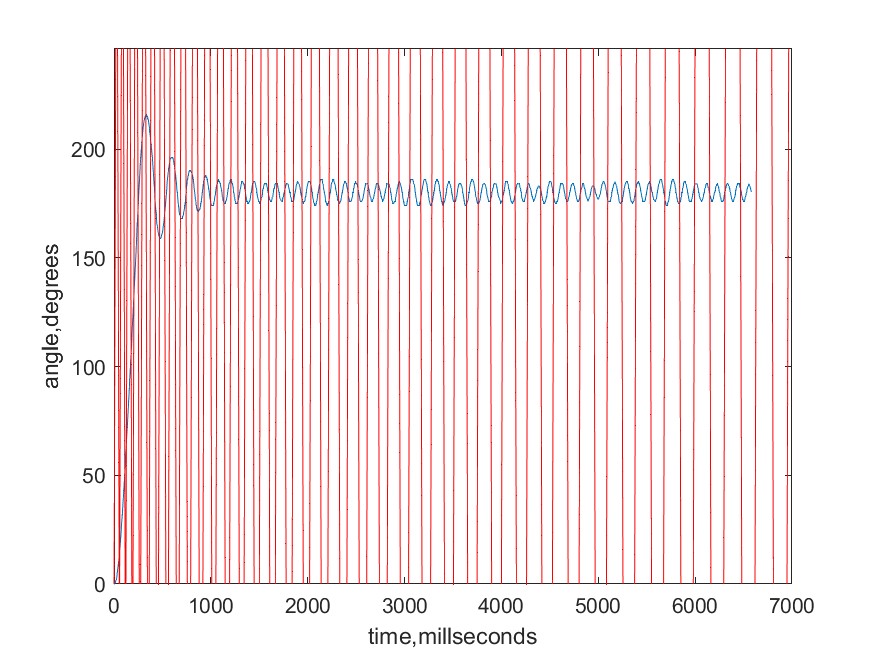
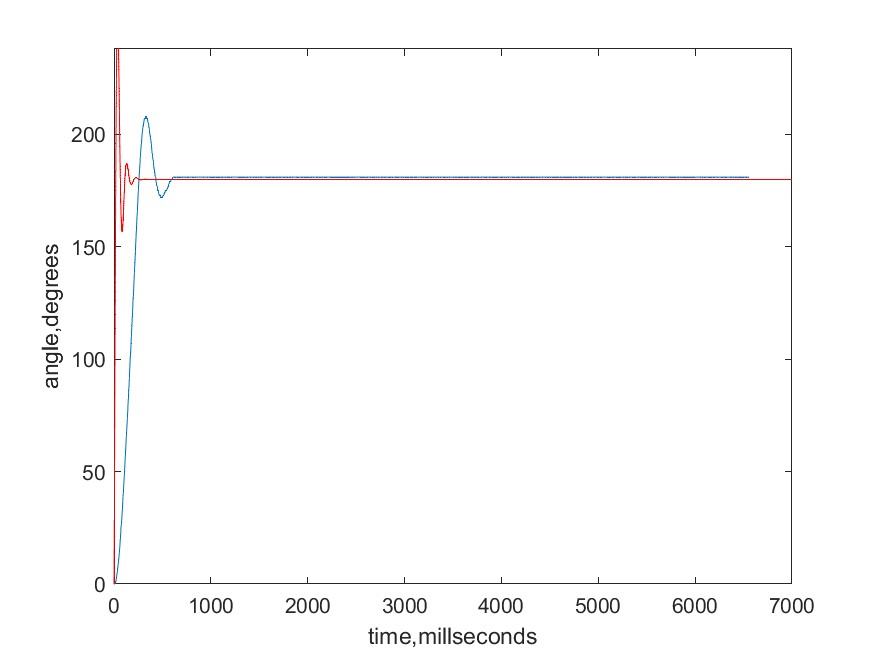
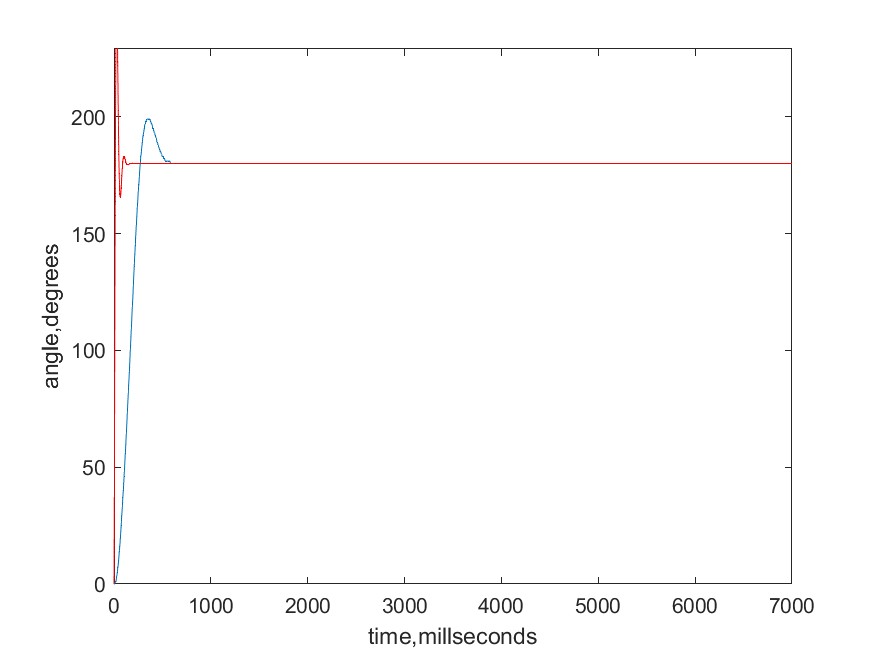
