

$$[K, L, T] = \text{get_fool}(G, \text{key})$$

key: 0) frequency response 1) transfer function

$$G = \text{opt_app}(\tilde{G}, \text{no}, \text{do}, \text{delay})$$

no: order of numerator

do: order of denominator

delay: 0) without delay 1) with delay

$$[G_c, H, K_p, T_i, T_d] = \text{ziegler_nic}(\text{key}, \text{vars})$$

key: 1) P 2) PI 3) PID 4) PI-D

vars: $[K \ T_c \ N]$ $[K \ L \ T \ N]$ $[K \ T_c \ r_b \ p_b \ N]$
modified ZN

$$[G_c, H, K_p, T_i, T_d, \text{beta}] = \text{rziegler_nic}(\text{vars})$$

vars: $[K \ L \ T \ N] \ K_c \ T_c$

$$[G_c, H, K_p, T_i, T_d] = \text{chr_pid}(\text{key}, \text{typ}, \text{vars})$$

key: 1) P 2) PI 3) PID 4) PI-D

typ: 1) set point 2) disturbance

vars: $[K \ L \ T \ N] \ O_s$ 0) no overshoot 1) %20 overshoot

$$[G_c, K_p, T_i, T_d] = \text{wjcpid}(\text{vars})$$

vars: $[K \ L \ T \ N]$

$[G_c - sys, H - sys, K_p, T_i, T_d] = \text{cohen-pid}(key, typ, vars)$

key : 1) P 2) PI 3) PID 4) PI-D 5) PD (if typ=2)

typ : 1) CC 2) CC revisited

vars : [K L T N]

$[G_c - sys, H - sys, K_p, T_i, T_d] = \text{astrom-hagglund}(key, typ, vars)$

key : 1) PI 2) PID

typ : 1) AH 2) frequency based AH

vars : [K L T N] (if typ=1)

[K K_c T_c N] (if typ=2)

$[G_c^H, K_p, T_i, T_d] = \text{opt-pid}(key, typ, vars)$

key : 2) PI 3) PID 4) PI-D

typ : 1) set point 2) disturbance

vars : [K L T N C] → 1) ISE 2) ISTE 3) IST²E