

Math 582G
Convex Optimization: Fundamentals, Applications, and Algorithms

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Monday/Wednesday/Friday Time: 8:30

Research in the theory, applications, and algorithms for convex optimization has experienced dramatic growth over the past 15 years. This growth is energized by the fact that numerous important and previously considered intractable problems in control theory, power systems engineering, signals processing, digital and analog circuit design, mechanical and structural engineering, communications systems, imaging, machine learning, finance, statistics, and computational geometry can now be successfully modeled and solved by the methods of convex optimization. These successes are due to mathematical and numerical discoveries over the past 25 years, in particular, the expanding understanding and use of convex duality theory among practitioners and the development of the interior point solution methodology. This course will cover these developments. We begin with an introduction to a few of the necessary basics in convex analysis and move quickly on to learning how to recognize, formulate, and solve convex optimization problems that arise in applications.

Learning Objectives:

- To develop the tools and training to recognize convex optimization problems that arise in applications.
 - To present the basic theory of such problems, concentrating on results that are useful in modeling and computation.
 - To develop an understanding of solution methods reinforced by some hands-on experience in solving a few toy problems.
 - To develop the background necessary for using these methods.
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