E1251 Aug 3:0

Linear and Nonlinear optimization

Instructor

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Department: Electrical Engineering

Course Time: WF 2:00 - 3:30 pm

Lecture venue: EE 308

Detailed Course Page: https://sites.google.com/site/lnoatiisc/

Announcements

Brief description of the course

This is an introductory course to optimization covering both theoretical and algorithmic aspects. Considerable emphasis is given for the derivations of conditions of optimality for both constrained and unconstrained problems. While the course covers most essential algorithms for unconstrained problems, for the constrained problems, linear programming is covered thoroughly. For non-linear constrained optimization problems, an overview of important algorithms is provided.

Prerequisites

Linear algebra, basic calculus

Syllabus

Review of mathematical background: Background linear algebra;

Background calculus.

Characterization of maxima and minima: Conditions of maxima

and minima for unconstrained optimization; Convex and quadratic

functions; Conditions of maxima and minima for constrained

optimization; Convex optimization problems and duality.

Iterative methods for unconstrained optimization:

Line search methods; Method of steepest descent and Newtonâ€™s

method; Method of conjugate directions; Quasi-Newton method.

Iterative methods for constrained optimization: Linear programming;

Iterative methods for nonlinear constrained optimization

Course outcomes

Students will have understood the conditions of optimality and their meaning.

The students will be able to implement important types of unconstrained

optimization algorithms, and essential variants of linear programming methods.

Grading policy

Three monthly tests - 45 %

Five revision tests - 15 %

Final exam- 40 %

Assignments

Resources

An introduction to optimization â€“ Chong and Zak - Wiley

Linear and nonlinear programming â€“ Luenberger and Ye - Springer

Numerical optimization â€“ J. Nocedal, S. J. Wright â€“ Springer