

1. Record Nr.	UNINA9910132164503321
Autore	Krichen Saoussen
Titolo	Graph-related optimization and decision support systems // Saoussen Krichen, Jouhaina Chaouachi
Pubbl/distr/stampa	London, England ; ; Hoboken, New Jersey : , : ISTE : , : Wiley, , 2014 ©2014
ISBN	1-118-98424-2 1-118-98426-9 1-118-98425-0
Descrizione fisica	1 online resource (186 p.)
Collana	Focus Computer Engineering Series, , 2051-249X
Classificazione	90-0190C3590C2705C90
Disciplina	519.6
Soggetti	Constrained optimization Differential equations, Partial Telecommunication
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover page; Half-Title page; Title page; Copyright page; Contents; List of Tables; List of Figures; List of Algorithms; Introduction; 1: Basic Concepts in Optimization and Graph Theory; 1.1. Introduction; 1.2. Notation; 1.3. Problem structure and variants; 1.4. Features of an optimization problem; 1.5. A didactic example; 1.6. Basic concepts in graph theory; 1.6.1. Degree of a graph; 1.6.2. Matrix representation of a graph; 1.6.3. Connected graphs; 1.6.4. Itineraries in a graph; 1.6.5. Tree graphs; 1.6.6. The bipartite graphs; 1.7. Conclusion; 2: Knapsack Problems; 2.1. Introduction 2.2. Graph modeling of the knapsack problem 2.3. Notation; 2.4. 0-1 knapsack problem; 2.5. An example; 2.6. Multiple knapsack problem; 2.6.1. Mathematical model; 2.6.2. An example; 2.7. Multidimensional knapsack problem; 2.7.1. Mathematical model; 2.7.2. An example; 2.8. Quadratic knapsack problem; 2.8.1. Mathematical model; 2.8.2. An example; 2.9. Quadratic multidimensional knapsack problem; 2.9.1. Mathematical model; 2.9.2. An example; 2.10. Solution approaches for knapsack problems; 2.10.1. The greedy algorithm; 2.10.2. A genetic algorithm for the KP; 2.10.2.1. Solution encoding

2.10.2.2. Crossover; 2.10.2.3. Mutation; 2.11. Conclusion; 3: Packing Problems; 3.1. Introduction; 3.2. Graph modeling of the bin packing problem; 3.3. Notation; 3.4. Basic bin packing problem; 3.4.1. Mathematical modeling of the BPP; 3.4.2. An example; 3.5. Variable cost and size BPP; 3.5.1. Mathematical model; 3.5.2. An example; 3.6. Vector BPP; 3.6.1. Mathematical model; 3.6.2. An example; 3.7. BPP with conflicts; 3.7.1. Mathematical model; 3.7.2. An example; 3.8. Solution approaches for the BPP; 3.8.1. The next-fit strategy; 3.8.2. The first-fit strategy; 3.8.3. The best-fit strategy; 3.8.4. The minimum bin slack; 3.8.5. The minimum bin slack'; 3.8.6. The least loaded heuristic; 3.8.7. A genetic algorithm for the bin packing problem; 3.8.7.1. Solution encoding; 3.8.7.2. Crossover; 3.8.7.3. Mutation; 3.9. Conclusion; 4: Assignment Problem; 4.1. Introduction; 4.2. Graph modeling of the assignment problem; 4.3. Notation; 4.4. Mathematical formulation of the basic AP; 4.4.1. An example; 4.5. Generalized assignment problem; 4.5.1. An example; 4.6. The generalized multiassignment problem; 4.6.1. An example; 4.7. Weighted assignment problem; 4.8. Generalized quadratic assignment problem; 4.9. The bottleneck GAP; 4.10. The multilevel GAP; 4.11. The elastic GAP; 4.12. The multiresource GAP; 4.13. Solution approaches for solving the AP; 4.13.1. A greedy algorithm for the AP; 4.13.2. A genetic algorithm for the AP; 4.13.2.1. Solution encoding; 4.13.2.2. Crossover; 4.13.2.3. Mutation; 4.14. Conclusion; 5: The Resource Constrained Project Scheduling Problem; 5.1. Introduction; 5.2. Graph modeling of the RCPSP; 5.3. Notation; 5.4. Single-mode RCPSP; 5.4.1. Mathematical modeling of the SM-RCPSP; 5.4.2. An example of an SM-RCPSP; 5.5. Multimode RCPSP

Sommario/riassunto

Constrained optimization is a challenging branch of operations research that aims to create a model which has a wide range of applications in the supply chain, telecommunications and medical fields. As the problem structure is split into two main components, the objective is to accomplish the feasible set framed by the system constraints. The aim of this book is expose optimization problems that can be expressed as graphs, by detailing, for each studied problem, the set of nodes and the set of edges. This graph modeling is an incentive for designing a platform that integrates all optimizatio
