ECE4562 Course Syllabus

ECE4562

Neural Networks and Fuzzy Logic in Control (2-3-3)

Prerequisites
ECE 3085/3550

Corequisites
None

Catalog Description
Principles of neural networks and fuzzy systems; the MATLAB Neural Network and Fuzzy Logic Toolboxes; examples from system identification, classification and control; laboratory experience.

Textbook(s)
No Textbook Specified.

Topical Outline

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* Introduction/Motivation (1 week)
- What is Intelligent Control?
- Attributes of Intelligent Behavior
- Dealing with Uncertainty
* Data Management (1 week)
- Statisical and other
- Methods for Data Processing
* Neural Networks (4 weeks)
- Introduction to neural networks; the biological neuron; threshold
units
- Classical neural network models
- Learning Rules and the Backpropagation Algorithms
- The MATLAB Neural Network Toolbox
- Neural Networks in Control Applications
* Genetic Algorithms (1 week)
- Applications to Optimization Problems
* Fuzzy Sets and Fuzzy Logic (1 week)
- Fuzzy arithmetic
- Fuzzy set operations
- Fuzzy Logic, inferencing and approximate reasoning
* Fuzzy Logic Control (2 weeks)
- Heuristic methods
- A systematic fuzzy logic control design methodology
- Examples
* Fuzzy Tools (1 week)
- Software and firmware tools
- Laboratory demonstrations
* The Neuro-Fuzzy Connection (2 weeks)
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- Identification and Control
* Class Projects (1 week)