Tentative Course Pacing

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Abstract

Incomplete list of topics to be covered throughout the course.

Week 01:

- One-dimensional Optimization and Sensitivity Analysis
- Multi-dimensional Optimization, Lagrange Multipliers, and Shadow Prices

Week 02:

- Optimization using Newton's Method and Variants
- Types of Optimization and Linear Programming
- Network Flows and Linear Programming

Week 03:

- Duality and Complementary Slackness
- Dual Prices and Integer Programming
- Branch and Bound Algorithms

Week 04:

- Graph Models, Max Flow, and Min Cut
- bipartite graphs & matching

Week 05:

- Finite-state Machines and Transition Diagrams
- Iteration Matrices, Eigenvectors, and Power Iterations
- Markov Chains

Week 06:

- Intro to Statistics and the Central Limit Theorem
- Monte-Carlo Integration
- Monte-Carlo Simulation
- Binomial and Poisson Distributions

Week 07:

- Recurrence relations & generating functions
- Linear least squares

Week 08:

- Nonlinear optimization
- Introduction to Machine learning and Neural Networks

Week 09-14:

- Introduction to Time Series Analysis
- Select research topics