Curso avanzado Arduino: PID

ElCacharreo.com

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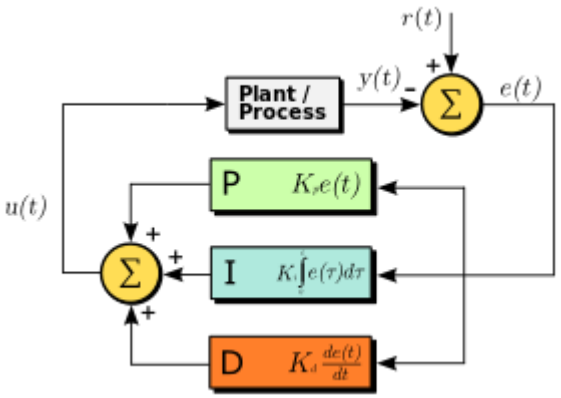
PID: Resumen

Teoría http://en.wikipedia.org/wiki/PID_controller

Librería pid arduino http://playground.arduino.cc/Code/PIDLibrary

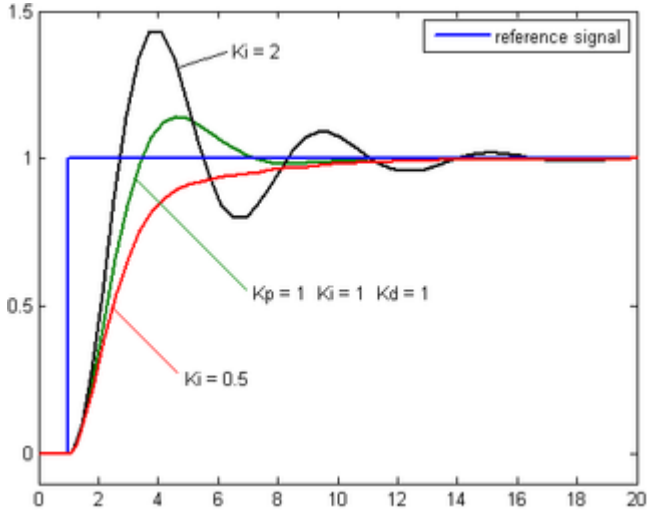
Ecuaciones http://www.regnumelectronic.com/Docs/PID.pdf

PID: Teoría



http://en.wikipedia.org/wiki/PID_controller

$$\mathrm{u}(t) = \mathrm{MV}(t) = K_p e(t) + K_i \int_0^t e(\tau)\,d\tau + K_d \frac{d}{dt} e(t)$$



PID: Aplicada

$$dCO = K_i e dt - K_p dPV - K_d \frac{d^2 PV}{dt}$$

Discretization of the above equation with sampling period Ts gives the following form that can be implemented in a digital computer:

$$CO(k) = CO(k-1) + K_i e(k) T_s - K_p [PV(k) - PV(k-1)] - \frac{K_d}{T_s} [PV(k) - 2PV(k-1) + PV(k-2)]$$

where

Ts:	Sampling period	seconds
Kp:	Proportional gain	No unit
Ki:	Integral grain	(1/second)
Kd:	Derivative gain	seconds

http://en.wikipedia.org/wiki/PID_controller

$$\mathrm{u}(t) = \mathrm{MV}(t) = K_p e(t) + K_i \int_0^t e(\tau)\,d\tau + K_d \frac{d}{dt} e(t)$$

PID: Arduino's way

```
#include <PID_v1.h>

//Define Variables we'll be connecting to
double Setpoint, Input, Output;

//Specify the links and initial tuning parameters PID
myPID(&Input, &Output, &Setpoint,2,5,1, DIRECT);

void setup()
{
  //initialize the variables we're linked to
  Input = analogRead(0);
  Setpoint = 100;

  //turn the PID on
  myPID.SetMode(AUTOMATIC);
}

void loop()
{
  Input = analogRead(0);
  myPID.Compute();
  analogWrite(3,Output);
}
```

