淡江大學 Tamkang University

Syllabus

Fall, 2007

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Course: Automatic Control System 3 credits

Course Objective:

Analysis and design of continuous-time control systems using frequency- and time-domain methods. The classical methods of control engineering are covered: Laplace transforms and transfer functions; root locus design; Routh-Hurwitz stability analysis; frequency response methods, including Bode, Nyquist, and Nichols; steady-state error for standard test signals; second-order system approximations; and phase and gain margin and bandwidth.

Prerequisite: Dynamics, Ordinary Differential Equations, Linear Algebra

Class: Class 2009, Aerospace Eng.

Lecture: Class A - Tue: 5:10 ~ 6:00 PM; Thu: 4:10 ~ 6:00PM; Class B - Tue: 4:10 ~ 5:00 PM; Thu: 2:10 ~ 4:00PM

Room: Class A - E813 (Tue), E405 (Thr); Class B – E813 (Tue), E411 (Thr).

Office hours: Mon, Tue, Thu, and Fri.11:00AM ~ 6:00PM or by appointment.

Textbook:

Richard C. Dorf and Robert H. Bishop, *Modern Control Systems*, 10th ed., Pearson Education, Inc., 2005. (Imported by 偉明圖書有限公司)

Course Schedule:

Week	Dates	Material covered
1st week	09/18, 09/20	Syllabus, Introduction to Control Systems.
2nd week	09/27	Mathematic Methods of Systems, 09/25 中秋節
3rd week	10/02, 10/04	Mathematic Methods of Systems, State Variable Methods
4th week	10/09, 10/11	State Variable Methods.
5th week	10/16, 10/18	Feedback Control system Characteristics,1st Exam (7:00~9:00 PM, 10/19, Friday),
6th week	10/23, 10/25	The Performance of Feedback Control Systems
7th week	10/30, 11/01	The Performance of Feedback Control Systems, The Stability of Linear Feedback Systems
8th week	11/06, 11/08	The Stability of Linear Feedback Systems
9th week		2nd Exam (11/15)
10th week	11/20, 11/22	The Root Locus Method
11th week	11/27, 11/29	The Root Locus Method
12th week	12/04, 12/06	The Root Locus Method, 3rd Exam (7:00~9:00 PM, 12/07, Friday),
13th week	12/11, 12/13	Frequency Domain Method,
14th week	12/18, 12/20	Frequency Domain Method
15th week	12/25, 12/27	Frequency Domain Method , Stability in the Frequency Domain
16th week	01/04	Stability in the Frequency Domain.
17th week	01/09, 01/11	Design of Feedback Control System
18th week		4th Exam (01/18)

Grading Policy*:

1. Quizzes (held every Monday night), Homeworks, Class attendance, 15%
2. Exams,
   - 1st Exam includes: Introduction to Control Systems (Chapter 1), Mathematic Methods of Systems (Chapter 2), and State Variable Methods (Chapter 3) 15%
   - 2nd Exam includes: Feedback Control system Characteristics (Chapter 4), The Performance of Feedback Control Systems (Chapter 5), and The Stability of Linear Feedback Systems (Chapter 6), 15%
   - 3rd Exam includes: The Root Locus Method (Chapter 7), 15%
   - 4th Exam includes: Frequency Domain Method (Chapter 8), Stability in the Frequency Domain (Chapter 9) and Design of Feedback Control Systems (Chapter 10) 25%
3. Term Project 15%

Useful Links:

1. The MCS website: http://www.prenhall.com/dorf .
2. Control Tutorials for Matlab (http://www.engin.umich.edu/group/ctm/)

* I reserve the right to change the policy.