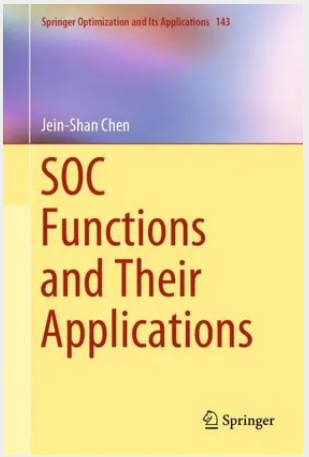
Chen

SOC Functions and Their Applications

This book covers all of the concepts required to tackle second-order cone programs (SOCPs), in order to provide the reader a complete picture of SOC functions and their applications. SOCPs have attracted considerable attention, due to their wide range of applications in engineering, data science, and finance. To deal with this special group of optimization problems involving second-order cones (SOCs), we most often need to employ the following crucial concepts: (i) spectral decomposition associated with SOCs, (ii) analysis of SOC functions, and (iii) SOC-convexity and -monotonicity.

Moreover, we can roughly classify the related algorithms into two categories. One category includes traditional algorithms that do not use complementarity functions. Here, SOC-convexity and SOC-monotonicity play a key role. In contrast, complementarity functions are employed for the other category. In this context, complementarity functions are closely related to SOC functions; consequently, the analysis of SOC functions can help with these algorithms.

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128,39 €
119,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9789811340765
Medium: Buch
ISBN: 978-981-13-4076-5
Verlag: Springer
Erscheinungstermin: 20.02.2019
Sprache(n): Englisch
Auflage: 1. Auflage 2019
Serie: Springer Optimization and Its Applications
Produktform: Gebunden
Gewicht: 494 g
Seiten: 206
Format (B x H): 160 x 241 mm

Kundenservice Verlag Dr. Otto Schmidt KG
Neumannstraße 10, 40235 Düsseldorf | kundenservice@otto-schmidt.de | 0221-93738-997 (Inland)