



Faculté des sciences appliquées

FSAMAPR2300 **Process Control**

[30h+37.5h exercises] 5 credits

This course is taught in the 2nd semester

Teacher(s): Georges Bastin, Denis Dochain
Language: french
Level: 2nd cycle course

Aims

- to set a control problem
- to define the important variables of the control problem
- to set it in the appropriate mathematical framework
- to analyse the control problem
- to select and synthesize the appropriate control strategy
- to evaluate the performance of the selected control strategy

Content and teaching methods

The content of this course deals with the control of linear time invariant systems in the context of chemical engineering processes. In particular the notions of dynamical models and feedback loop will be considered. The notion of operator (implicitly connected to Laplace transform) will be used to transform differential equations into algebraic equations in order to introduce the concept of transfer functions that will ease the analysis and synthesis of controllers and closed-loop systems. The course will mainly concentrate on PID (proportional-integral-derivative) controllers, with reference to the IMC (internal model control) approach which is largely used in process control. The course will also consider topics like time-delay compensation, feedforward actions, ratio control and cascade control, and is open to topics like inferential control and state observers. The course is based in particular on the notions of mass and energy balances and of unit operations, and it is illustrated by examples drawn from applications in the process industry.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Written support : notes

Reference book : Seborg D.E., T.F. Edgar and D.A. Mellichamp (2003). Process Dynamics and Control, 2nd edition, John Wiley, New York.

Evaluation : final exam (75%); laboratories and homeworks (25%)

Other credits in programs

BIR22/2C	Deuxième année du programme conduisant au grade de bio-ingénieur : Chimie et bio-industries (Ingénierie biomoléculaire et cellulaire)	(5 credits)	Mandatory
BRAS3DS	Diplôme d'études spécialisées en brasserie		Mandatory
CMAG23/5	Troisième année du programme conduisant au grade de bio-ingénieur (Biologie et microbiologie industrielles)		Mandatory
ELME23/E	Troisième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (énergie)	(5 credits)	Mandatory
INCH22	Deuxième année du programme conduisant au grade d'ingénieur civil chimiste	(5 credits)	Mandatory
MAP21	Première année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(5 credits)	
MAP22	Deuxième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(5 credits)	
MECA21	Première année du programme conduisant au grade d'ingénieur civil mécanicien	(5 credits)	
MECA22	Deuxième année du programme conduisant au grade d'ingénieur civil mécanicien	(5 credits)	Mandatory
MECA23	Troisième année du programme conduisant au grade d'ingénieur civil mécanicien	(5 credits)	