

ME446.630 Control Systems II Mechanical Engineering@SNU Fall 2016

Instructor: Prof. Dongjun Lee (office) 301-1517 (e-mail) djlee@snu.ac.kr (p) 02-880-1724

Class Schedule: M/W 17:00-18:15pm @ 301-301

Office Hours: M/W 13:00-14:00pm

TA: Nguyen Hai-Nguyen (office) 301-211 (e-mail) hainguyen@snu.ac.kr (p) 02-880-1690

Textbooks:

Applied Nonlinear Control, Slotine and Li, Prentice-Hall, 1991

Optimal control theory: an introduction, D. E. Kirk, Dover, 2004

References:

Nonlinear systems, 3rd Ed., H. K. Khalil, Prentice-Hall

Nonlinear systems: analysis, stability and control, S. Sastry, Springer, 1999

Constructive nonlinear control, R. Sepulchre, M. M. Jankovic & P. Kokotovic, Springer-Verlag

Optimal control: an introduction to the theory & its applications, M. Athans & P. L. Falb, Dover

Convex Optimization, S. Boyd and L. Vandenberghe, Cambridge University Press, 2004

Course Description: As a sequel to 446.632 Control Systems I, this course aims to introduce graduate students to the essential concepts and techniques of modern control system theory, with particular emphasis in this semester on the nonlinear system analysis, Lyapunov stability theory and control design, sliding control, adaptive control, online parameter estimation, and optimal control. Main topics of the course in this semester are:

Introduction to nonlinear systems

Lyapunov stability method

Advanced stability techniques

Feedback linearization

Lyapunov-based control design and backstepping

Sliding mode control

Adaptive control and online parameter estimation

Constrained optimization

Dynamic programming and HJB equation

Calculus of variation and Pontryagin's minimum principle

Other topics of choice (if time permits)

Prerequisites: Control system I (ME446.632) or equivalent; or by the consent of instructor

Grading: homework (20%) mid-term (40%) 10/26 7-9:30pm final exam (40%) 12/12 7-10pm

Homework: Homework should be turned in at the beginning of the lecture on the due date. If turned in late on the same day, 50% will be deducted. Otherwise, it will get zero point. Each problem of homework will be graded in the scale of 0/0.5/1 from 0-1 scale.

Students conduct: students are expected to behave professionally in this class: going-in/out during the class, newspaper reading, phone call, texting, or any other unprofessional behaviors are not allowed.

Academic integrity: any academic dishonesty is strictly prohibited in this class, and, if caught, can result in F-grade and academic disciplinary actions.