Functions

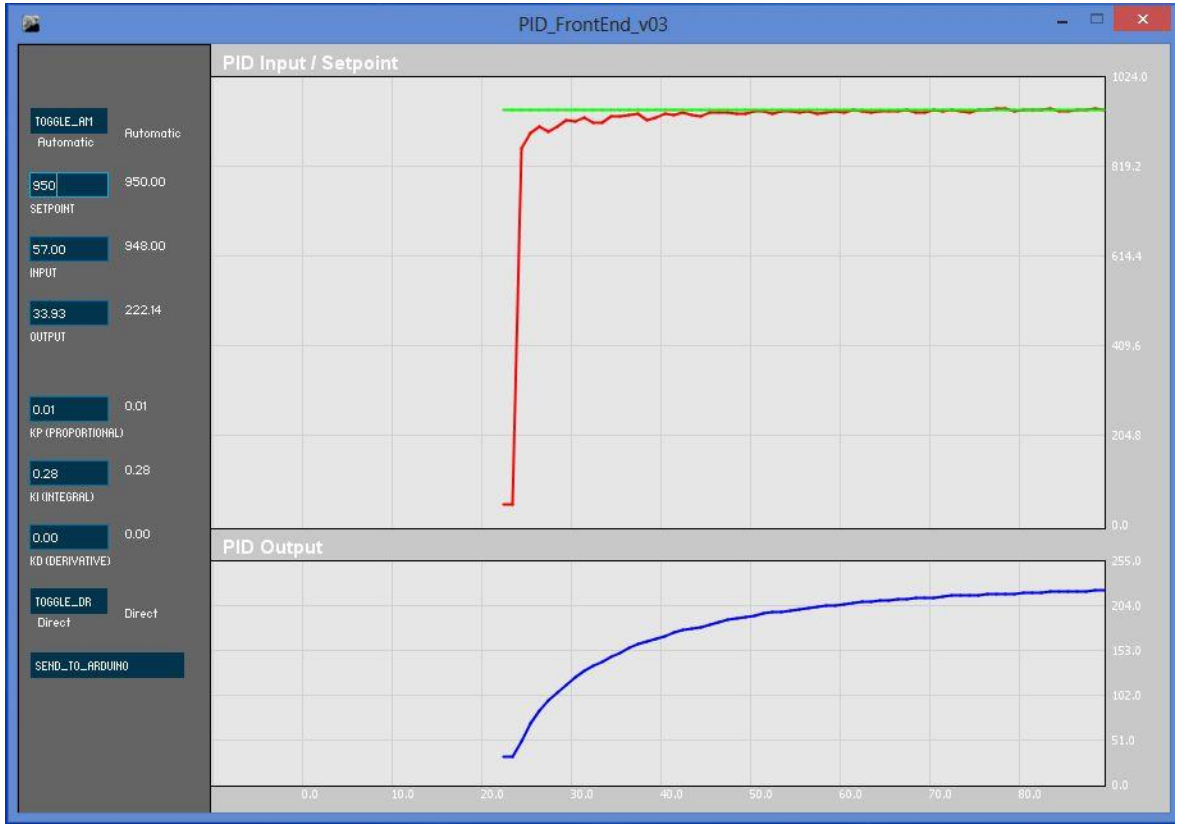
- PID()
- Compute()
- SetMode()
- SetOutputLimits()
- SetTunings()
- SetSampleTime()
- SetControllerDirection()
- Display Functions

Examples

- Basic
- RelayOutput
- AdaptiveTunings

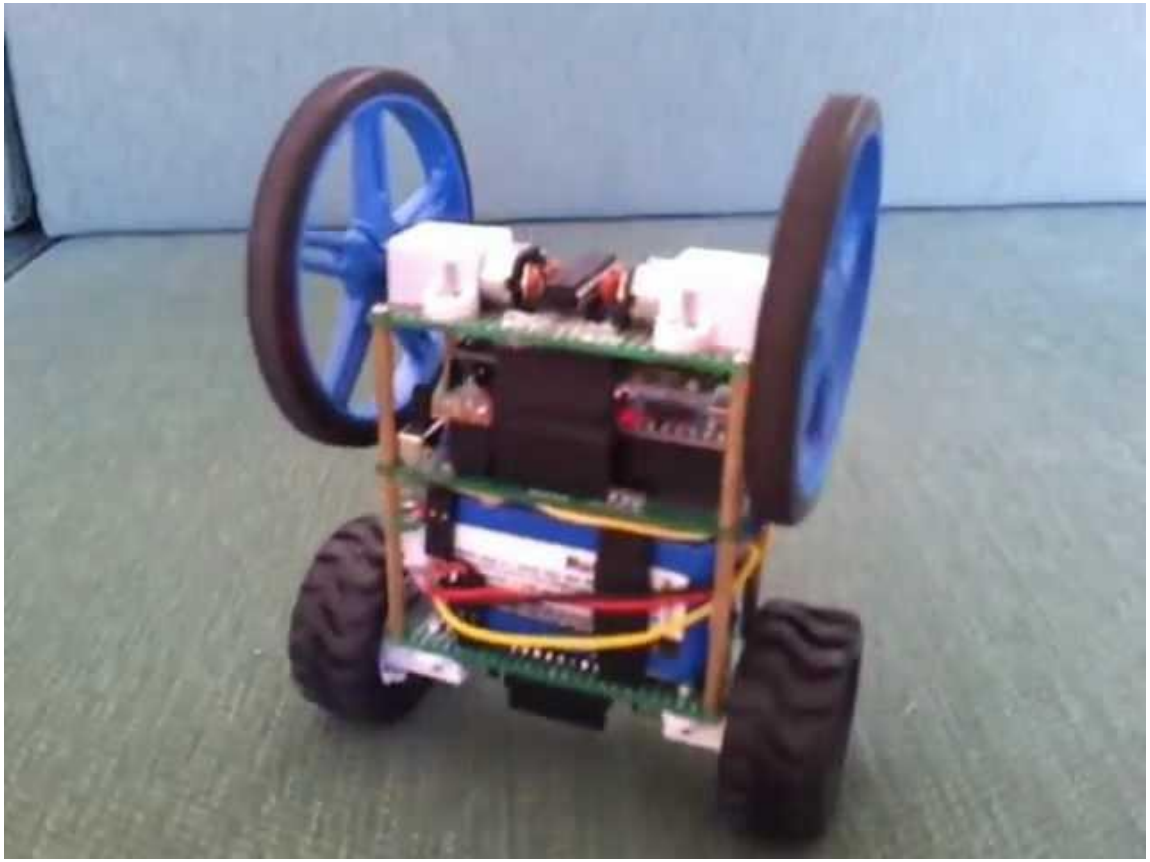
http://playground.arduino.cc/Code/PIDLibrary
http://playground.arduino.cc//Code/PIDAutotuneLibrary

