#include <Servo.h>

Servo myservo;

long val, duration, cm;

const int Pinsensor = 13;

double Setpointpos, Setpointvel;

float Lecturas [100];

float Vel;

int i;

float Output1;

float Output2;

void setup()

{

myservo.attach(7);

Serial.begin(9600);

myservo.write(90);

delay(500);

Setpointpos = 10;

Setpointvel = 0;

}

void loop()

{

long tiempo=millis(); //tiempo antes de iniciar la lectura

int cm=distancia(20); //lectura de distancia

tiempo=millis()-tiempo; //milisegundos que duró la lectura

Lecturas[i] = cm;

Vel = (Lecturas[i] - Lecturas[i + 1]);

int Controlador [2][2] = {

{-8.0000, -1.0000},

{1.0000, 0.0000}};

//{-3.6013, -6.0302},

//{1.0000, 0.0000}};

float Input1= Setpointpos - cm;

float Input2= Setpointvel - Vel;

float Input [2][1] = {

{Input1},

{Output2}};

Output1 = Controlador[0][0]\*Input[0][0] + Controlador[0][1]\*Input[1][0];

Output2 = Controlador[1][0]\*Input[0][0] + Controlador[1][1]\*Input[1][0];

float Output [2][1] = {

{Output1},

{Output2}};

val = map(Output[0][0], -360, 360, 120, 70);

myservo.write(val-4);

Serial.print(Setpointpos-cm);

Serial.print(" ");

Serial.print(val-4);

Serial.println(" ");

}

float distancia(int n)

{

long suma=0;

for(int i=0;i<n;i++)

{

suma=suma+analogRead(A0);

}

float adc=suma/n;

float distancia\_cm = 17569.7 \* pow(adc, -1.2062);

return(distancia\_cm);

}