DEGREE CURRICULUM

ELECTRONICS AND CONTROL SYSTEMS DESIGN

Coordination: Francisco Claria Sancho

Academic year 2015-16

Subject's general information

Subject name	Electronics and Control Systems Design
Code	14525
Semester	1
Typology	Obligatory
ECTS credits	6
Theoretical credits	6
Practical credits	0
Coordination	Francisco Claria Sancho
Office and hour of attention	by agreement
Department	Informàtica i Enginyeria Industrial
Teaching load distribution between lectures and independent student work	(40%) 60 h classroom (60%) 90 h autonomous work
Modality	Presencial
Important information on data processing	Consult this link for more information.
Language	Spanish
Degree	Master in Industrial Engineering
Office and hour of attention	by agreement
E-mail addresses	claria@diei.udl.cat

Francisco Claria Sancho

Subject's extra information

Suggestions

The feedback systems can be represented as discrete or continuous models and are usually described by transfer functions, pole-zero diagrams, state equations, differential equations and difference equations. This implies the need for a sufficient basis in electronics, control theory, signal processing, and some ownership in the Laplace transform, z transform Fourier transform, transformed that are common in electronics and control engineering .

The course as part of the academic plan

It is a subject that is given in the second year and first semester of the master in industrial engineering, it is framed in the electronics and control module and belongs to industrial technologies. The content of this subject is oriented to the description of mathematical models of systems whose output signals depend on the input signals and the delayed output signals. In these systems, whose dynamics is unknown, you can only access their input and output. The aim is to identify systems that are fed back by providing a mathematical description. The methodology presented for identification systems, makes possible the design of the elements and control devices.

Learning objectives

See competences

Competences

University of Lleida strategic competences

- Master Information and Communication Technologies.

  Goals

  - • Estimate and quantify system models.

Degree-specific competences

- Ability to design and project automatic production systems and advanced process control.

  Goals

  - • Identify and modeling systems.

- Ability to design electronic and industrial instrumentation systems.

  Goals

  - • Analyzing and modeling systems.

Degree-transversal competences

- Ability to conceive, design and deploy projects and/ or contribute new solutions, using engineering tools.

  Goals

  - • Know and understand the concepts of adaptive models. • Designing adaptive feedback systems.

Subject contents

SYSTEMS ANALYSIS AND MODELING

1. TOOLS FOR MODELING AND ANALYSIS OF SYSTEMS

1.1. LAPLACE TRANSFORM

TRANSFER FUNCTION

1.2. DISCRETE FOURIER TRANSFORM

SPECTRUM

MODULATION

SAMPLING

DISCRETE FOURIER TRANSFORM AND CONVOLUTION

1.3. ZETA TRANSFORM

HOLDERS

1.4. SIGNAL FILTERING

1.5. FEEDBACK

STABILITY

2. ANALYSIS OF AN ELECTRONIC NONLINEAR SYSTEM

2.1. PHASE LOKED LOOP DEVICE

DESCRIPTION

OBTAINING THE EQUATION

OBTAINING LINEAR MODEL

ACQUISITION AND TRACKING SYSTEM

STEADY STATE ERROR IN TRACKING SYSTEM.

SYSTEM IDENTIFICATION AND ADAPTIVE CONTROL

1. IDENTIFICATION SYSTEMS

1.1. IDENTIFICATION WITH RANDOM SIGNALS

1.2. CONVOLUTIONAL MODELS

1.3. ESTIMATION OF MODELS FOR LOW ORDER

1.4. POLYNOMIAL MODELS

1.4.1. ARX MODEL

4.3.4. EQUALIZER

Methodology

Master class

Problem-based learning

Classroom Practices

Development plan

Develops sequentially contents

Evaluation

Evaluation Method

During the semester, there shall be four assessments in the form of two written tests and two papers that account for the study and the work done in the labs. These documents will have a maximum score of 1 point each and not considered any improvement threshold. The two written tests will be held on dates determined by the EPS for this purpose.

In this course, by its nature, has little sense to evaluate parts of avoiding your stuff previous contents. Thus, each written test will be on all the stuff that has been given so far.

The first written test will have a maximum score of 3 points and be considered approved if the score is greater than or equal to 1.5 points. The second written test will have a maximum score of 5 points and will be considered approved if the score is greater than or equal to 2.5 points.

As the material is cumulative in each written test, if the second test is passed, then the first test will be compensated if the latter has not been surpassed, with half its maximum score (1.5 points).

-The total score is the sum of the notes of the 4 reviews. **(This is the first of the two possible pathways of qualifications that are contemplated)**.

-If the second written test you get a lower score to 2.5 points, you must use the recovery activity, to be performed on the date set by the EPS. The written test will have a valuation recovery maximum 8 points and be deemed to have been passed if you get a note added to the laboratory practice notes and document preparation practices study is greater than or equal to 5 points. (**This is the second pathway**)

In addition:

Any person enrolled in this course, that have made the 2nd written test whether or not it has been overcome, be furnished to the recovery activity to increase the final grade. If the 2nd test had been overcome the final grade will never be lower than it would have obtained by the first approach.

Bibliography

Specific Bibliography

TIME SERIES ANALYSIS, IDENTIFICATION AND ADAPTIVE FILTERING

D. Graupe

Ed. Robert Krieger Publishing Company. 1989.

IDENTIFICACIÓN y CONTROL ADAPTATIVO

A. Aguado, M. Martinez

Ed. Prentice Hall. 2002.

ADAPTIVE SIGNAL PROCESSING

B. Widrow, S.D. Stearns

Ed. Prentice Hall. 1995.

Complementary bibliography

SISTEMAS DIGITALES Y ANALOGICOS, TRANSFORMADAS DE FOURIER, ESTIMACION ESPECTRAL.

Athanasios Papoulis.

Ed. Marcombo. 1978

TRATAMIENTO DIGITAL DE SEÑALES

John G. Proakis, Dimitris G. Manolakis

1997 Ed. Prentice Hall.

TRATAMIENTO DE LA SEÑAL

F. Clariá

Quaderns E.U.P. Num. 4 (primera edición, 2002)

Ed. Paperkite Editorial

SISTEMAS DE CONTROL

G.H. Hosteter, C.J. Savant, R.T. Stefani.

Ed. Interamericana. 1984

INGENIERÍA DE CONTROL MODERNA

Katsuhiko Ogata

Ed. Prentice Hall. 1998

SISTEMAS DE CONTROL AUTOMATICO

B.C. Kuo

Ed. Prentice Hall. 1996.

DISCRETE TIME SIGNAL PROCESSING

A.V. Oppenheim, R.W. Schaffer

Ed. Prentice Hall. 1998.

INGENIERÍA DE CONTROL UTILIZANDO MATLAB

Katsuhiko Ogata

Ed. Prentice Hall. 1999