EEE 446/546 Control and Optimization of Stochastic Systems

Classes held through Zoom on Mon 13:40-16:30, Thu 13:40-16:30.
Office hour: TBA

Course Information. This course is concerned with control and optimization of dynamical systems under probabilistic uncertainty. Such systems are of increasing importance in many application areas such as information systems, control systems, signal processing, machine learning, and networks, as well as in optimization, economics, mathematical finance etc.

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References:	Supplemental Notes will be posted on the web.
	Markov Chains and Stochastic Stability, by S. P. Meyn, R. L. Tweedie
	Discrete-Time Markov Control Processes, by O. Hernandez-Lerma and J. B. Lasserre.
	Dynamic Programming and Optimal Control, by D. P. Bertsekas
Announcements:	Visit Moodle.
Grading:	Midterms (22.5% $\times$ 2) + Final 30% + Matlab Assignment 12.5% + Term Report 12.5%
	Students who do not qualify for the final exam will receive an FZ grade.
	Homeworks will be posted but not graded.

Topics

- Review of Probability
- Markov Chains and Controlled Markov Chains
- Martingales and Stochastic Stability
- Control Problems over Finite and Infinite Time and Dynamic Programming
- Partially Observed Models and Non-linear Filtering
- Linear Quadratic Gaussian Systems and Kalman Filtering
- Average Cost Optimization Problems
- Computational and Approximation Methods (Value/Policy Iteration, Linear Programming, Quantization Methods, Robustness)
- Reinforcement Learning / Empirical Learning Methods
- Time-permitting: Decentralized Stochastic Control
- Time-permitting: Continuous-Time Models and Controlled Stochastic Differential Equations