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Innovation and Creativity

Validation of the SIMC PID tuning rules

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My assignment:

- Validate the SIMC tuning rules

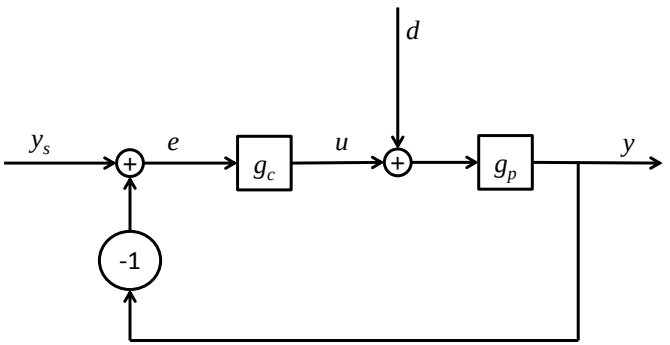
$$K_c = \frac{1}{k_p}\frac{\tau_1}{\tau_c+\theta} \qquad \tau_I = \min\{\tau_1, 4(\tau_c+\theta)\} \qquad \tau_D = \tau_2$$

- 2nd order processes:

$$g_p(s) = \frac{k_p}{(\tau_1 s+1)(\tau_2 s+1)} e^{-\theta s}$$

- MatLab - fmincon (minimization problem)
- Cost function:

$$J = 0.5\left[\frac{IAE_{ys}}{IAE_{ys}^{\circ}} + \frac{IAE_d}{IAE_d^{\circ}}\right] \qquad IAE = \int_0^{\infty} |y(t) - y_s(t)| dt$$



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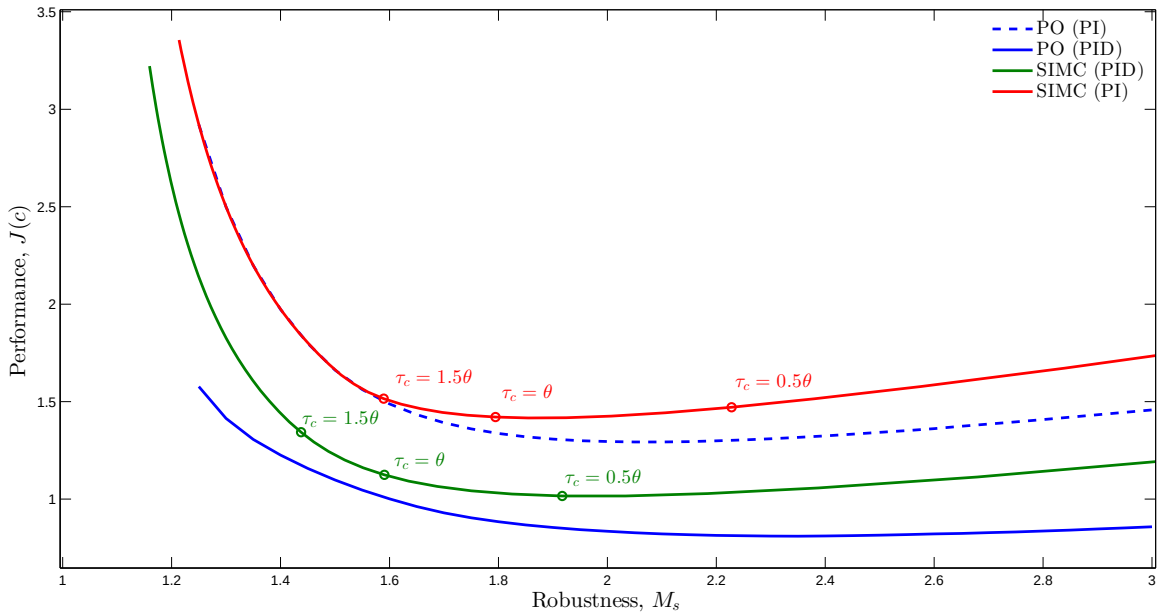
Results (hopefully):

— PO PID and PI vs. SIMC PID and PI



Future work:

— Solve more processes

— Interpret the results

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