Control of Stochastic Systems

Classes held in Jeffrey 126 at Tue 12:30-13:20, Thu 11:30-12:20, Fri 13:30-14:20.

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, and networks as well as in finance and applied mathematics at large.

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Marker: Drew Steeves e-mail: 1ds19@queensu.ca
Office Hours: Thu 10:30-11:20
Recommended Text: Discrete-Time Markov Control Processes, by O. Hernandez-Lerma and J. B. Lasserre,
Supplemental Notes will be posted on the course web site
References: Dynamic Programming and Optimal Control, by D. P. Bertsekas
Markov Chains and Stochastic Stability, by S. P. Meyn, R. L. Tweedie
Announcements: Visit http://www.mast.queensu.ca/~math472 for announcements, homeworks etc.
Grading: Homework Assignments 15%, Project and Presentations 25%,
maximum of(Midterm 25% + Final 35%, Midterm 15% + Final 45%)

Topics

• Introduction to Markov Chains
• Martingales and Stochastic Stability
• Control Problems over Finite and Infinite Time and Dynamic Programming
• Partially Observed Models
• Linear Quadratic Gaussian Problem and Kalman Filtering
• The Average Cost: ACOE and the Linear Programming Approach to Markov Decision Processes
• Numerical Methods and Algorithms (Value/Policy Iteration, Linear Programming, Q-Learning) and Approximations
• Continuous-Time Models and Elements of Stochastic Differential Equations
• Decentralized Stochastic Control