Through the adjustment of different PID parameters, it can be found that the function of each parameter is different.

- Adding the ratio Kp coefficient can reduce the deviation quickly. The smaller the Kp coefficient is, the weaker the control effect is and the slower the system response is. On the contrary, the larger the Kp coefficient is, the stronger the control effect is and the faster the system response is. However, if the Kp is too large, the system will produce large overshooting and oscillation, which will lead to poor stability of the system. Therefore, Kp should be selected carefully so that it will not produce large oscillation while reducing the deviation. However, the static error can not be completely eliminated simply by adding Kp coefficient.

- Adding the integral ki coefficient can eliminate the static error and improve the error free degree of the system. The strength of the integral action depends on the Ki coefficient. The larger the Ki coefficient is, the slower the integral speed is, and the weaker the integral action is. On the contrary, the smaller the Ki coefficient is, the faster the integral speed is, and the stronger the integral action is. Too strong integration will increase the overshoot of the system and even make the system oscillate. Moreover, the introduction of integral coefficient will reduce the response speed of the system.

- By adding differential Kd coefficient, the system can respond in time when there is a deviation at the beginning, and can generate control according to the variation trend of the deviation, which can reduce the overshoot of the system and overcome the oscillation. Too large Kd coefficient is easy to cause system instability.

In order to ensure the safety of the system, more conservative parameters should be set at the beginning of debugging, such as the proportion coefficient should not be too large, and the integration time should not be too small, so as to avoid the abnormal situation of system instability or overshoot. Through the manual experiment, the proportional coefficient and integral time are adjusted repeatedly. If the overshoot is still large, the differential control can be added. The differential time increases gradually from 0, and the parameters of the proportional, integral and differential parts of the controller are adjusted repeatedly.