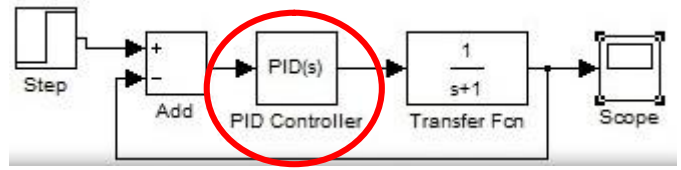
Simulink -> Continous -> PID Controller

PID Controller (2DOF)



Function Block Parameters: PID Controller

PID Controller

This block implements continuous- and discrete-time PID control algorithms and includes advanced features such as anti-windup, external reset, and signal tracking. You can tune the PID gains automatically using the 'Tune...' button (requires Simulink Control Design).

Controller: PID Form: Parallel

Time domain:

- (•) Continuous-time
- ( ) Discrete-time

Main | PID Advanced | Data Types | State Attributes

Controller parameters

Proportional (P): 1

Integral (I): 1

Derivative (D): 0

Filter coefficient (N): 100

Compensator formula

$$P + I\frac{1}{s} + D\frac{N}{1+N\frac{1}{s}}$$

Initial conditions

Source: internal

Integrator: 0

Filter: 0

External reset: none

☐ Ignore reset when linearizing

☑ Enable zero-crossing detection

OK

Function Block Parameters: PID Controller

PID Controller

This block implements continuous- and discrete-time PID control algorithms and includes advanced features such as anti-windup, external reset, and signal tracking. You can tune the PID gains automatically using the 'Tune...' button (requires Simulink Control Design).

Controller: PID Form: Ideal

Time domain:

- (•) Continuous-time
- ( ) Discrete-time

Main | PID Advanced | Data Types | State Attributes

Controller parameters

Proportional (P): 1

Integral (I): 1

Derivative (D): 0

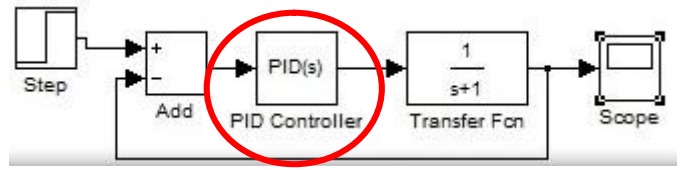
Filter coefficient (N): 100

Compensator formula

$$P\left(1 + I\frac{1}{s} + D\frac{N}{1+N\frac{1}{s}}\right)$$

Simulink -> Continous -> PID Controller

PID Controller (2DOF)



Function Block Parameters: PID Controller

PID Controller

This block implements continuous- and discrete-time PID control algorithms and includes advanced features such as anti-windup, external reset, and signal tracking. You can tune the PID gains automatically using the 'Tune...' button (requires Simulink Control Design).

Controller: PID Form: Parallel

Time domain:

