Lecture 3
The SIMC PID controller tuning rules

David Di Ruscio

SCE1106: Control Theory part
Tel: +47 93820870
Email:david.di.ruscio.no
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Contents: (variants of the following)

1. Transfer function description of the PID controller, Sec 4.2.1 Both the ideal form Eq. (2.29) and Cascade/series form Eq. (4.27) Relationship between the parameters in the ideal and series form as in Eqs (4.30)-(4.32).

2. Continuous time state space description of the PID controller, Sec.4.2.2 Notice, time domain descriptions of the PID controller is derived form the ideal form of the PID controller.

3. The Simple Internal Model Control (SIMC) PID controller tuning rules. Skogestad (2001) Eqs. (3), (4) and (5) + Skogestad (2002) eqs. (23), (24) and (25). These papers is found in the syllabus list on the course home-page. Notice that these tuning rules also loosely is referred to as the "Skogestad PID controller tuning rules".

4. Derivation of the SIMC tuning rules as presented in Lecture notes Ch. 3.4.2. Remark: Only the $T_i = \min(T_1, 4(T_c + \tau) = T_1$ derived. The $T_i = 4(T_c + \tau)$ part in an upcoming lecture.

5. Linearizing the non linear chemical reactor continuous time state space model $\dot{x} = f(x, u)$, $y = g(x, u)$ where the non-linear function $f(x, u)$ is given in Exercise 3.

6. Notice Sec 1.12.1 about Numerical Linearization and the m-files jacobi.m and jacobi2.m which may be downloaded from the lecture plan.