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Dynamics and Control of Chemical Processes

Prof. Davide Manca
Chemistry, Material and Chemical Engineering Department, "G. Natta"
Politecnico di Milano

Lab #4 – PI control loops with performance criteria

Exercise 1

Given the process reported in Lab #3, design a PI controller by minimizing the following performance indexes:

$$ISE = \int_0^{+\infty} \varepsilon^2(t)\,dt$$

$$IAE = \int_0^{+\infty} |\varepsilon(t)|\,dt$$

$$ITAE = \int_0^{+\infty} t\,|\varepsilon(t)|\,dt$$

In addition, evaluate the dynamics of the controlled system in case of set-point change (*i.e.* servo-problem, see also Exercise 3 of Lab #3).