- (•) Continuous-time
- ( ) Discrete-time

Main | PID Advanced | Data Types | State Attributes

Controller parameters

Proportional (P): 1

Integral (I): 1

Derivative (D): 0

Filter coefficient (N): 100

Compensator formula

$$P + I\frac{1}{s} + D\frac{N}{1+N\frac{1}{s}}$$

Initial conditions

Source: internal

Integrator: 0

Filter: 0

External reset: none

[ ] Ignore reset when linearizing

[x] Enable zero-crossing detection

Main | PID Advanced | Data Types | State Attributes

Output saturation

[x] Limit output

Upper saturation limit: inf

Lower saturation limit: -inf

[ ] Ignore saturation when linearizing

Anti-windup method: none

- none
- back-calculation
- clamping

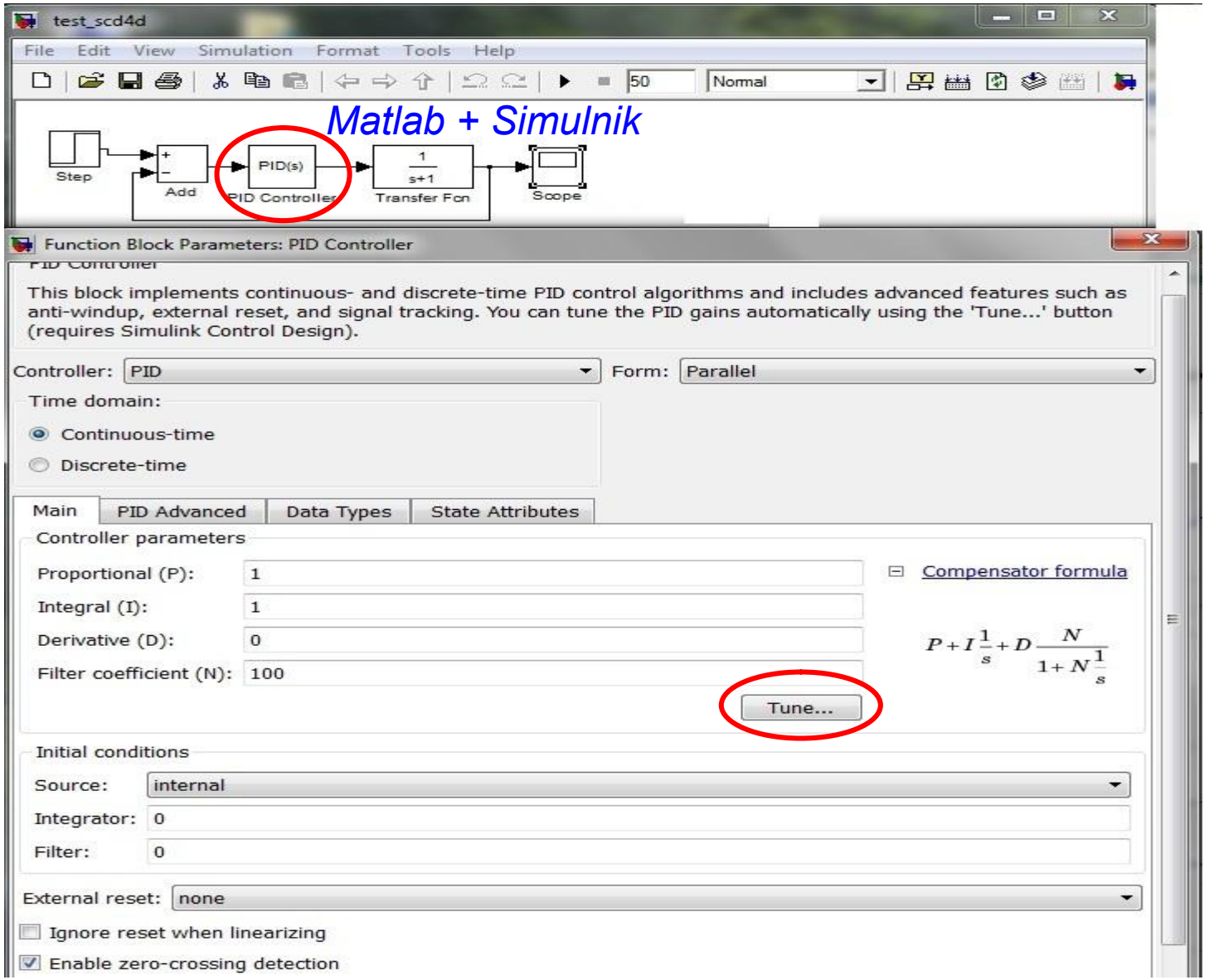
Tracking mode

[ ] Enable tracking mode

Tracking coefficient (Kt): 1

Simulink -> Continous -> PID Controller

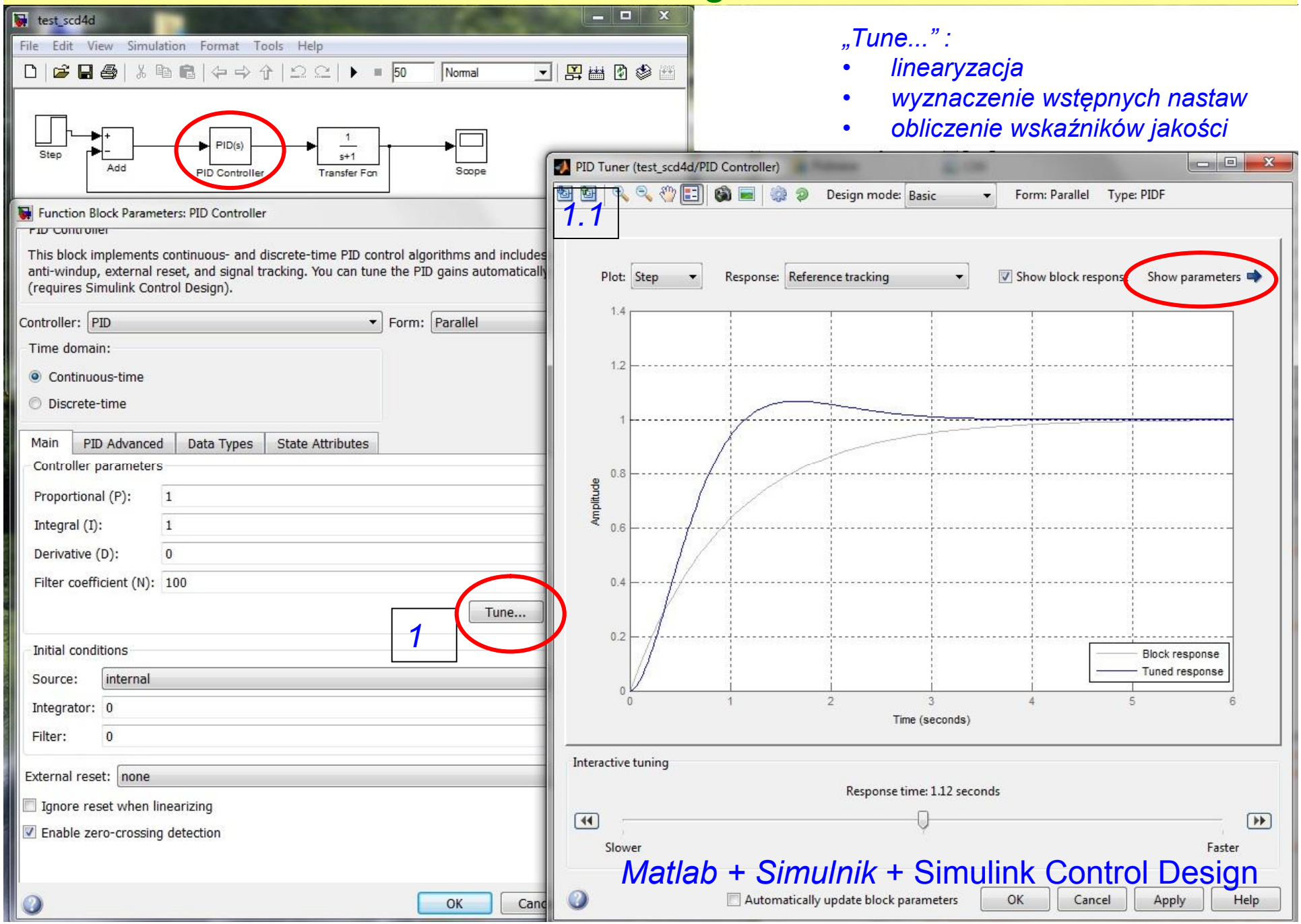
PID Controller (2DOF)



Simulink Control Design -> PID Tuner

„Tune...” :

- *linearyzacja*
- *wyznaczenie wstępnych nastaw*
- *obliczenie wskaźników jakości*



Matlab + Simulnik + Simulink Control Design

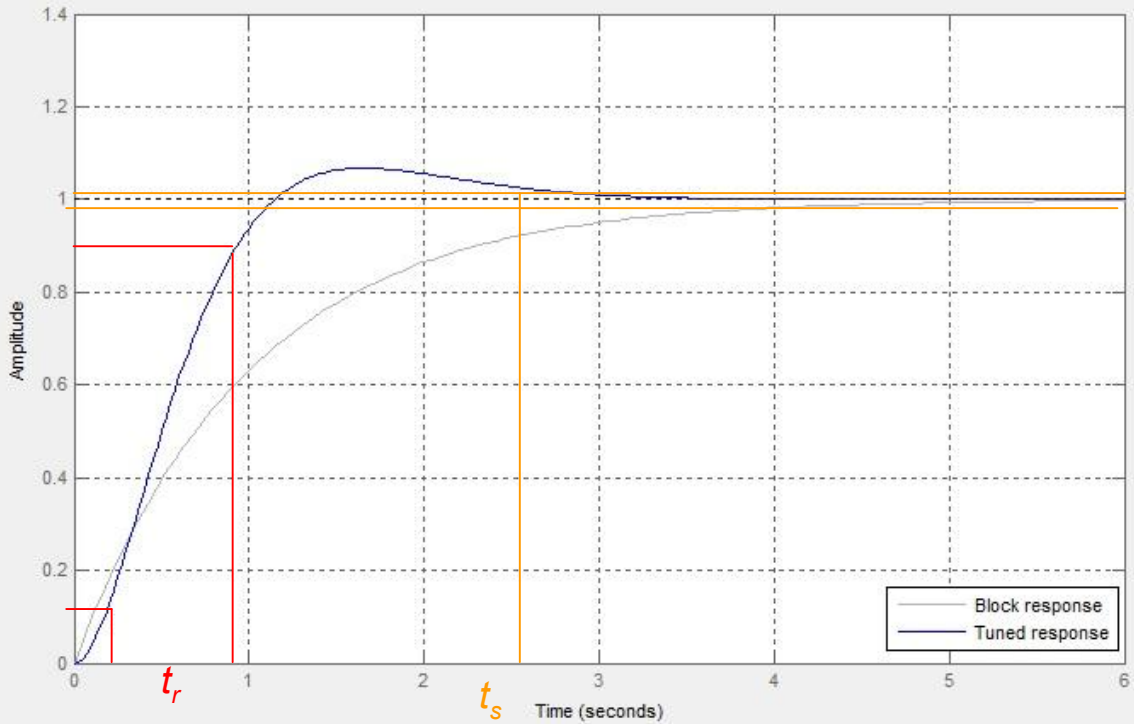
Simulink Control Design -> PID Tuner

PID Tuner (test_scd4d/PID Controller)

Design mode: Basic Form: Parallel Type: PIDF

1.1

Plot: Step Response: Reference tracking Show block response Hide parameters



Controller parameters

	Tuned	Block
P	1.3185	1
I	2.2306	1
D	-0.27354	0
N	4.8203	100

Performance and robustness

	Tuned	Block
Rise time (seconds)	0.758	2.2
Settling time (seconds)	2.67	3.91
Overshoot (%)	6.77	0
Peak	1.07	1
Gain margin (rad/s)	Inf @ Inf	Inf @ NaN
Phase margin (rad/s)	63.9 @ 1.78	90 @ 1
Closed-loop stability	Stable	Stable