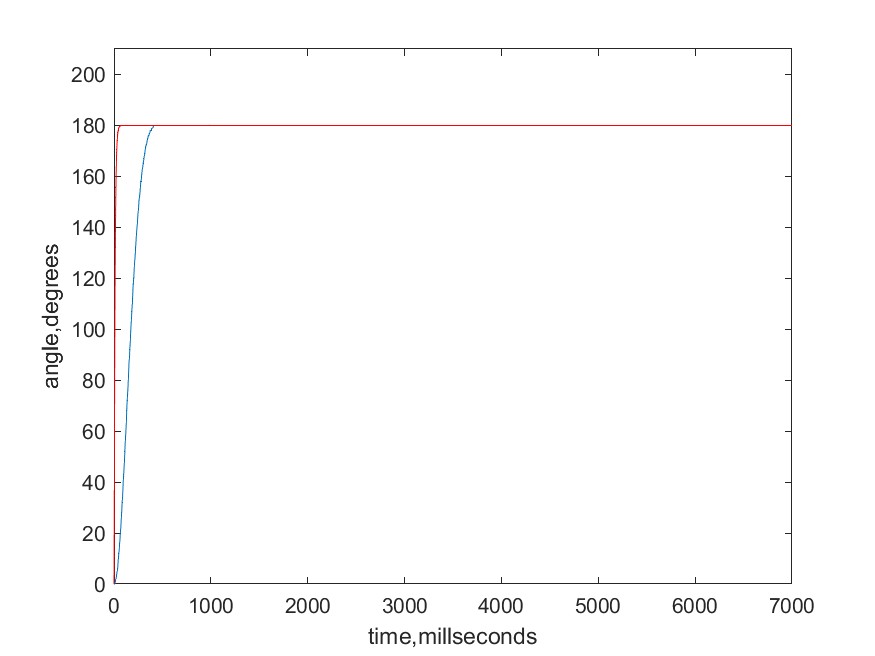
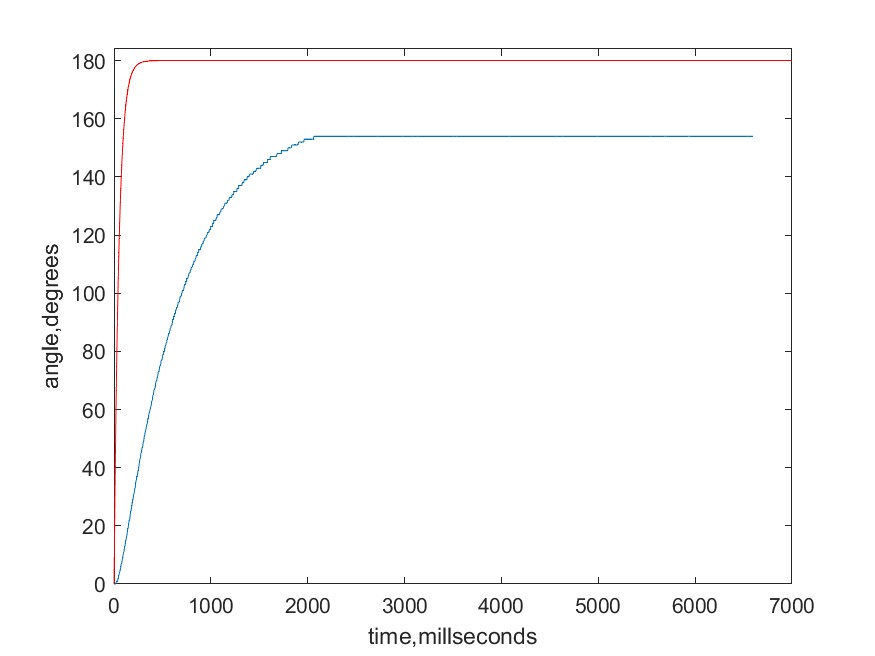
