

Lectures on modern convex optimization: analysis, algorithms, and engineering applications

Ben-Tal, Aharon, author

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Abstrak

Here is a book devoted to well-structured and thus efficiently solvable convex optimization problems, with emphasis on conic quadratic and semidefinite programming. The authors present the basic theory underlying these problems as well as their numerous applications in engineering, including synthesis of filters, Lyapunov stability analysis, and structural design. The authors also discuss the complexity issues and provide an overview of the basic theory of state-of-the-art polynomial time interior point methods for linear, conic quadratic, and semidefinite programming. The book's focus on well-structured convex problems in conic form allows for unified theoretical and algorithmical treatment of a wide spectrum of important optimization problems arising in applications.

Lectures on Modern Convex Optimization: Analysis, Algorithms, and Engineering Applications presents and analyzes numerous engineering models, illustrating the wide spectrum of potential applications of the new theoretical and algorithmical techniques emerging from the significant progress taking place in convex optimization. It is hoped that the information provided here will serve to promote the use of these techniques in engineering practice. The book develops a kind of "algorithmic calculus" of convex problems, which can be posed as conic quadratic and semidefinite programs. This calculus can be viewed as a "computationally tractable" version of the standard convex analysis.