DEGREE CURRICULUM

DISCRETE PROCESSES

Coordination: PALLEJÀ CABRÉ, TOMÀS

Academic year 2016-17

DISCRETE PROCESSES 2016-17

Subject's general information

Subject name	DISCRETE PROCESSES
Code	102125
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION
Typology	<table><tr><th>Degree</th><th>Course</th><th>Typology</th><th>Modality</th></tr><tr><td>Bachelor's Degree in Automation and Industrial Electronic Engineering</td><td>3</td><td>COMPULSORY</td><td>Attendance-based</td></tr></table>
ECTS credits	6
Groups	1GG
Theoretical credits	6
Practical credits	0
Coordination	PALLEJÀ CABRÉ, TOMÀS
Department	INFORMATICA I ENGINYERIA INDUSTRIAL
Teaching load distribution between lectures and independent student work	(40%) 60 h classroom (60%) 90 h autonomous work
Important information on data processing	Consult this link for more information.
Language	spanish
Office and hour of attention	by agreement

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Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
PALLEJÀ CABRÉ, TOMÀS	tpalleja@diei.udl.cat	6	

Subject's extra information

This subject hardly assimilated without the opportunity to apply these tools in a practical way without understanding the peculiarities involving sampling signal and the discretization of systems.

The use of computers and simulation software is a useful tool in understanding the subject.

Specific documentation is also provided throughout the course.

The continuous-time processing of signals and systems enables, students of Electrical Engineering and Information Technology, to analyze and design systems with some degree of complexity. However, the analysis of the systems and the transfer of continuous-time solutions are sometimes not the most suitable. This paper presents the tools that extend the concepts of signal processing and continuous time systems in discreet time processing, with emphasis on feedback systems

Learning objectives

See competences

Competences

Degree-specific competences

- Knowledge of principles and applications of robotised systems.
- Knowledge of automatic regulation and control techniques and their application to industrial automation.

Objectives

- Relate the stability of a system with the position of the poles in the complex plane of its transfer function.
- Know the conditions for a system to have finite impulse response.

• Knowledge and capability for modeling and simulation.

Objectives

- Know and use the Transform Zeta (TZ) to transform signals and systems in general. - Relate the TZ with the difference equation of a system. - Know methods to calculate the temporal sequence of samples corresponding to

a transformed system. - Understand the concept of group delay and phase delay systems in general.

• Ability to design electronic systems analog, digital and the power.

• Ability to design control systems and industrial automation.

Objectives

- Distinguish and evaluate the amplitude spectrum of discrete system from the position of the poles and zeros of the transfer function. - Extender in the discrete field the concept of a system as a filter with a specific frequency bandwidth. - Know discretization methods of continuous systems

Degree-transversal competences

Ability to gather and interpret relevant data within their area of study, to make judgments that include reflection on relevant social, scientific or ethical topics.

Objectives

- Designing discrete feedback systems specifications.

Ability to solve problems and develop and defend arguments within their area of study.

Objectives

- Analyze systems relating their bandwidth, gain and pole position

Subject contents

1. PRINCIPLES OF DIGITAL SYSTEMS

1.1. TRANSFORM Z

1.2. INVERSE TRANSFORM

1.3. PRESENTATION SYSTEM

1.4. IMPULSE INVARIANCE

1.5. POLE POSITION AND PERIOD OF SAMPLING

1.6. PARAMETERS OF A SECOND ORDER

1.7. SPECIAL FEATURES: POLE, SAMPLING FREQUENCY, TRANSIENT RESPONSE.

1.8. REDUCED EQUIVALENT SYSTEM

2. SAMPLE AND HOLD

- 2.1. SAMPLE RETAINING
- 2.2. BLOCKS DIAGRAMS Z
- 2.3. CLOSED LOOP
- 2.4. SYSTEMS WITH CONTINUOUS AND DISCRETE BLOCKS
- 2.5. CONTINUOUS SCANNING SYSTEM
- 2.6. MATCHING METHOD OF POLES AND ZEROS
- 2.7. TRANSFORMATION AND FREQUENCY RESPONSE

3. STABILITY

- 3.1. JURY STABILITY CRITERION
- 3.2. Bilinear transformation AND STANDARD OF ROUTH-HURWITZ
- 3.3. STEADY STATE ERROR.

4. DYNAMIC BEHAVIOR

- 4.1. PLACE OF ROOTS
- 4.2. APPLICATION
- 4.3. DRIVER DESIGN BY LOCATION OF ROOTS
- 4.4. DRIVER DESIGN ALGEBRAIC
- 4.5. DRIVER DESIGN BY POLE ASSIGNMENT
- 4.6. DRIVER DESIGN BY DIRECT SYNTHESIS

5. DIGITAL SYSTEMS WITH FINITE IMPULSE RESPONSE

- 5.1. CONDITIONS TO MEET IN A STREAM TO HAVE A LINEAR PHASE SPECTRUM
- 5.2. SYMMETRIES SUMMARY CHART ON FIR FILTER
- 5.3. HOW TO DESIGN A SYSTEM WITH A SPECIFIED FREQUENCY RESPONSE AND PHASE LINEAR

6. EXERCISE FILTER IN SIGNAL PROCESSING AND CONTROL SYSTEMS DIGITAL

- 6.1. OBJECTIVES
- 6.2. CONTENT

Methodology

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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

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Ed. Marcombo. 1978

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 AUTOMÁTICO

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

CONTROL DE SISTEMAS DISCRETOS

O. Reinosa, J.M. Sebastián, F.T. Medina, R.A. Santoja

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