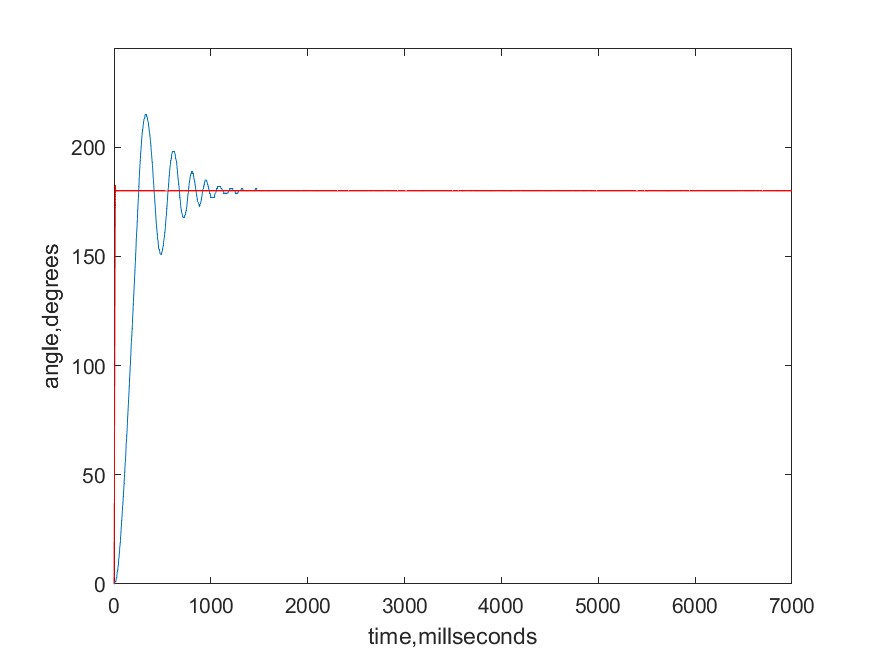




Model



Sim(Red) vs Real



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.