Electrical & Computer ENGINEERING

SEMINAR

DISTINGUISHED LECTURE

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Stephen Boyd
PROFESSOR
STANFORD UNIVERSITY

Stephen P. Boyd is the Samsung Professor of Engineering, and Professor of Electrical Engineering in the Information Systems Laboratory at Stanford University. His current research focus is on convex optimization applications in control, signal processing, and circuit design.

Professor Boyd received an AB degree in Mathematics, summa cum laude, from Harvard University in 1980, and a PhD in EECS from U. C. Berkeley in 1985. In 1985 he joined the faculty of Stanford's Electrical Engineering Department.

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Professor Boyd is the author of many research articles and three books: Linear Controller Design: Limits of Performance (with Craig Barratt, 1991), Linear Matrix Inequalities in System and Control Theory (with L. El Ghaoui, E. Feron, and V. Balakrishnan, 1994), and Convex Optimization (with Lieven Vandenberghe, 2004).

Professor Boyd has received many awards and honors for his research in control systems engineering and optimization, including an ONR Young Investigator Award, a Presidential Young Investigator Award, and an IBM faculty development award. In 1992 he received the AACC Donald P. Eckman Award, which is given annually for the greatest contribution to the field of control engineering by someone under the age of 35.

In addition to teaching large graduate courses on Linear Dynamical Systems, Nonlinear Feedback Systems, and Convex Optimization, Professor Boyd has regularly taught introductory undergraduate Electrical Engineering courses on Circuits, Signals and Systems, Digital Signal Processing, and Automatic Control.

Convex Optimization*

In this talk I will give an overview of general convex optimization, which can be thought of as an extension of linear programming, and some recently developed subfamilies such as second-order cone, semidefinite, and geometric programming. Like linear programming, we have a fairly complete duality theory, and very effective numerical methods for these problem classes; in addition, recently developed software tools considerably reduce the effort of specifying and solving convex optimization problems. There is a steadily expanding list of new applications of convex optimization, in areas such as circuit design, signal processing, statistics, machine learning, communications, control, finance, and other fields. Convex optimization is also emerging as an important tool for hard, non-convex problems, where it can be used to generate lower bounds on the optimal value, and as a heuristic method for generating suboptimal points.

* Joint work with Lieven Vandenberghe and Michael Grant

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