

PID controller

A proportional–integral–derivative controller (PID controller) is a control loop feedback mechanism widely used in industrial control systems. PID controller is a three component controller featuring proportional, integral and derivative terms. A PID controller continuously calculates an error value as the difference between a desired setpoint and a measured process variable. It then applies a correction based on proportional, integral, and derivative terms.

PID controller uses two TCP/IP channels for communication with a controlled system. One channel is used by PID to send values of control parameters, for example a voltage value in the case of heater, or DC motor and force in the case of a spring model. The second TCP/IP channel is used by PID to receive values of controlled parameters which are then compared to a set point. PID controller widget contains a graph to show value of the controlled parameter compared to a setpoint.

The user specifies the clock values which is used for the PID exchange period and set the point which is related to the controlled system.

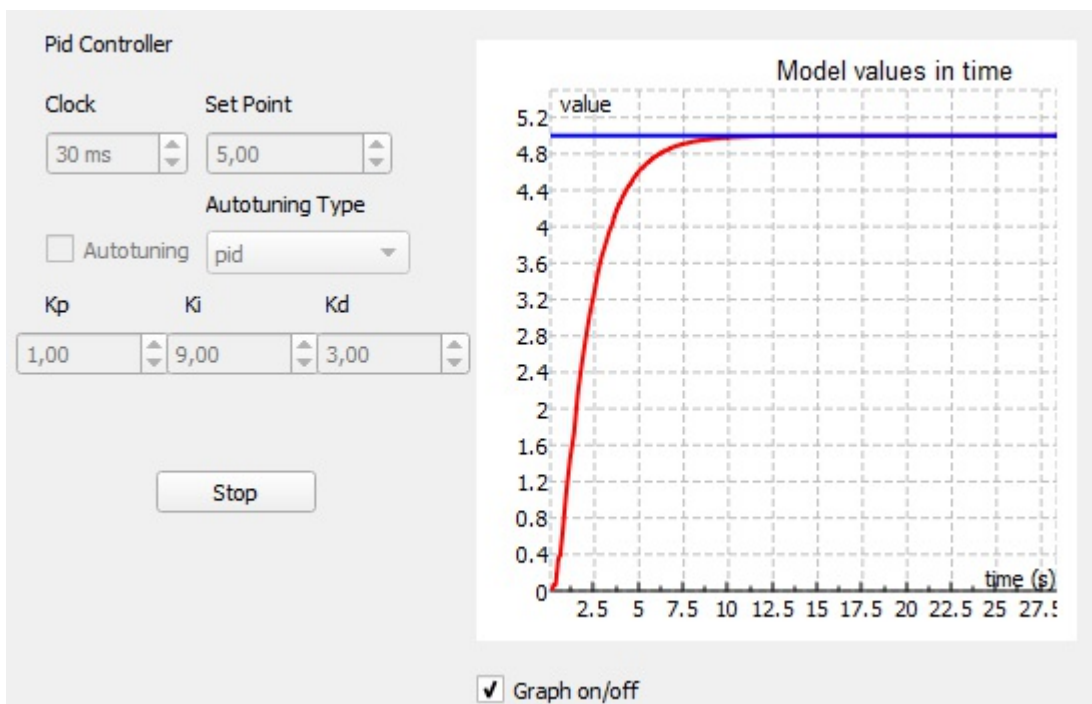
channels table () =

ID	Name	IP Address	Port	Origin	Source Name
0	"model 11 input"	"127.0.0.1"	1805	"model 11 input"	"Value"
1	"model 11 output"	"127.0.0.1"	1806	"model 11 output"	"Value"

`in1 := channel connect("127.0.0.1" , 1806)` Input channel

`out := channel connect("127.0.0.1" , 1805)` Ouptut channel

`p := pid controller widget(0 , "pid1" , in1 , out)` Definition of PID controller widget



Automatic tuning

Auto-tuning the PID controller is the adjustment of its control parameters_(proportional gain, integral gain, derivative gain) to the optimum values for the desired control response. Ziegler–Nichols method

for auto-tuning is the most common method in practice.

MatDeck provides PID controller for real-time operation and control with communication with a system implemented through TCP/IP channel. The PID controller can be used in a graphical mode by invoking the PID Controller widget and using function `pid controller widget()`. In the graphical mode all parameters are set by choosing corresponding options. The proportional, integral and derivative gains can be entered manually or they can be determined by auto-tuning. The auto-tuning is based on the Ziegler–Nichols method, with the following different controllers: p, pi, pid, less overshoot, no overshoot, and Pessen integral. PID controller widget contains a graph where it is possible to see the value of the measured process variable versus the set point.