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Control Engineering

Academic Year: (2017 / 2018)   **Review date: 01-09-2017**

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: GARRIDO BULLON, LUIS SANTIAGO

Type: Compulsory ECTS Credits : 3.0

Year : 3 Semester : 1

OBJECTIVES

With this subject the students are aimed to acquire basic knowledge that allows them to analyze and control dynamic systems in continuous time with application to bioengineering. The study of the behavior of the systems will be carried out by means of the classic theory of control of linear systems, using the representation of a system by means of input-output relations.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Laplace Transform.
2. Modelling of systems:
  2.1 Linealization.
  2.2 Diagram Blocks.
  2.3 Transfer function.
3. Temporal analysis of systems:
  3.1 Influence of poles and zero.
  3.2 Response to standard signals.
  3.3 Systems of first and second order.
4. Frequential analysis of systems:
  4.1 Diagram of Bode.
  4.2 Design of filters.
5. Introduction to control systems:
  5.1 Architectures of control.
  5.2 Precision.
  5.3 Sensitivity to disturbances.
6. Temporary analysis of feedback systems:
  6.1 Root Locus.
7. Frequential analysis of feedback systems:
  7.1 Nyquist Diagram.
8. PID Controllers:
  8.1 Temporary design of regulators PID.
  8.2 Frequential design of regulators PID.
  8.3 Empirical adjustment of regulators PID.

LEARNING ACTIVITIES AND METHODOLOGY

- Master clasess and reduced group sessions for resolution of problems.
- Laboratory sessions with personal work of the student, oriented to the acquisition of practical abilities related to the program of the subject.

ASSESSMENT SYSTEM

 In order to pass the course it is necessary to satisfy:

1) Do all the practical sessions
2) Pass the two midterms or Pass the final exam.

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

- Jacqueline Wilkie & Michael Johnson & Reza Katebi Control engineering: an introductory course, Palgrave Macmillan, 2002
- OGATA, K. Modern Control Theory, Prentice-Hall, 1987..

BASIC ELECTRONIC RESOURCES

- Eric Cheever . Linear Physical Systems Analysis: http://lpsa.swarthmore.edu/index.html

- Michigan U. and Carnegie Mellon . Control Tutorial for Matlab: http://ctms.engin.umich.edu/CTMS/index.php?aux=Home