Duality in Vector Optimization: A Comprehensive Exploration by Eric Delabaere
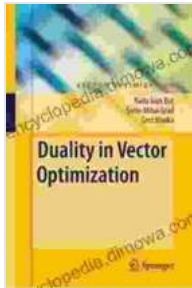
Duality in Vector Optimization by Eric Delabaere

★★★★★ 5 out of 5

Language	: English
File size	: 10540 KB
Screen Reader	: Supported
Print length	: 416 pages

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In the realm of mathematical optimization, understanding the intricate relationship between primal and dual problems is of paramount importance. For vector optimization, where multiple objectives are simultaneously considered, duality theory provides a powerful framework to analyze and solve complex optimization problems. In his seminal work, "Duality in Vector Optimization," Eric Delabaere presents a comprehensive treatise on this fundamental concept.

Mathematical Foundations

Delabaere meticulously lays out the mathematical foundations of duality theory in vector optimization. He begins with a thorough examination of vector spaces, convex sets, and cones, providing readers with a solid understanding of the underlying mathematical structures. The concept of vector duality is then introduced, where the dual problem is constructed to provide valuable information about the primal problem.

Duality Theorems

The heart of the book lies in the exploration of various duality theorems. Delabaere presents the classical Wolfe duality theorem, which establishes the existence of a dual problem for every primal problem under certain assumptions. He also delves into extensions and generalizations of Wolfe's theorem, such as the Mond-Weir duality theorem and the Kuroiwa duality theorem. These theorems provide essential insights into the relationship between primal and dual solutions and their applications in solving optimization problems.

Applications

Delabaere demonstrates the practical significance of duality theory by exploring its applications in various fields. He highlights its relevance in robust optimization, constrained optimization, and multi-objective decision-making. Through real-world examples and case studies, he illustrates how duality can be leveraged to efficiently solve complex optimization problems arising in engineering, economics, and other disciplines.

Algorithms

To facilitate the practical implementation of duality theory, Delabaere presents a comprehensive overview of algorithms for solving vector optimization problems. He discusses interior-point methods, gradient-based methods, and evolutionary algorithms, providing detailed descriptions of their strengths and limitations. The inclusion of numerical examples and computational experiments further enhances the book's practical value.

Summary and

Eric Delabaere's "Duality in Vector Optimization" stands as an authoritative reference on the subject. It offers a comprehensive treatment of duality theory, from its mathematical foundations to its practical applications. Through rigorous analysis, insightful examples, and accessible language, the book empowers readers with a deep understanding of this essential concept in vector optimization. Whether you are a seasoned researcher, a student, or a practitioner in the field, this book is an indispensable resource that will guide you through the intricacies of duality and its impact on solving multi-objective optimization problems.

About the Author

Eric Delabaere is a renowned expert in mathematical optimization and vector optimization. He has authored several influential works on these topics and is widely recognized for his contributions to the field. His research has been instrumental in advancing our understanding of duality theory and its applications in various disciplines.

Book Details

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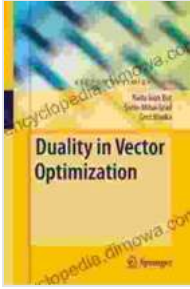
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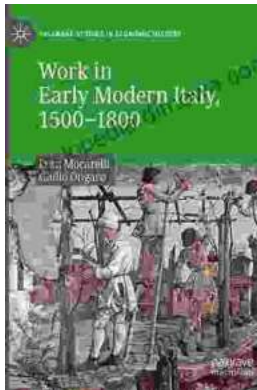|	
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