EEL5182: State Variable Methods – Fall 2014

Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on the course web site and will be announced in the classroom.

1. Class Time: T 03:00-04:40pm and R 04:05-04:55
2. Class Location: CHE 316
3. Final Exam Time & Date: No Final Exam
4. Mid Term Exams Location: Tentatively in the classroom. Please pay attention to class announcements before the exam date.
5. Pre-requisites: Undergraduate level control theory, basics of linear algebra, and differential equations. The students are expected to have basic understanding of dynamics, transfer functions, feedback and forward, Bode plots, poles and zeros, and PID. Basic familiarity with Matlab is also required.
6. Course Objectives: This course provides a graduate-level introduction to state space method and its application in control theory. Some of the topics covered in this course are: the concept of state and state space representation, linear and nonlinear systems, linearization, feedback linearization, linear algebra and linear operators, Jordan form, causality, Laplace transform, state transition matrix, solution of linear state equations, discrete time systems and Z-transforms, realization, minimal realization, Lyapunov stability theory, BIBO stability, controllability, observability, feedback controller design, eigenvalue placement by state and output feedback, stabilization, state observer design (full and reduced order), tracking, disturbance rejection, basics of optimal control, Riccati equation, infinite horizon problems. The material is mostly focused on linear time invariant (LTI) and Linear time variant (LTV) systems but it will also cover some introductory discussions of nonlinear effects and methods in dynamical systems.
7. Instructor: Kamran Mohseni, Ph.D.
   a. Office location: NEB 141
   b. Office Hours: Immediately after the class on Thursdays.
   c. Instructor Email for This Course: mohseni@ufl.edu Please allow at least 48 hours for a response. Please note that I do not do HW by emails. Please come to my office hours. Make sure that the subject of your email start with EEL 5182 so your email does not filtered out.
   d. Web site: http://lss.at.ufl.edu (e-learning system)
8. Teaching Assistants Not sure we have a TA this semester (depends on the number of students at the end of the first week)
   a. TA Office:
   b. TA Office Hours:
   c. TA Email:
• Textbooks: There is no required textbook for this course. Here are three recommended books
   If you need some refreshing of your memory on undergraduate level materials you could consult any of the following books:
a. N.S. Nise, Control Systems Engineering, Wiley.
b. R.C. Dorf and R.H. Bishop, Modern Control Systems, Prentice Hall.

- **Assessment Methods and Grading:**
  There will be two midterm exams. All exams will be cumulative in the sense that the course material builds on previous material but will emphasize the most recently covered materials. Exam Dates and Times are as instructed in the first lecture in the class. If a student feels that an exam or homework is graded unfairly, or if there is an error in the grading, it should be brought to the attention of the TA of the course grader within two weeks after the graded material is handed back. Scores will not be reconsidered beyond two weeks after they are handed back.

There will be one midterm exam and a final exam. All exams will be cumulative in the sense that the course material builds on previous material but will emphasize the most recently covered material. Exam Dates and Times are as instructed in the first lecture in the class. If a student feels that an exam or homework is graded unfairly, or if there is an error in the grading, it should be brought to the attention of the TA of the course grader or the Professor within two weeks after the graded material is handed back. Scores will not be reconsidered beyond two weeks after they are handed back.

- **Make-up Policy:** No late assignments will be accepted. Makeup exams are not normally allowed. If you cannot attend an exam, you must contact the instructor prior to the exam. Arrangements will be made for students in exceptional cases such as medical reasons. In such cases supporting documentation is required.

- **Honesty Policy** – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others. Using unauthorized materials (eg solutions from previous years or downloaded on the web are violations of the honor code).

- **Grading:** HW sets 0%, midterm exam 50%, final exam 50% on 9/12/14. Note that HW sets will be collected but not grades.
Notes on Homework Solutions

Policies/Procedures:

1. Homework assignments are posted on the course website at https://lss.at.ufl.edu/
2. Homework is given each week (usually on Wednesdays) and is due at the start of the lecture on the following week.
3. Homework will be given back to you in the following two weeks.
4. You are expected to return solutions to all HW sets. However, grading might be conducted only on selected problems.
5. Students are encouraged to discuss the general principles involved in the homework sets with one another, but the solution of each problem must be completed individually.
6. You will be given an envelope for your HW. You need to write your name clearly on the back top right corner of your envelope. You are expected to hand in your HW in this envelope and you will receive your graded HW back in the same envelope. You need to keep this envelop for the entire semester.

Format

1. Use 8.5" x 11" paper and write on one side.
2. Write down your name on the 1st page and on every subsequent pages. The naming format should be: **First Name   Last Name**
3. Do not use pages torn from a spiral notebook.
4. Use a stapler (no exceptions). Do not staple over the problem numbers, allow a 1” margin so that it's visible when the pages are stapled.
5. Start each problem on a new page.
6. Put the problems in numerical order.
7. Attach a listing of any computer program(s) used in the solution.
8. Use good penmanship, as illegible writing cannot be graded.

HW Feedback

On top of the first page of your HW set please write:

• How many hours it took you to read and do the HW of that week.