

Syllabus

Fall, 2006

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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

Class: Class 2008-B, Aerospace Eng.

Lecture: Tue: 3:10 ~ 4:00 PM; Thu: 4:10 ~ 6:00PM.

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
1 st week	09/12, 09/14	Syllabus, Introduction to Control Systems.
2 nd week	09/19, 09/21	Mathematic Methods of Systems
3 rd week	09/26, 09/28	Mathematic Methods of Systems, State Variable Methods
4 th week	10/03, 10/05	State Variable Methods.
5 th week	10/12	Feedback Control system Characteristics, 1 st Exam (7:00~9:00 PM, 10/13, Friday).
6 th week	10/17, 10/19	Feedback Control system Characteristics, The Performance of Feedback Control Systems
7 th week	10/24, 10/26	The Performance of Feedback Control Systems
8 th week	10/31, 11/02	The Stability of Linear Feedback Systems
9 th week	11/07, 11/09	The Stability of Linear Feedback Systems
10 th week		2 nd Exam (11/17)
11 th week	11/21, 11/23	The Root Locus Method
12 th week	11/28, 11/30	The Root Locus Method,
13 th week	12/05, 12/07	The Root Locus Method, 3 rd Exam (7:00~9:00 PM, 12/08, Friday).
14 th week	12/12, 12/14	Frequency Domain Method
15 th week	12/19, 12/21	Frequency Domain Method , Stability in the Frequency Domain
16 th week	12/26, 12/28	Design of Feedback Control Systems ,
17 th week		4 th Exam (01/04)
18 th week		

Grading Policy* :

1. Quizzes, Homeworks, Class participation, 30%
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), 20%
 - 4th Exam includes: Frequency Domain Method (Chapter 8), Stability in the Frequency Domain (Chapter 9) and Design of Feedback Control Systems (Chapter 10) 20%

Useful Links:

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

* I reserve the right to change the policy.