ECE 58900 - State Estimation and Parameter Identification of Stochastic Systems

Type of Course
Graduate Course

Catalog Description
Introduction to point estimation, least squares, Bayes risk, and maximum likelihood. Optimum mean-square recursive estimation for non-dynamic stochastic systems. State estimation for discrete-time and continuous-time dynamic systems. Parameter identification of stochastic systems using maximum livelihood. Stochastic approximation, least squares, and random search algorithms.

Credits
Cr. 3, Dual Level, Undergraduate-Graduate

Prerequisite Courses
ECE 30200

Corequisite Courses
None

Prerequisites by Topics
Linear algebra, discrete-time systems, random process.

Textbook
An Introduction to Identification, J. P. Norton, Dover Publications, 2009.

Course Objectives
To provide students with an introduction to fundamental topics in system identification and linear estimation.

Course Outcomes

Students who successfully complete this course will have demonstrated
1. An ability to model LTI systems for the purpose of identification
2. An understanding of nonparametric time domain methods of system identification
3. An understanding of nonparametric frequency domain methods of system identification
4. An understanding of parameter estimation methods
5. An insight into the properties of various identification methods in terms of their convergence and consistency
6. A familiarity with various recursive estimation methods

Lecture Topics

1. Models of LTI systems
2. Nonparametric time domain methods
3. Nonparametric frequency domain methods
4. Parameter estimation methods
5. Convergence and consistency
6. Recursive estimation methods

Computer Usage

High

Laboratory Experience

None

Design Experience

Low

Coordinator

TBD

Date

10/01/2018