Validation of the SIMC PID tuning rules
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My assignment:

- Validate the SIMC tuning rules

\[ K_c = \frac{1}{K_p} \frac{\tau_1}{\tau_c + \theta} \quad \tau_I = \min\{\tau_1, 4(\tau_c + \theta)\} \quad \tau_D = \tau_2 \]

- 2\textsuperscript{nd} 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:

\[ J = 0.5 \left[ \frac{IAE_{ys}}{IAE_{ys}^c} + \frac{IAE_d}{IAE_d^c} \right] \quad IAE = \int_0^\infty |y(t) - y_s(t)| dt \]
Results (hopefully):

- PO PID and PI vs. SIMC PID and PI

Future work:
- Solve more processes
- Interpret the results

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