Sprawdzić definicje wskaźników

Interactive tuning

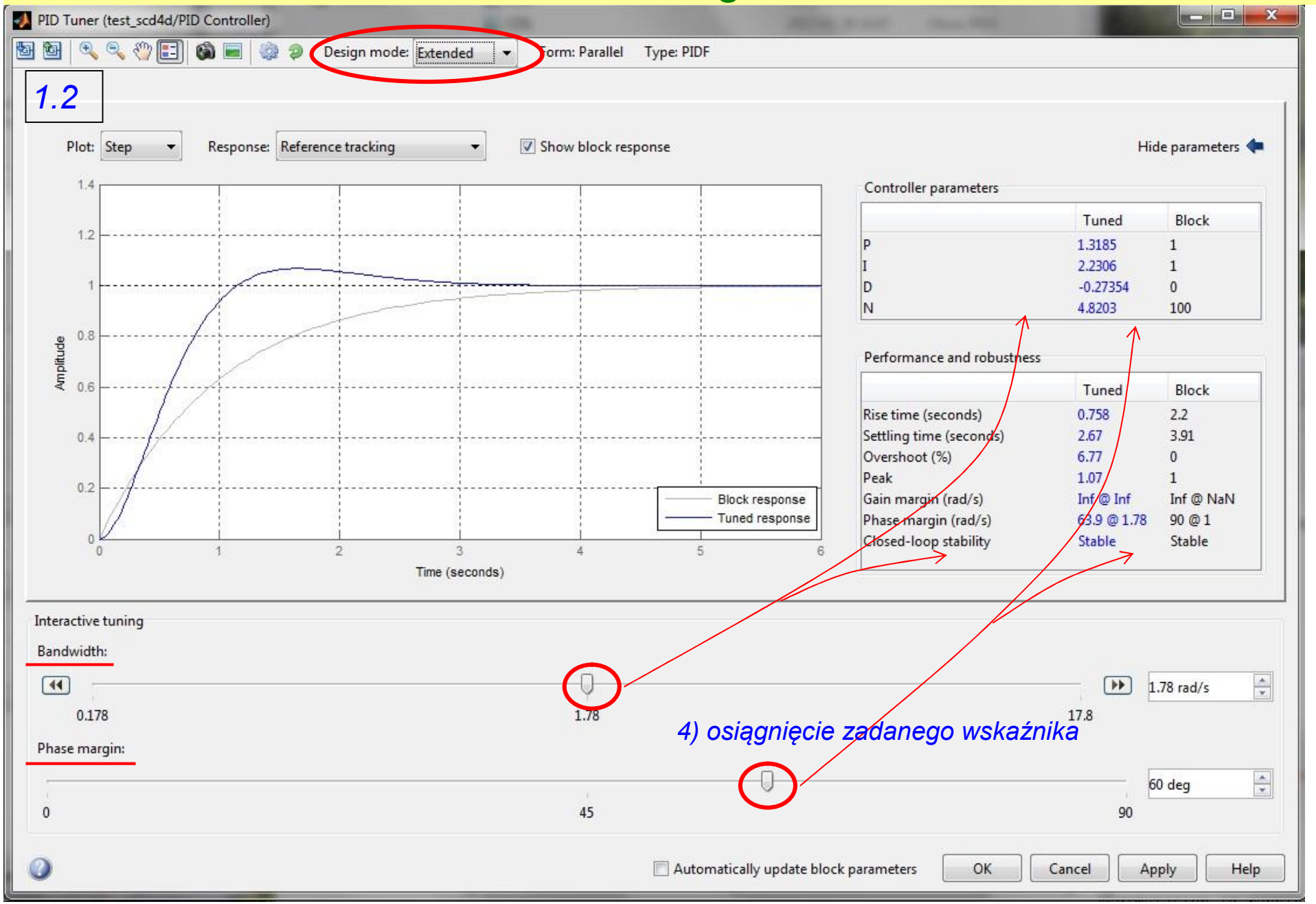
Response time: 1.12 seconds

Slower Faster

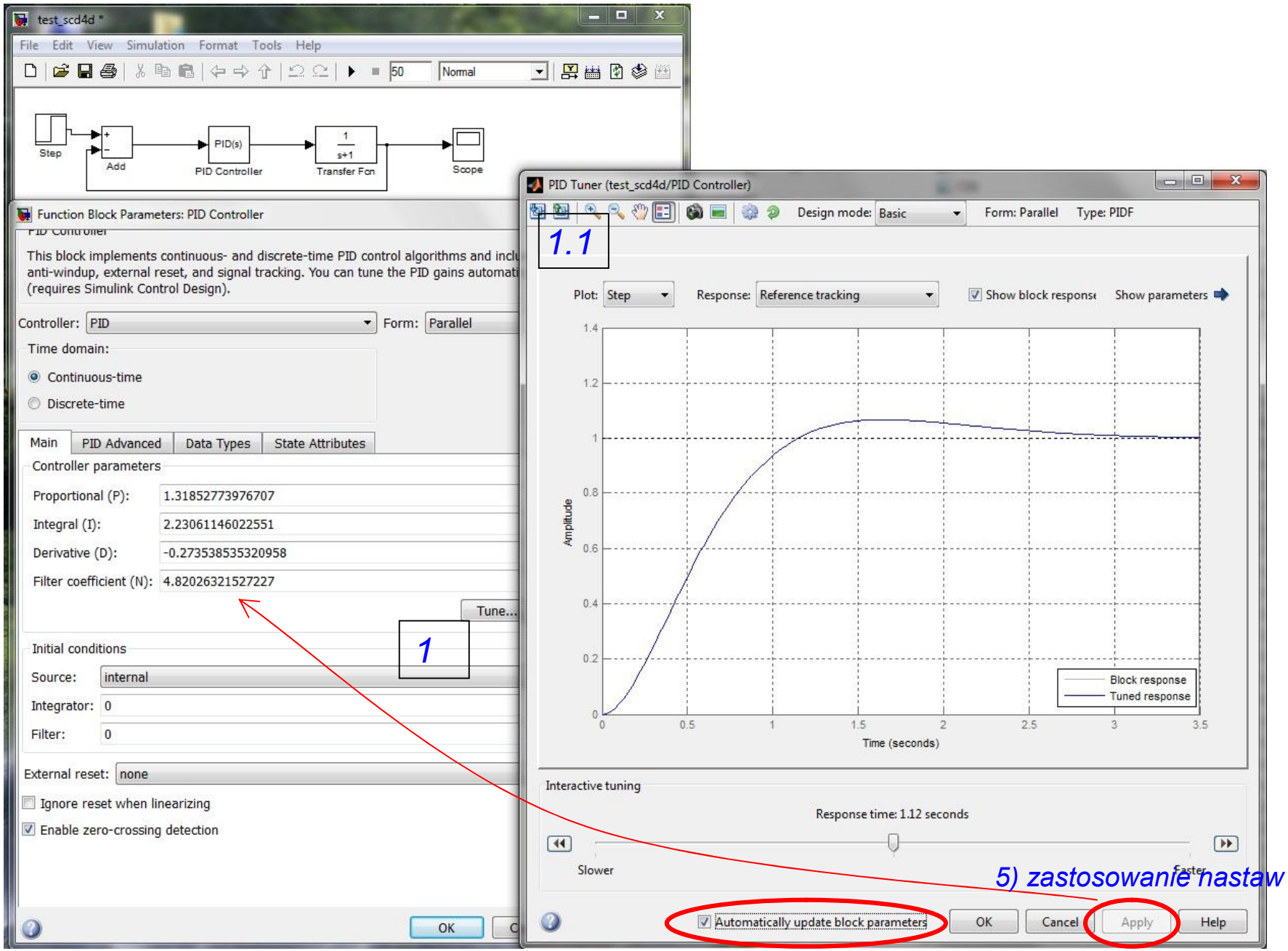
4) osiągnięcie zadanego wskaźnika

Automatically update block parameters OK Cancel Apply Help

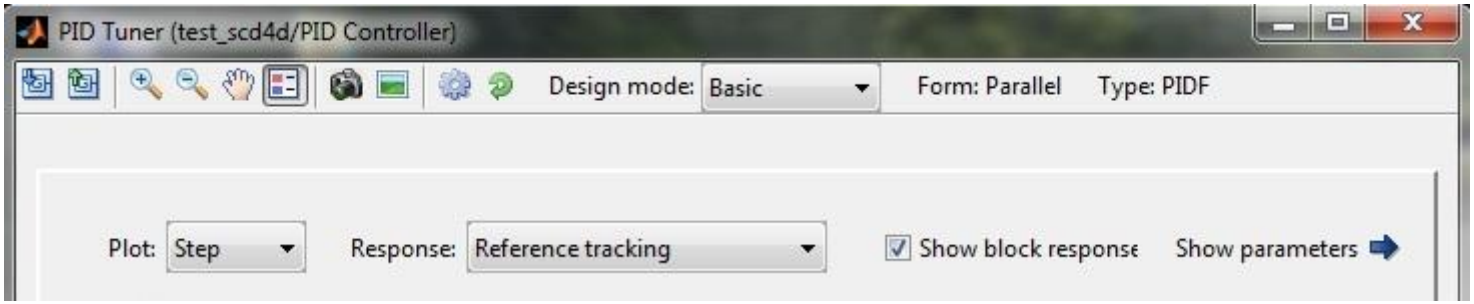
Simulink Control Design -> PID Tuner

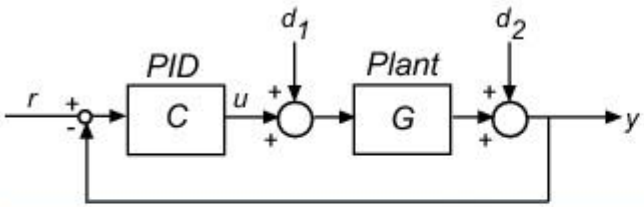


Simulink Control Design -> PID Tuner



1.1 Simulink Control Design -> PID Tuner

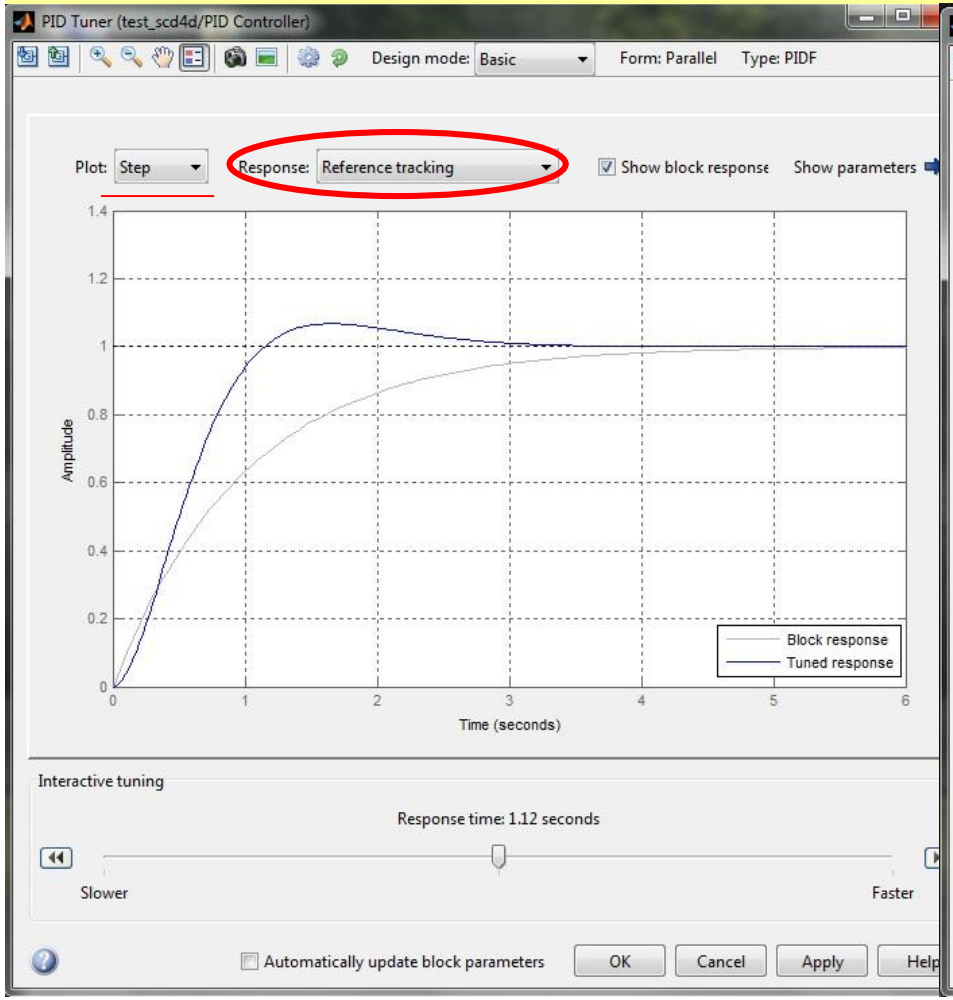


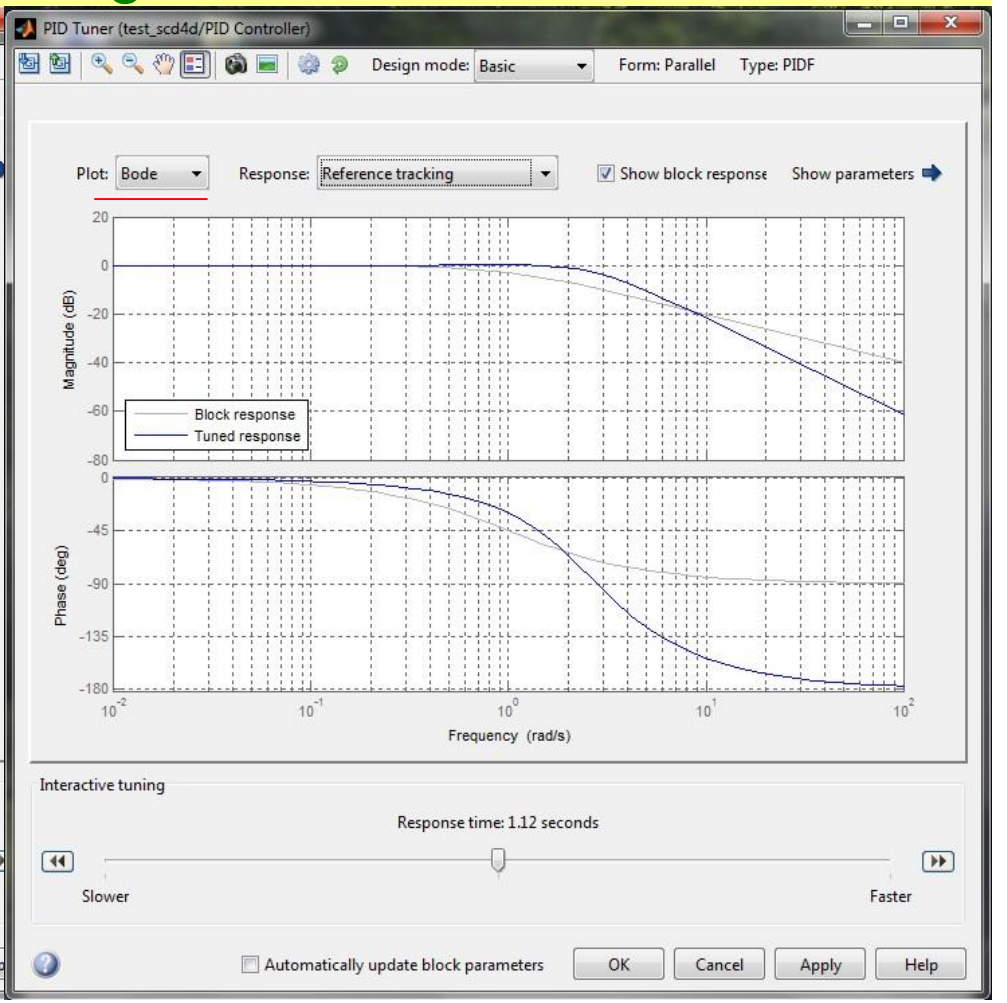


Response	Plotted System	Description
Reference tracking	$\frac{CG}{1+CG}$ (from r to y)	Shows the closed-loop system response to a step change in setpoint.
Controller effort	$\frac{C}{1+CG}$ (from r to u)	Shows the closed-loop controller output response to a step change in setpoint.
Input disturbance Rejection	$\frac{G}{1+CG}$ (from d_1 to y)	Shows the closed-loop system response to load disturbance (a step disturbance at the plant input).
Output disturbance Rejection	$\frac{1}{1+CG}$ (from d_2 to y)	Shows the closed-loop system response to a step disturbance at plant output.
Open-loop	CG	Shows response of the open-loop controller-plant system.
Plant	G	Shows the plant response.

