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Nota di contenuto	Applied Integer Programming: Modeling and Solution; CONTENTS; PREFACE; PART I MODELING; 1 Introduction; 1.1 Integer Programming; 1.2 Standard Versus Nonstandard Forms; 1.3 Combinatorial Optimization Problems; 1.4 Successful Integer Programming Applications; 1.5 Text Organization and Chapter Preview; 1.6 Notes; 1.7 Exercises; 2 Modeling and Models; 2.1 Assumptions on Mixed Integer Programs; 2.2 Modeling Process; 2.3 Project Selection Problems; 2.3.1 Knapsack Problem; 2.3.2 Capital Budgeting Problem; 2.4 Production Planning Problems; 2.4.1 Uncapacitated Lot Sizing; 2.4.2 Capacitated Lot Sizing; 2.4.3 Just-in-Time Production Planning; 2.5 Workforce/Staff Scheduling Problems; 2.5.1 Scheduling Full-Time Workers; 2.5.2 Scheduling Full-Time and Part-Time Workers; 2.6 Fixed-Charge Transportation and Distribution Problems; 2.6.1 Fixed-Charge Transportation; 2.6.2 Uncapacitated Facility Location; 2.6.3 Capacitated Facility Location; 2.7 Multicommodity Network Flow Problem; 2.8 Network Optimization Problems with Side Constraints; 2.9 Supply Chain Planning Problems; 2.10 Notes; 2.11 Exercises; 3 Transformation Using 0-1 Variables; 3.1

Transform Logical (Boolean) Expressions

3.1.1 Truth Table of Boolean Operations 3.1.2 Basic Logical (Boolean) Operations on Variables; 3.1.3 Multiple Boolean Operations on Variables; 3.2 Transform Nonbinary to 0-1 Variable; 3.2.1 Transform Integer Variable; 3.2.2 Transform Discrete Variable; 3.3 Transform Piecewise Linear Functions; 3.3.1 Arbitrary Piecewise Linear Functions; 3.3.2 Concave Piecewise Linear Cost Functions: Economy of Scale; 3.4 Transform 0-1 Polynomial Functions; 3.5 Transform Functions with Products of Binary and Continuous Variables: Bundle Pricing Problem; 3.6 Transform Nonsimultaneous Constraints 3.6.1 Either/Or Constraints 3.6.2 p Out of m Constraints Must Hold; 3.6.3 Disjunctive Constraint Sets; 3.6.4 Negation of a Constraint; 3.6.5 If/Then Constraints; 3.7 Notes; 3.8 Exercises; 4 Better Formulation by Preprocessing; 4.1 Better Formulation; 4.2 Automatic Problem Preprocessing; 4.3 Tightening Bounds on Variables; 4.3.1 Bounds on Continuous Variables; 4.3.2 Bounds on General Integer Variables; 4.3.3 Bounds on 0-1 Variables; 4.3.4 Variable Fixing Redundant Constraints, and Infeasibility; 4.4 Preprocessing Pure 0-1 Integer Programs; 4.4.1 Fixing 0-1 Variables 4.4.2 Detecting Redundant Constraints And Infeasibility 4.4.3 Tightening Constraints (or Coefficients Reduction); 4.4.4 Generating Cutting Planes from Minimum Cover; 4.4.5 Rounding by Division with GCD; 4.5 Decomposing a Problem into Independent Subproblems; 4.6 Scaling the Coefficient Matrix; 4.7 Notes; 4.8 Exercises; 5 Modeling Combinatorial Optimization Problems I; 5.1 Introduction; 5.2 Set Covering and Set Partitioning; 5.2.1 Set Covering Problem; 5.2.2 Set Partitioning and Set Packing; 5.2.3 Set Covering in Networks; 5.2.4 Applications of Set Covering Problem; 5.3 Matching Problem 5.3.1 Matching Problems in Network

Sommario/riassunto

An accessible treatment of the modeling and solution of integer programming problems, featuring modern applications and software. In order to fully comprehend the algorithms associated with integer programming, it is important to understand not only how algorithms work, but also why they work. Applied Integer Programming features a unique emphasis on this point, focusing on problem modeling and solution using commercial software. Taking an application-oriented approach, this book addresses the art and science of mathematical modeling related to the mixed integer
