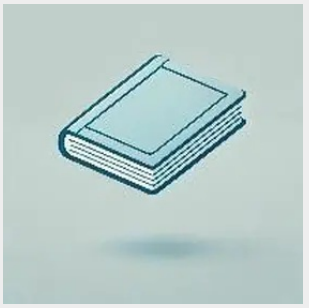
Guldmann

Optimization Methods and Applications in Public Sector Policy and Planning



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Optimization Methods and Applications in Public Sector Policy and Planning offers a comprehensive scientific reference integrating optimization theory, numerical algorithms, GAMS software implementation of iconic problems, and detailed descriptions of practical applications in public-sector domains. This book uniquely combines foundational mathematical concepts, advanced optimization methods, and complex challenges in environmental management, energy systems, transportation, urban planning, and sustainability. It equips readers with tools to formulate and solve policy and planning optimization problems. The book is organized into twelve chapters covering classical, linear, integer, nonlinear and multi-objective programming; stochastic and multi-level optimization; network and transportation models; cooperative game theory; and the intersection of optimization with machine learning and large language models. It includes appendices on matrix algebra, multivariable calculus, and GAMS programming. Each chapter blends methodological exposition with applied examples, enhanced by diagrams, flowcharts, and GAMS implementations, with mathematical formulations, data, computer programs, and results analyses. Designed for upper-level undergraduate and graduate students, academic faculty, researchers, consultants and professionals in planning, policy, and energy sectors, this reference provides the knowledge necessary to mathematically model, numerically solve, and interpret the results of optimization problems. It supports various disciplines including urban and regional planning, public policy, environmental sciences, civil and environmental engineering, geography, and natural resources management.

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