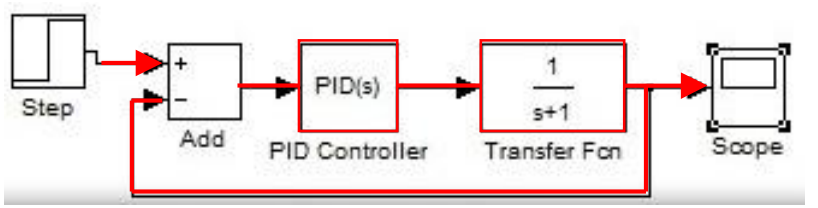
http://www.mathworks.com/help/slcontrol/ug/designing-controllers-with-the-pid-tuner.html

1.1 Simulink Control Design -> PID Tuner

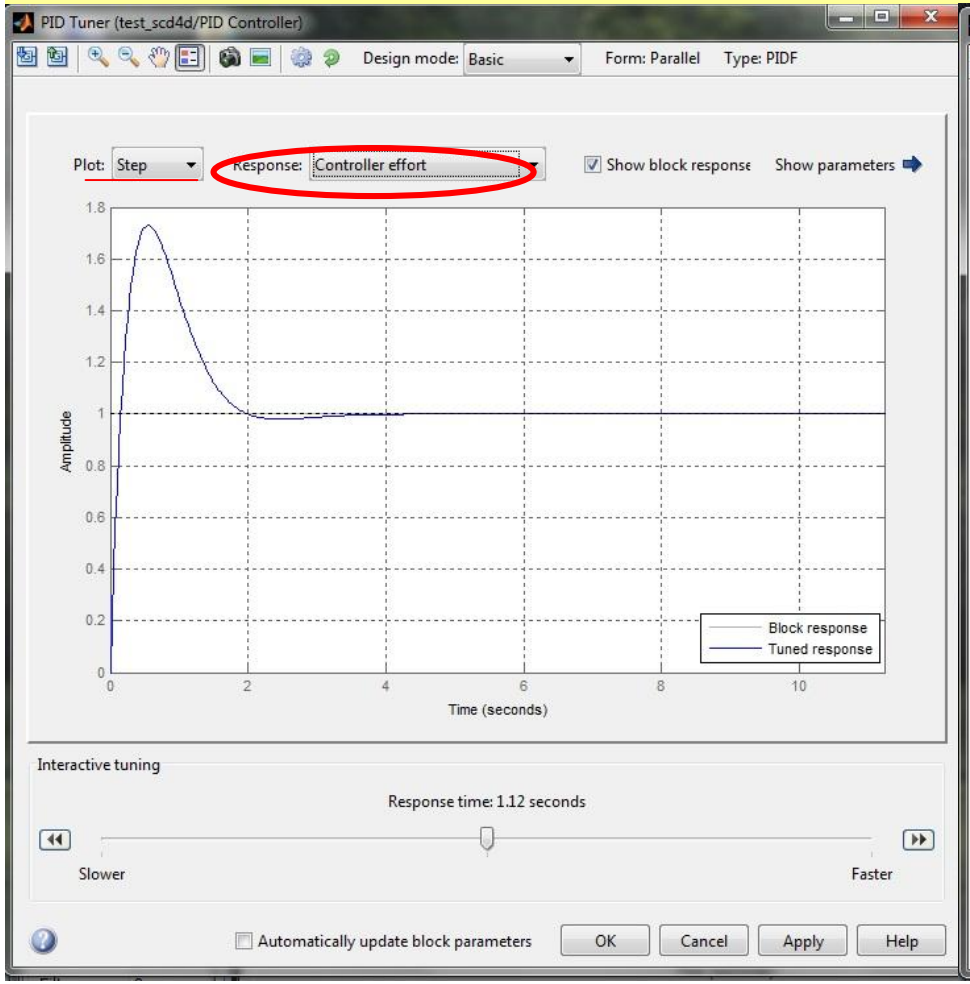


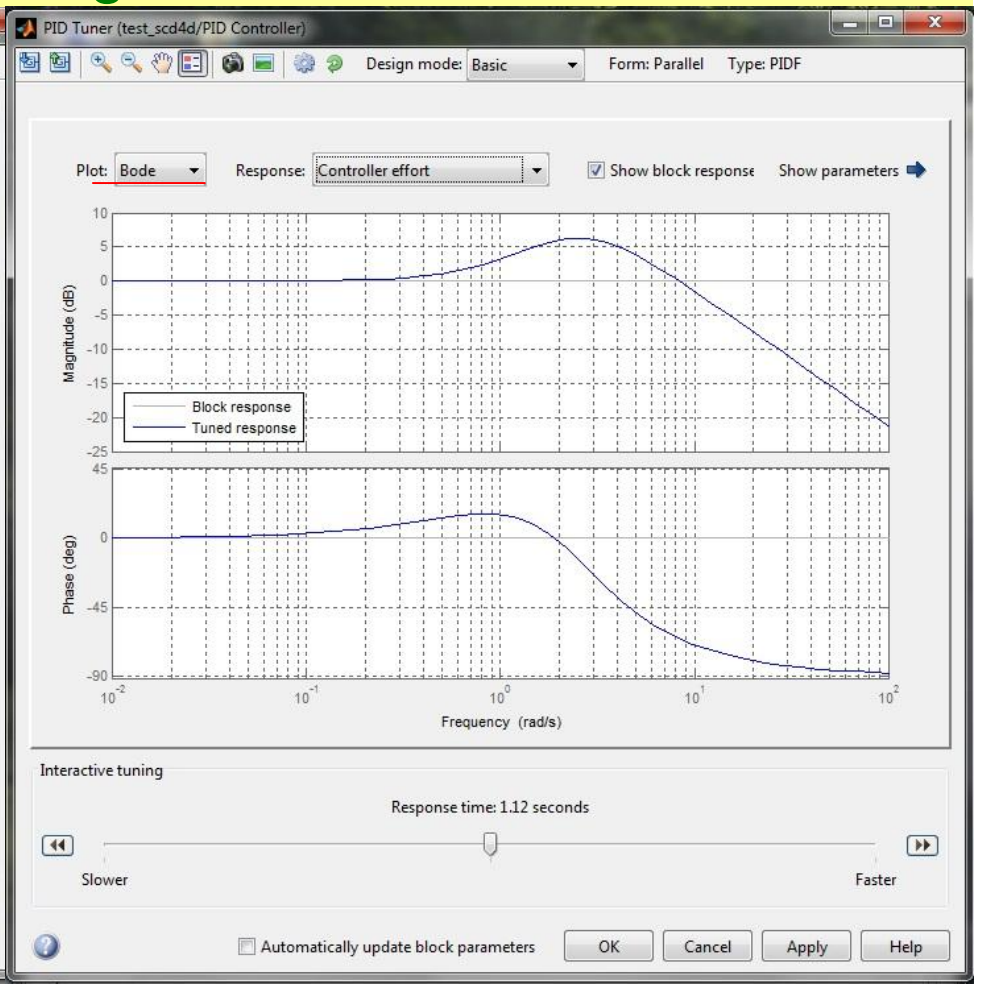


Reference tracking
Przebieg zmiennej procesowej (wyjście obiektu)

