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Sinopsis

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This book provides a self-contained, accessible introduction to the mathematical advances and challenges resulting from the use of semidefinite programming in polynomial optimization. This quickly evolving research area with contributions from the diverse fields of convex geometry, algebraic geometry, and optimization is known as convex algebraic geometry.

Each chapter addresses a fundamental aspect of convex algebraic geometry. The book begins with an introduction to nonnegative polynomials and sums of squares and their connections to semidefinite programming and quickly advances to several areas at the forefront of current research. These include
? semidefinite representability of convex sets,
? duality theory from the point of view of algebraic geometry, and
? nontraditional topics such as sums of squares of complex forms and noncommutative sums of squares polynomials.

Suitable for a class or seminar, with exercises aimed at teaching the topics to beginners, Semidefinite Optimization and Convex Algebraic Geometry serves as a point of entry into the subject for readers from multiple communities such as engineering, mathematics, and computer science. A guide to the necessary background material is available in the appendix.

Audience
This book can serve as a textbook for graduate-level courses presenting the basic mathematics behind convex algebraic geometry and semidefinite optimization. Readers conducting research in these areas will discover open problems and potential research directions.

About the Authors
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