Optimization Essentials

Theory, Tools, and Applications

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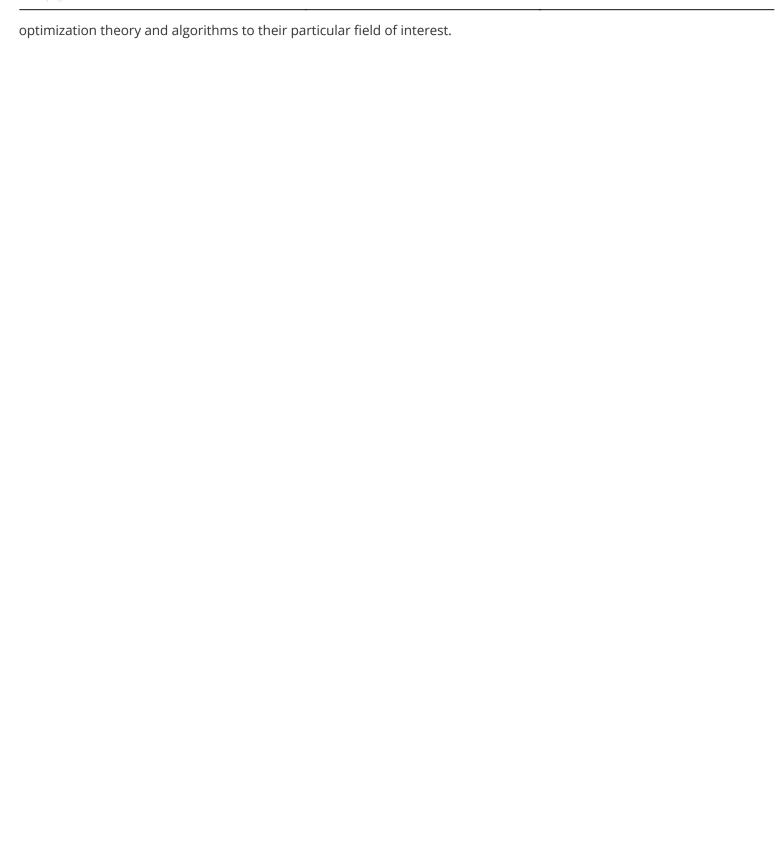https://ln-mag2-test.webpreview.at/optimization-essentials-9789819954902.html

Details

This book explores recent developments and exciting challenges in operations research and mathematical optimization. It provides the following in a unified and carefully developed presentation: (a) novel problems that have arisen in the real-life optimization domain, highlighting the challenges in each problem; (b) significant methodological advances for solving existing optimization problems, with a special emphasis on large scale problems.

The book assumes a decent understanding of matrix algebra, linear and integer programming, non-linear programming, computational complexity, and graph theory. Each chapter in this book starts with an introduction to the underlying optimization technique. It then explores a real-life case study to which the technique will be applied. The objective is to demonstrate how the underlying technique can be utilized to solve a challenging problem. The chapters offer details on how to formulate a research problem into a formal optimization model, reformulate or transform it (if required) to improve computational tractability, and apply necessary customizations to the optimization technique specific to the underlying problem to derive an optimal or near-optimal solution.

The book covers various state-of-the-art methods (both exact and heuristics) and modelling approaches in sync with the current research trends, which are still not discussed in typical graduate-level textbooks. Applications covered in the book span the realms of resource planning, telecommunications, scheduling, logistics, education, environmental conservation, and many others. It is thus a valuable resource for post-graduate students of operations research and mathematical optimization. It also serves as a valuable reference for researchers who wish to explore various optimization techniques as part of their research methodologies. The learning from the book should enable the professionals to apply

optimization theory and algorithms to their particular field of interest.