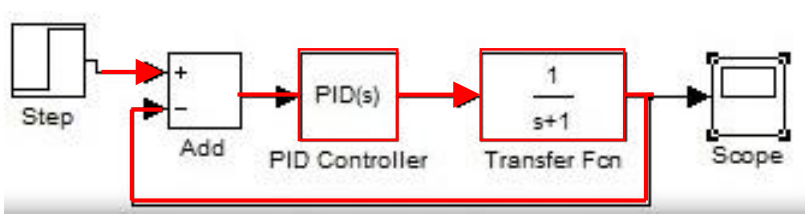


1.1 Simulink Control Design -> PID Tuner

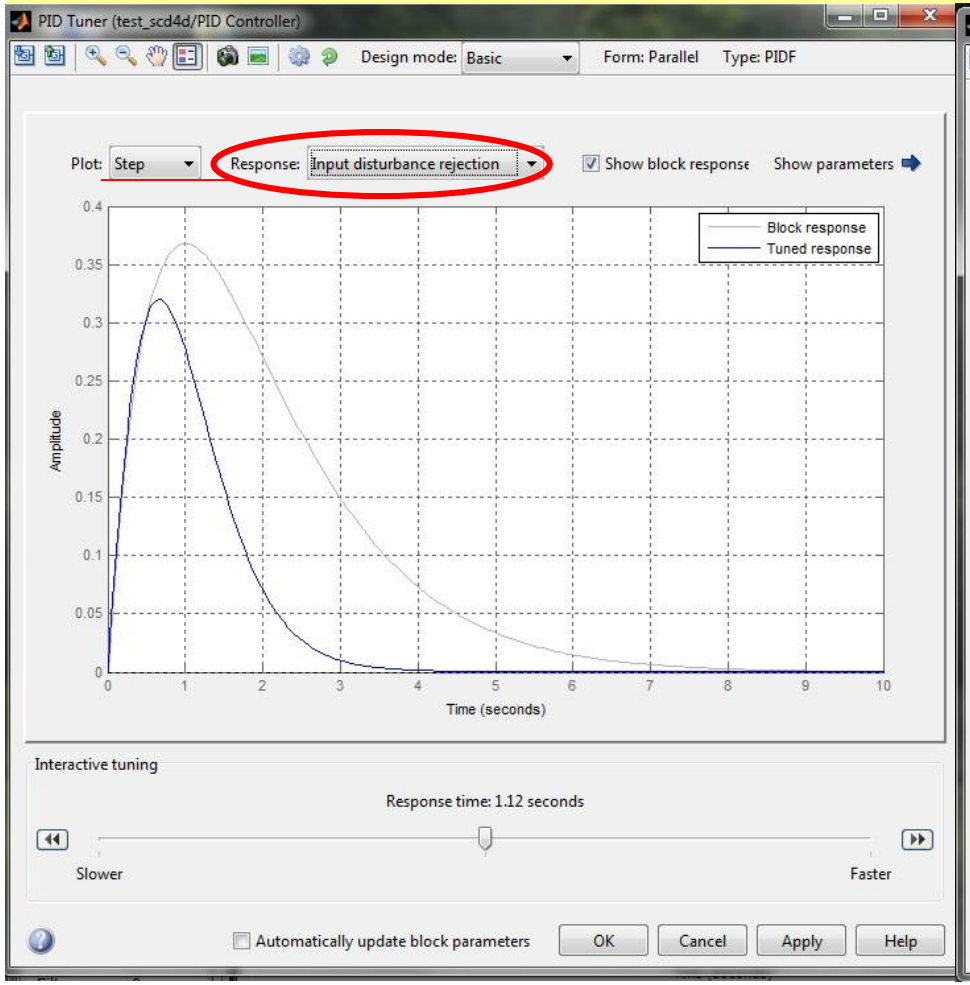


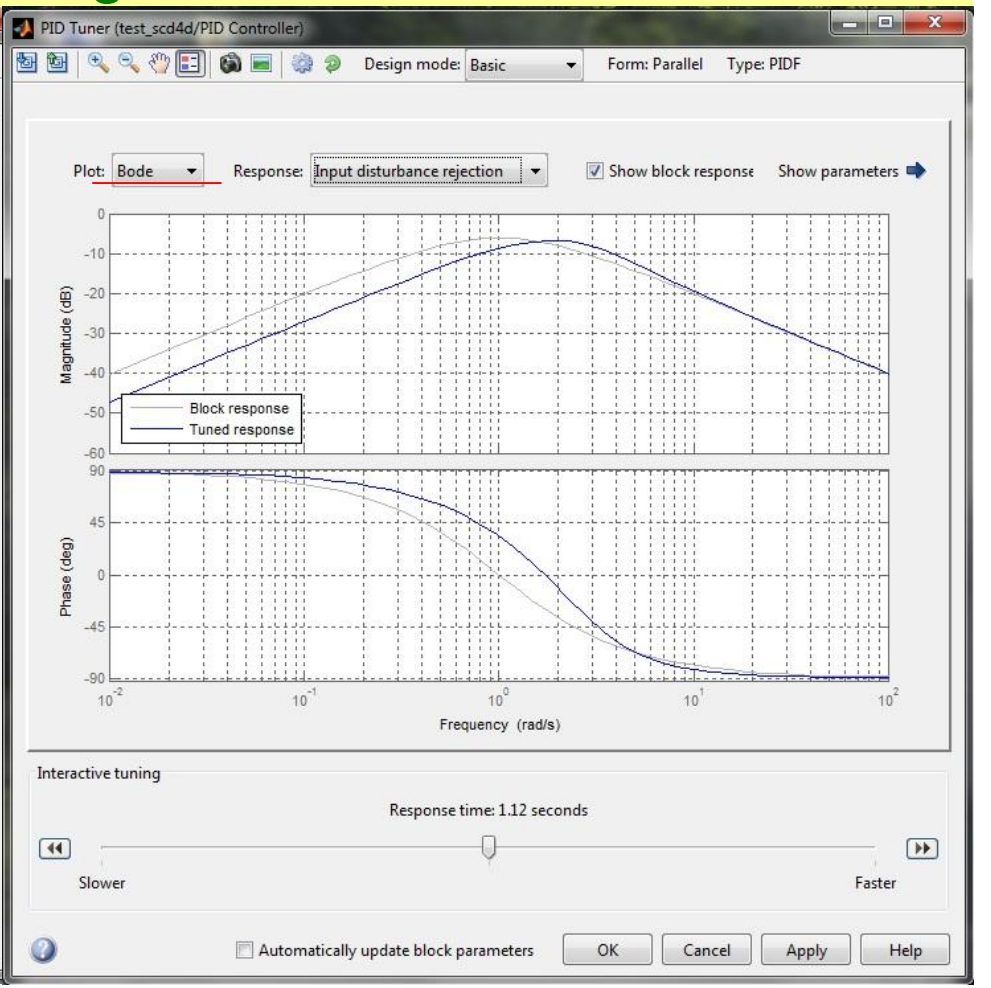


Controller effort
Przebieg zmiennej sterującej (wyjście regulatora)



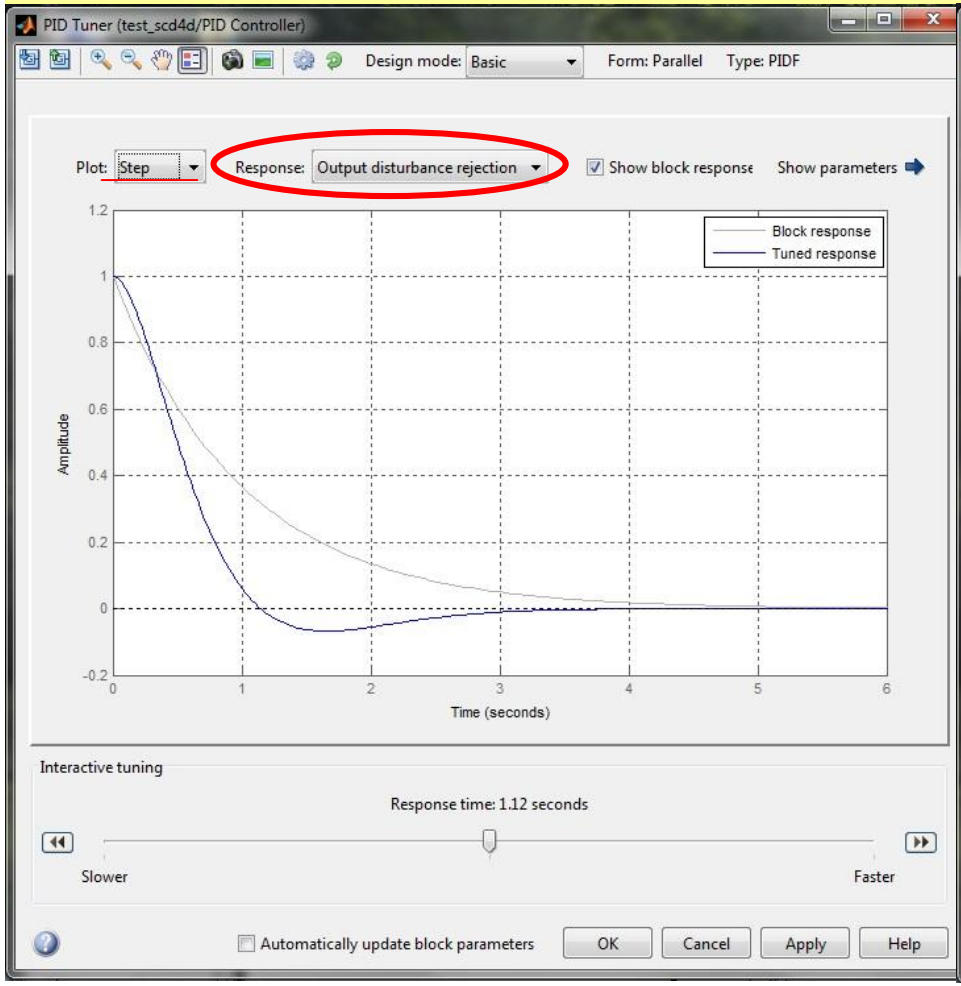
1.1 Simulink Control Design -> PID Tuner