Ejemplo de control



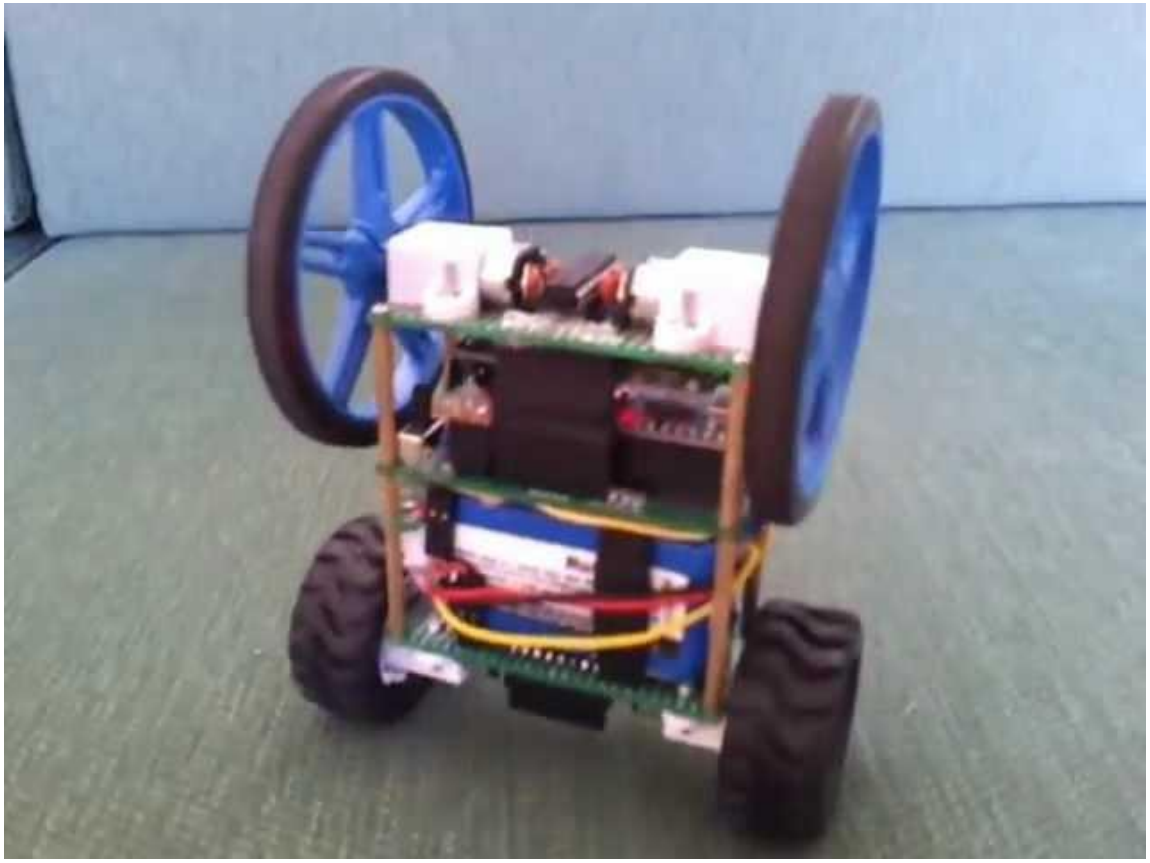
Control de brillo

Ejemplo de control



Detalle

Ejemplo de control



SegWay clone

Conclusiones

Gracias por vuestra atención