ELEG 667 - Convex Optimization

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Course Description

This course provides a comprehensive coverage of both the theoretical foundation and numerical algorithms for convex optimization. The main objectives of this course are to give students the tools and training to recognize convex optimization problems that arise in applications, and to present the basic theory of such problems as well as how to solve them numerically.

Topics covered in this course include: Convex sets, functions, and optimization problems; Basics of convex analysis; Least-squares, linear and quadratic programs, semidefinite programming, minimax; Optimality conditions, duality theory, theorems of alternative; Descent methods, Newton's method, interior-point method; Applications.

Prerequisite

Undergraduate-level linear algebra and probability theory; mathematical maturity in general.

Textbook

- Main Textbook: Stephen Boyd and Lieven Vandenberghe, Convex Optimization, Cambridge University Press, 2004.

- Reference: Jorge Nocedal and Stephen Wright, Numerical Optimization, Springer Series in Operations Research and Financial Engineering, 2006.

Evaluation

- Attendance: 10%; Homework: 40%; Final Exam: 50% + 10% bonus