

AE 555/GE 555

Multivariable Control Design

Instructor: Prof. Petros G. Voulgaris, 161 CSL, tel. 333-1368, vougari@illinois.edu

Time and Place: Tu-Th, 2:30-4:00 pm, 225a Talbot

Outline:

This course provides basic design techniques of linear multivariable feedback control systems. Modern, systematic and robust design methodologies are presented. Various applications of these robust design techniques are encountered to engineering systems such as air and space vehicles, automobiles, etc. in a set of computer aided design (CAD) homeworks. These CAD homeworks involve the usage of MATLAB software. The topics to be covered include:

- Unstructured and Structured Uncertainty in Models of Systems
- Performance and Robust Performance in Feedback Systems
- Limitations of Feedback
- LQ and LQG/LTR Design Methodology
- \mathcal{H}^∞ Design Methodology
- μ -Synthesis

Recommended Text: K. Zhou, J. Doyle and K. Glover, *Robust and Optimal Control*, Prentice Hall, New Jersey, 1995.

Other Related Texts:

Skogestad and Postlethwaite, *Multivariable Feedback Control*, J. Wiley, 1997.

M. Green and D.J.N. Limebeer, *Linear Robust Control*, Prentice Hall, New Jersey, 1995.

J. Doyle, B.A. Francis and A. Tannenbaum, *Feedback Control Theory*, McMillan, 1992.

G.E. Dullerud and F. Paganini, *A Course in Robust Control Theory*, Springer 1999

Grading: Homework 75%, Exam 25%.

Prerequisites:

Basic knowledge of linear systems theory at the level of ECE 515, or consent of instructor.