1. Record Nr. UNINA9910760254803321

Autore	Zheng Maosheng
Titolo	Probability-Based Multi-objective Optimization for Material Selection / / by Maosheng Zheng, Jie Yu, Haipeng Teng, Ying Cui, Yi Wang
Pubbl/distr/stampa	Singapore : , : Springer Nature Singapore : , : Imprint : Springer, , 2024
ISBN	981-9939-39-9
Edizione	[2nd ed. 2024.]
Descrizione fisica	1 online resource (213 pages)
Disciplina	620.11
Soggetti	Materials Mathematical optimization Chemistry Probabilities Materials Engineering Optimization Materials Chemistry Applied Probability
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	History and Current Status of Material Selection with Multi – objective Optimization -- Introduction to Multi – objective Optimization in Material Selections -- Fundamental Principle of Probability - Based Multi - Objective Optimization and Applications -- Robustness Evaluation with Probability-Based Multi-objective Optimization -- Extension of Probability – based Multi – objective Optimization in Condition of the Utility with Desirable Value -- Hybrids of Probability – Based Multi – Objective Optimization with Experimental Design Methodologies -- Discretization of Simplified Evaluation in Probability-Based Multi-objective Optimization by Means of GLP and Uniform Experimental Design -- Fuzzy- based Probabilistic Multi-objective Optimization -- Cluster Analyses of Multiple Objectives -- Applications of Probability – based Multi – objective Optimization beyond Material Selection -- Treatment of Portfolio Investment by Means of Probability-BasedMulti-objective Optimization -- Treatment of Multi-objective Shortest Path Problem by Means of Probability-Based Multi-objective --

Discussion on preferable probability, discretization, error analysis and hybrid of sequential uniform design with PMOO -- General Conclusions.

Sommario/riassunto

The second edition of this book illuminates the fundamental principle and applications of probability-based multi-objective optimization for material selection in viewpoint of system theory, in which a brand new concept of preferable probability and its assessment as well as other treatments are introduced by authors for the first time. Hybrids of the new approach with experimental design methodologies (response surface methodology, orthogonal experimental design, and uniform experimental design) are all performed; robustness assessment and performance utility with desirable value are included; discretization treatment in the evaluation is presented; fuzzy-based approach and cluster analysis are involved; applications in portfolio investment and shortest path problem are concerned as well. The authors wish this work will cast a brick to attract jade and would make its contributions to relevant fields as a paving stone. It is designed to be used as a textbook for postgraduate and advanced undergraduate students in relevant majors, while also serving as a valuable reference book for scientists and engineers involved in related fields. .