

Automatic Control

Computer Engineering – 06LSLLM – 10 credits

Ingegneria Informatica – 06LSLOA – 10 credits

Electronic & Communications Engineering – 05LSLLP – 6 credits

Automatic Control – M. Canale

Instructors

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Door 2 (c.so Castelfidardo 34/C), 4th floor, zone C

Reception: by appointment upon request

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AC_L0_2

Prerequisites

- ***Mathematical analysis I*** (basic concepts on ordinary differential equations)
- ***Geometry*** (linear algebra, differential calculus)
- ***Physics*** (dynamic equations of physical systems e.g. II Newton principle of dynamics, ...)
- ***Circuit theory*** (dynamical circuits analysis, Laplace transform, Bode diagrams)
- ***Signal analysis and processing*** – INF only (LTI systems, impulse response and transfer function, Z transform)
- ***Basic knowledge of the MatLab environment*** (handle vectors and matrices, basic graphical issues, ...)

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AC_L0_3

Objectives

Provide fundamental instruments to

- Analyse dynamical systems behavior
- Define and study performance of feedback control systems
- Design simple control devices

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AC_L0_4

Course organization

Course is organized as follows

- Lessons
- Laboratory practice

The course material* will be (hopefully 😊) available in advance (week by week) at "Portale della Didattica"

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Course organization

Lessons:

- theory is introduced through slide presentation
- practical exercises are developed on the blackboard
- description of specific MatLab computation skills needed in the solution to exercises is presented

i.e. there is not a clear distinction between the lessons and the exercises

Course organization

Laboratory practice:

- students are required to work independently (or in group) in solving exercises and problems presented in the lab handout
- Lab practice handouts contain, in general, several problems → it is not required to solve all of them during the lab hours → homework
- An instructor will be always available to answer questions
- No report activity is required
- Attendance is strongly recommended 😊

Textbooks

Lessons have been set up using the following textbooks

C.T. Chen, "Linear systems theory and design", 3rd Edition, Oxford University Press, 1999.

N. S. Nise, "Control System Engineering", 5th Edition, Wiley, 2008.

R. C. Dorf, R. H. Bishop: "Modern Control Systems", 10th Edition, Prentice Hall, 2005.

G. F. Franklin, J.D. Powell, A. Emami-Naeini, "Feedback Control of Dynamic Systems", 5th Edition, Prentice Hall, 2006.

K. Ogata, "Modern Control Engineering", 4th Edition, Prentice Hall, 2002.

Course time table

14 weeks

Week	Tuesday	Wednesday	Friday
Odd	Room 12D 11.30-14.30	Room 12D 08.30-11.30	Room 12D 13.00-14.30
Even	Room 12D 11.30-13.00(*)	Room 12D 08.30-11.30	LaIB 4 (**) 13.00-16.00

(*) → In case of need for lesson recovery 11.30-14.30

(**) → 15/03, 29/03, 12/04, 03/05, 17/05, 31/05, 14/06

Exam overview

Written exam in lab with use of MatLab/Simulink

2 multiple choice exercises (~ 6 points)

1 open question on conceptual and/or practical topics (~ 10 points)

1 control system design problem (~ 17 points)

allowed the use of a formulary provided by the teacher

Exam overview

Exam simulation during the lab practice at 14th week

...more details and complete exam rules will be given at the end of the course

To be admitted: exam booking is compulsory