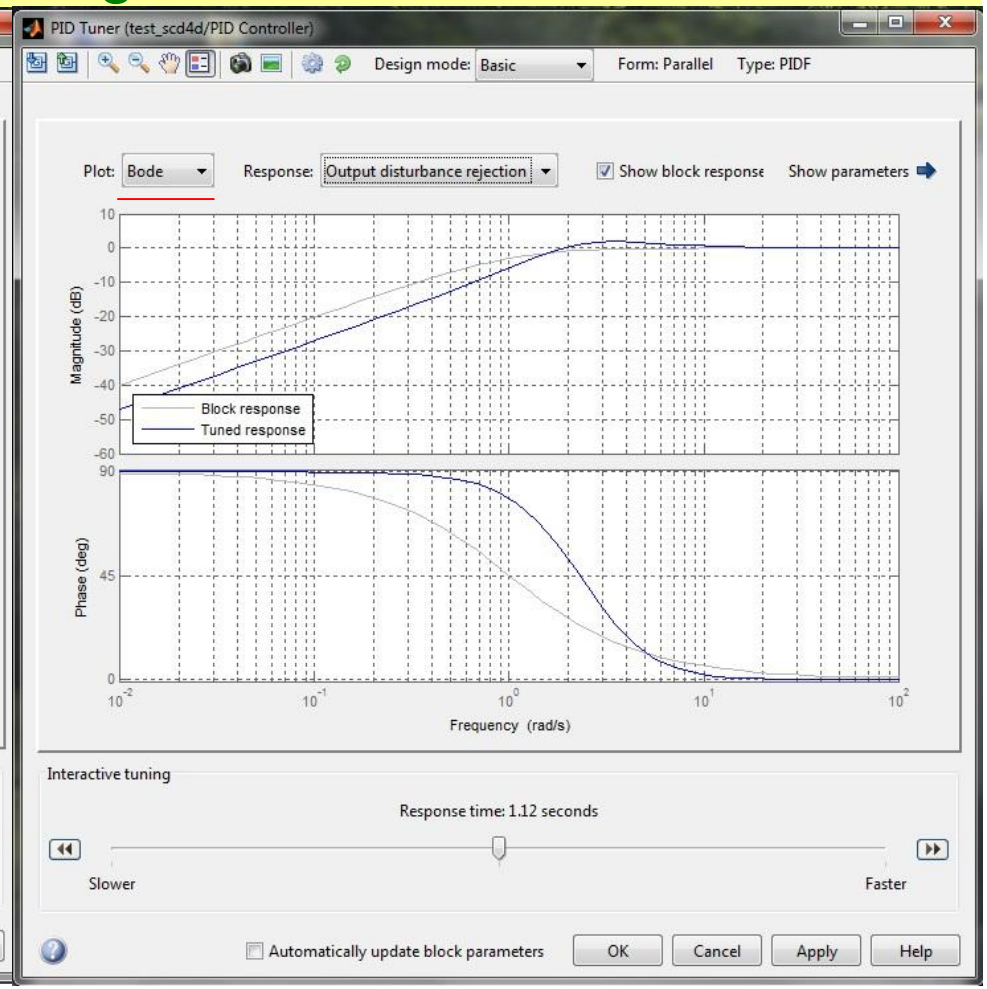




Input disturbance rejection
Tłumienie zakłóceń wejściowych

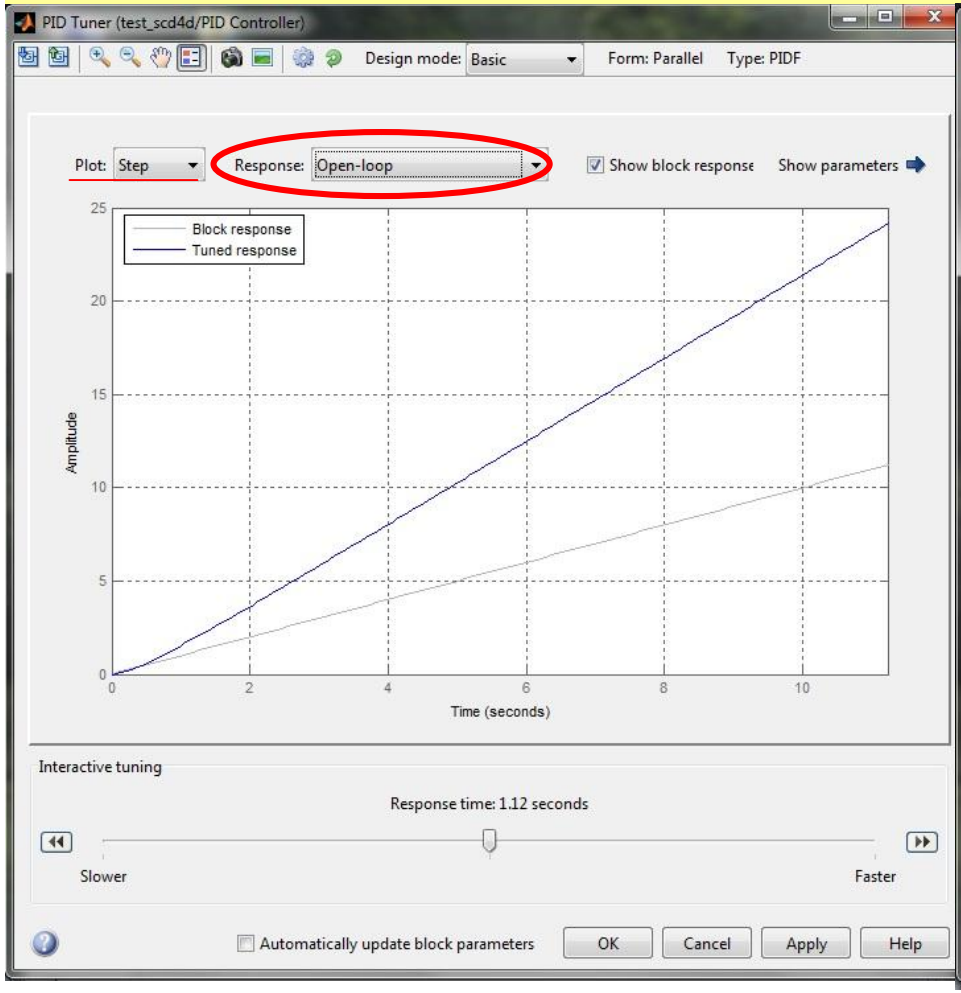
1.1 Simulink Control Design -> PID Tuner

