Math 164: Optimization

- Math 164: General Course Outline

Catalog Description

164. Optimization. Lecture, three hours; discussion, one hour. Requisite: course 115A. Not open for credit to students with credit for Electrical Engineering 136. Fundamentals of optimization. Linear programming: basic solutions, simplex method, duality theory. Unconstrained optimization, Newton's method for minimization. Nonlinear programming, optimality conditions for constrained problems. Additional topics from linear and nonlinear programming. P/NP or letter grading.

General Information

Math 164 provides an introduction to the theory and algorithms concerned with finding extrema (maxima and minima) of functions subject to constraints.

The course begins with some basic topics such as convexity and reviews relevant material from linear algebra. Then about half the quarter is dedicated to linear programming, which is concerned with extrema of linear functions of many variables subject to linear constraints. Topics include a widely used algorithm called the simplex method and a powerful duality theory.

After a review of topics from multivariable calculus such as the gradient, Hessian, Jacobian, Taylor series, Newton's method and Lagrange multipliers, as well as some further linear algebra review, the course offers the students a deeper understanding than that presented in calculus courses of nonlinear programming, that is, the study of extrema of nonlinear functions subject to various kinds of constraints.

There are ample opportunities for the students to improve their ability to read and write mathematical proofs as well as to solve applied and theoretical problems.

For more information, please contact undergraduate student services ugrad@math.ucla.edu.