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How To Write PID control algorithm using C language

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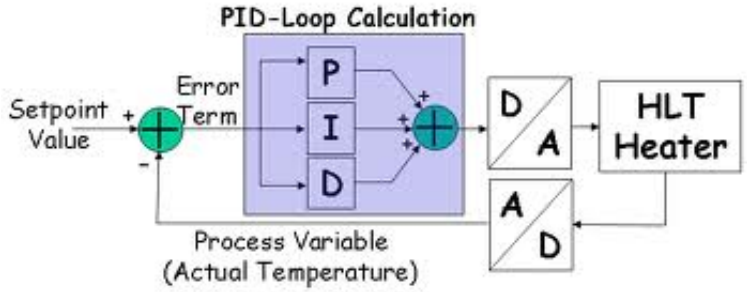
Today i am going to write **PID control algorithm using C language** and how can you write your own **PID control algorithm** using **C language**. The **PID algorithm** are basic and important in **control engineering** for example motor control. simple example of PID algorithm is written below in C language with out put diagram.

[smartads] [smartads]

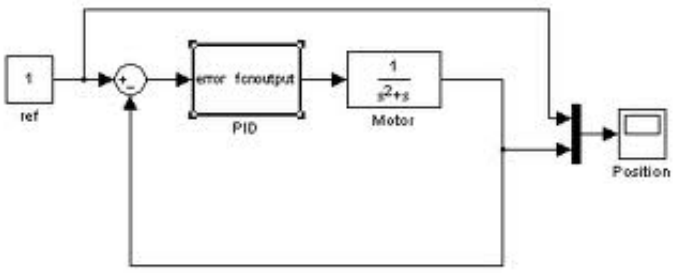
The Matlab simulation of the PID algorithm to control the DC motor




```
#ifndef PID_H_
#define PID_H_
#include

//Define parameter
#define epsilon 0.01
#define dt 0.01             //100ms loop time
#define MAX  4                   //For Current Saturation
#define MIN -4
```

```
#define Kp  0.1
#define Kd  0.01
#define Ki  0.005

float PIDcal(float setpoint,float actual_position)
{
    static float pre_error = 0;
    static float integral = 0;
    float error;
    float derivative;
    float output;

    //Caculate P,I,D
    error = setpoint - actual_position;

    //In case of error too small then stop integration
    if(abs(error) > epsilon)
    {
        integral = integral + error*dt;
    }
    derivative = (error - pre_error)/dt;
    output = Kp*error + Ki*integral + Kd*derivative;

    //Saturation Filter
    if(output > MAX)
    {
        output = MAX;
    }
    else if(output < MIN)
    {
        output = MIN;
    }
        //Update error
        pre_error = error;

 return output;
}
#endif /*PID_H_*/

after that embed PID Code :- >>>>

function output = fcn(error)

%Declare static value
persistent pre_error;
```

```
if isempty(pre_error)
    pre_error = 0;
end

persistent integral;
if isempty(integral)
    integral = 0;
end

%Constant Value
epsilon = 0.01;
dt = 0.01;
Kp = 5;
Kd = 3;
Ki = 0.01;

if(abs(error) > epsilon)
    integral = integral + error*dt;
end
derivative = (error - pre_error)/dt;
output = Kp*error  + Ki*integral + Kd*derivative;
pre_error = error;
```



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