ORTA DOĞU TEKNİK ÜNİVERSİTESİ

Syllabus
Electrical and Electronics Engineering
Linear Systems Theory II - 5670502
Spring, 2022

Instructor

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Course Details

Until further notice from the university, I will teach the content synchronously from the officially defined classroom and stream the lectures via Zoom video conference software (I will announce Zoom links via the ODTUclss page of the course). Note that attendance will **never** be mandatory throughout the course (attendance has never been compulsory in classes I offer alone, anyway). However, I highly recommend regularly following lectures, and I believe it is pointless to miss graduate-level lecture sessions regularly.

Note that, attendance to physical on-site midterms and final exam will be obviously mandatory unless you have official medical reasoning.

Prerequisite: Since it is a graduate-level course, there is no officially defined prerequisite course. However, it is highly recommended that students are either comfortable with or at least familiar with the contents covered in the following METU-EEE courses

- **EE302 - Feddback Systems.** Fundemental level undergraduate control systems course that teach the basics of modeling, analysis and design of (Continious Time - LTI) control systems.
- **EE402 - Disctrete-Time Systems.** Upper level undergraduate control systems course that teach the fundementals of modeling, analysis and design of **digital & discrete-time** control systems.
- **EE501 - Linear Systems Theary.** Graduate level linear-algebra course.

Lecture Hours:, Tuesday 13:40-15:30, Thursday 11:40-12:30 @EEMB A-306

Lecture Notes: In my courses, I generally create original lecture notes and post them on a public GitHub page. I am offering this course for the first time, and unfortunately, the start of the semester was very erratic. I will still try to create notes for each lecture and publish them on the GitHub page. However, it will be possible that I won't be able to post the notes of some lectures, or I may share some lectures after the synchronous classes. Moreover, always follow the changes in the GitHub repository.

GitHub Repository Link: https://github.com/mertankarali/Lecture-Notes/

Textbook: J. P. Hespanha. Linear systems theory. Princeton University Press, 2009.

Auxiliary Sources:

- 6.241- Dynamic systems and control (MIT Opencourseware), M. Dahleh, M.A. Dahleh and G. C. Verghese. https://ocw.mit.edu/courses/6-241j-dynamic-systems-and-control-spring-
- E. Tuna, EE502 Course Page. https://users.metu.edu.tr/home202/etuna/wwwhome/ee502/

Description & Outline

EE502 is a graduate-level course in the area of control and dynamical systems theory. The main goal is to teach the fundamental concepts in dynamical systems (with main focus on LTI systems) such as system representations, stability, reachability & observability, state-feedback, state-estimation, realization.

Course Grading

- **2 Midterm Examinations (M_1&M_2) and 1 Final Exam (F):** There will be 2 on-campus midterm examinations.
  - Each exam will mainly rely on **limited-open** material exam concept. However in some of the (or all of the) exams, there could be closed-format questions.
  - In a **limited-open** material exam you can use any text-based material (notes, book, worksheets, etc.) and any computing device provided it does not have internet and/or wireless communication capabilities (e.g., calculators).
  - In **closed-format** questions, all materials (including books, notes, calculators) will be prohibited.
- **Total Course Grade (G)** is calculated based on the formula given below

$$G = 0.3\,\mathbf{M_1} + 0.3\,\mathbf{M_2} + 0.40\,\mathbf{F}$$