

EEE 686 - Adaptive Control

Catalog Data: EEE 686 Adaptive Control (3) N
Main topics covered: Parametric models, Adaptive identification, Convergence, Persistence of Excitation, Stability, Performance and Robustness Properties of Adaptive Controllers.
Enroll requirements: Pre-requisites: Engineering MENG, MS, MSE, PhD and MCS students OR Science & Engr of Materials PhD students.

Textbook: Class notes and selected publications

Other References:

S. Sastry and M. Bodson, Adaptive Control: Stability, Convergence and Robustness. Prentice Hall, 1989;
G.C. Goodwin and K.S. Sin, Adaptive Filtering Prediction and Control. Prentice Hall, 1984.
P. Ioannou and J. Sun, Robust Adaptive Control. Prentice Hall, 1996.

Coordinator: K. Tsakalis

Prerequisites by topic: Linear Systems Theory. (EEE582)

Course description:

Linear systems are often used to approximate complex systems in control applications. In such cases the parameters of the linear model may be partially unknown and/or time-varying. Adaptive controllers have been developed to counteract such forms of parametric uncertainty and improve the closed loop performance. This is typically achieved by using on-line identification techniques to adjust the parameters of a linear control law. The course addresses the fundamental theoretical principles and practical issues arising in the analysis and design of adaptive controllers. Homework projects, consisting primarily of computer simulations, are designed to expose the basic properties and limitations of adaptive systems constitute an integral component of the instruction.

Topics:

1. Parametric Models
2. Adaptive Identification
3. Persistence of Excitation
4. Adaptive Control, Stability and Convergence Properties
5. Robustness of Adaptive Controllers and Performance Considerations
6. Additional topics: Nonlinear and Switching Adaptive Control

Estimated ABET Category Content:

Math	2 Credits
Engineering Science	1 Credit

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Date: 9/26/23