Car steering control (PD)

The tutorial mainly introduces the steering control of the balancing car.

Steering principle

The steering control can be achieved by the different speeds (speed difference) of the left and right motors of the balancing car.

PD controller

The main function of differential (D) control in PID control is to reduce the dynamic error and oscillation of the system, and the main function of integral (I) control is to eliminate static errors.

Since the car itself is equipped with heavy objects such as batteries and has a large moment of inertia, the car will overshoot during the adjustment process. If it is not suppressed, the car will over-steer and fall down; in order to eliminate the overshoot in the direction control of the car, it is necessary to add differential control.

Implementation code

```
int Turn_PD(float gyro)
{
static float Turn_Target,turn_PWM;
float Kp=Turn_Kp,Kd; //To change the steering speed, please change
Turn_Amplitude

Turn_Target=0;
Kd=Turn_Kd;

//=============================================//
turn_PWM=Turn_Target*Kp/100+gyro*Kd/100+Move_Z; //PD control combined with Z-axis
gyroscope

return turn_PWM; //Steering ring PWM is positive for right turn and negative for
left turn
}
```

Software code

Basic PID control of balancing car: 08-13 tutorial only provides one project file.

Product supporting materials source code path: Attachment → Source code summary → 3.PID_Course → 08-13.Balanced_Car_PID