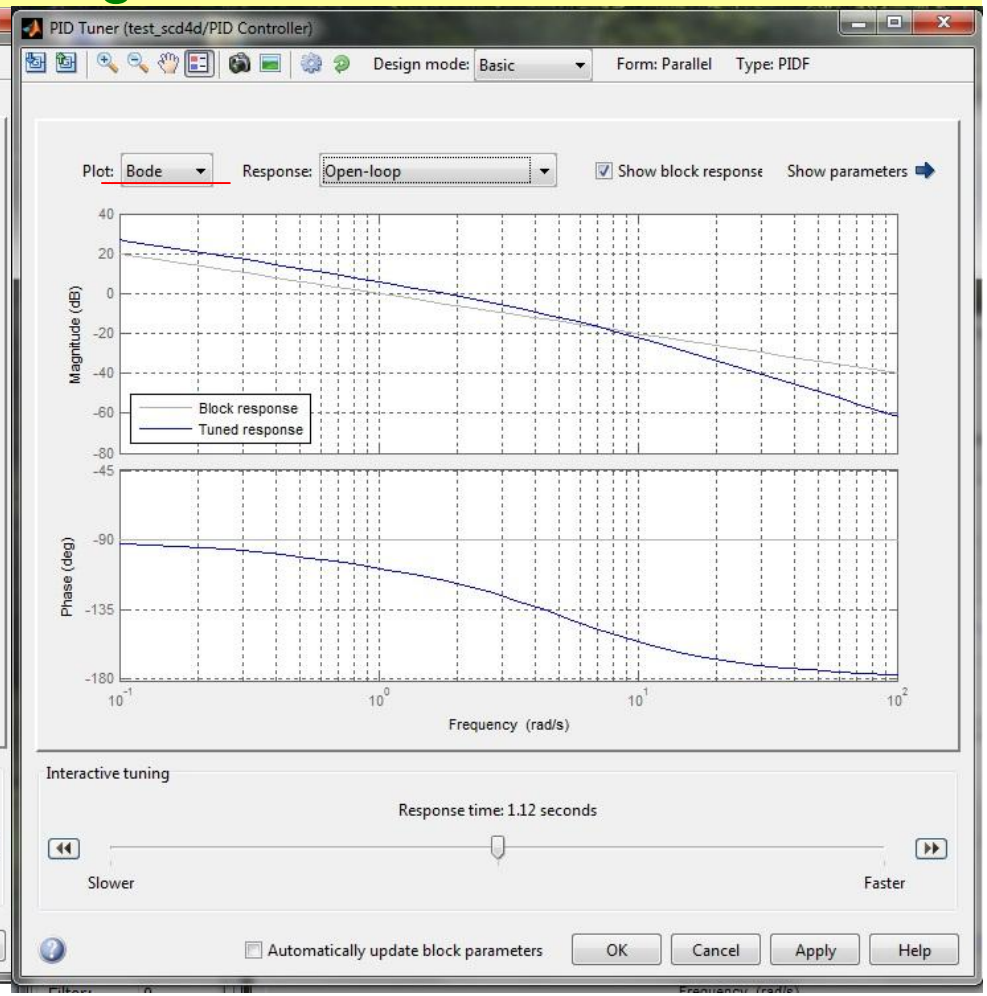




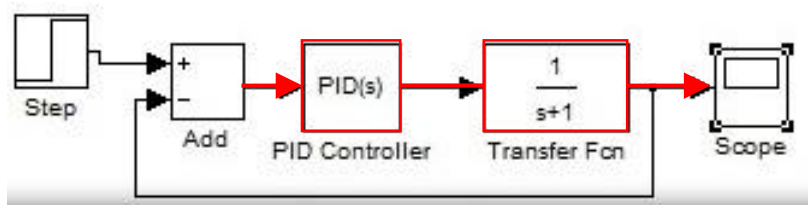
Output disturbance rejection
Tłumienie zakłóceń wyjściowych

1.1 Simulink Control Design -> PID Tuner

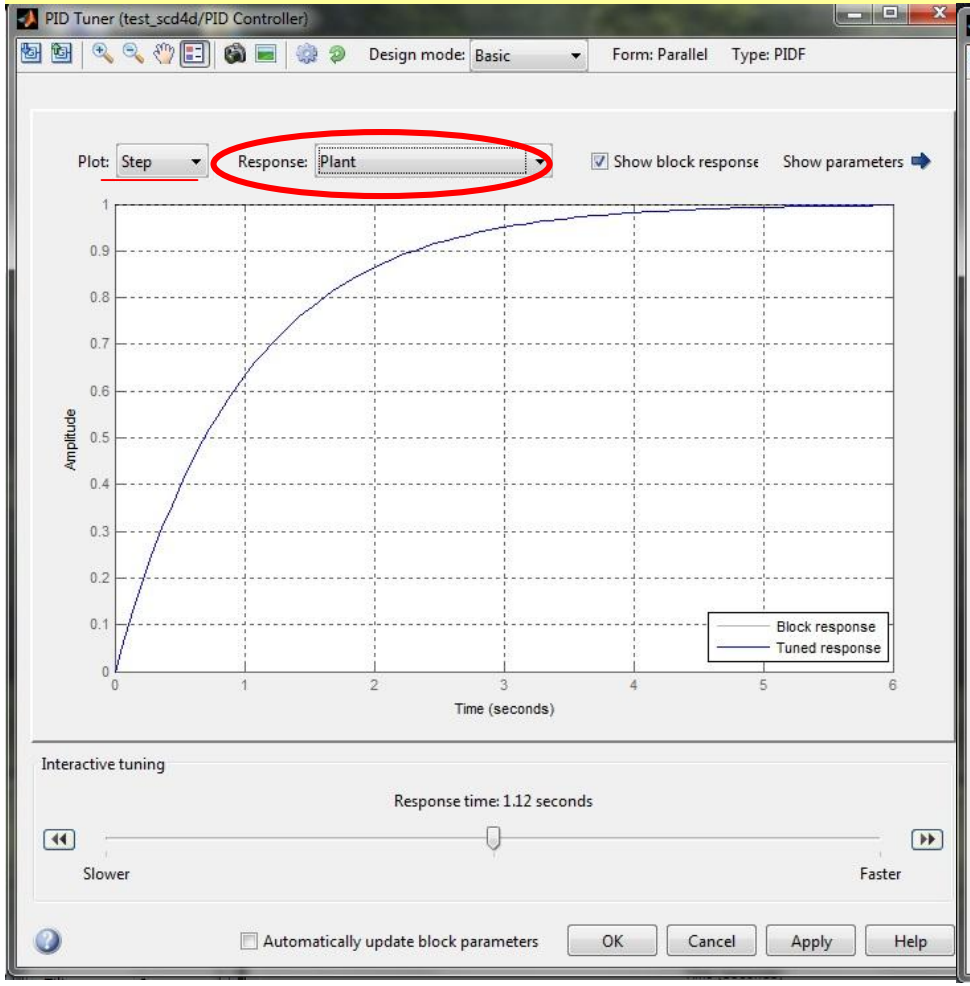


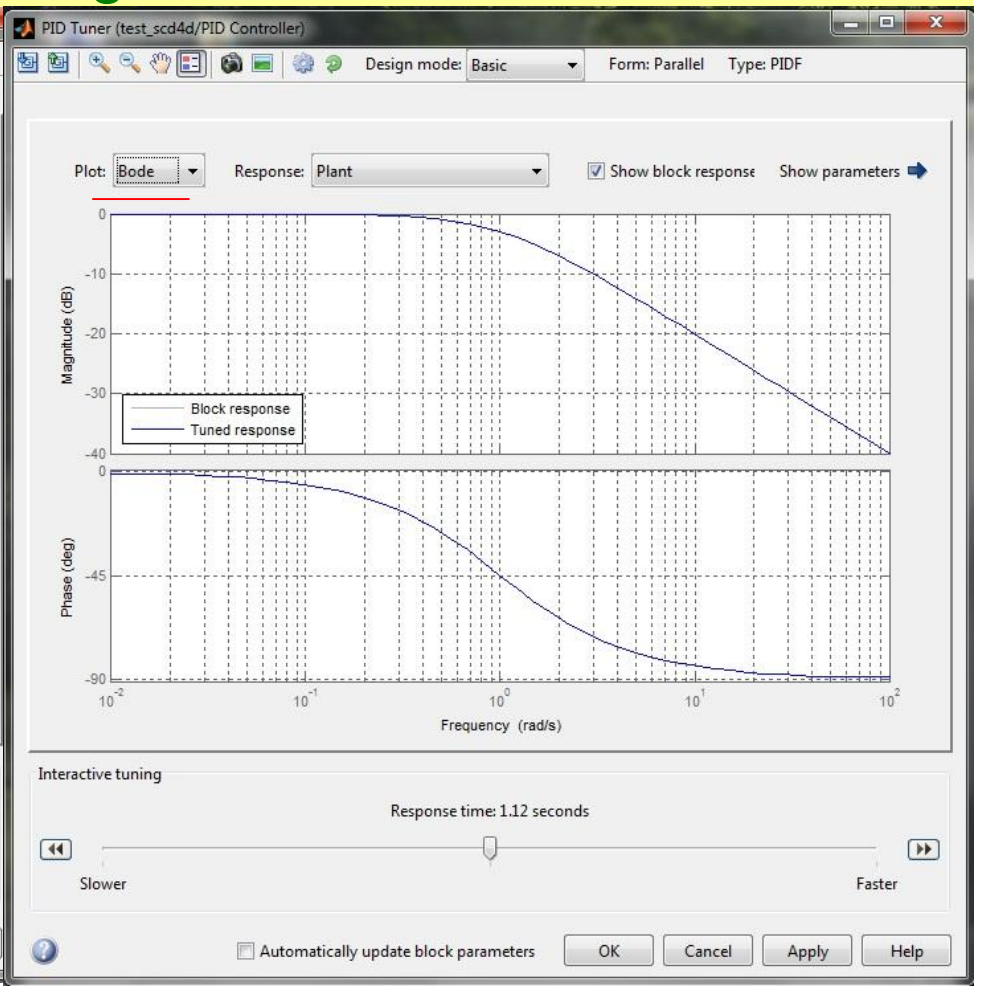


Open-loop
Układ otwarty



1.1 Simulink Control Design -> PID Tuner





Plant
Obiekt