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Título: Moments, Positive Polynomials And Their Applications (Icp Optimization Series Vo

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Precio: \$1232.00

Editorial:

Año: 2010

Tema:

Edición: 1^a

Sinopsis

ISBN: 9781848164451

Many important applications in global optimization, algebra, probability and statistics, applied mathematics, control theory, financial mathematics, inverse problems, etc. can be modeled as a particular instance of the Generalized Moment Problem (GMP).

This book introduces a new general methodology to solve the GMP when its data are polynomials and basic semi-algebraic sets. This methodology combines semidefinite programming with recent results from real algebraic geometry to provide a hierarchy of semidefinite relaxations converging to the desired optimal value. Applied on appropriate cones, standard duality in convex optimization nicely expresses the duality between moments and positive polynomials.

In the second part, the methodology is particularized and described in detail for various applications, including global optimization, probability, optimal control, mathematical finance, multivariate integration, etc., and examples are provided for each particular application.

An errata to the book is available. [Click here to download the pdf.](#)