

C O N T E N T S

SERIES EDITOR'S PREFACE.....	v
INTRODUCTION.....	1
§1 FOUNDATIONS.....	5
1.1. General preliminaries.....	5
1.2. Graph theory.....	6
1.3. Algorithms and complexity.....	10
§2 MAXIMUM FLOWS.....	13
2.1. Problem statement and fundamental results.....	13
2.2. Augmenting paths and blocking flows.....	14
2.3. Scaling.....	20
2.4. Preflows and the Goldberg algorithm.....	24
2.5. Computational results.....	31
2.6. Characterization of all optimal solutions.....	34
2.7. Maximal flows between all pairs of vertices.....	38
§3 MINIMUM-COST FLOW PROBLEMS.....	44
3.1. Problem statement and fundamental results.....	44
3.2. History of polynomial algorithms.....	49
3.3. The network simplex method.....	50
3.4. Computational results.....	61
§4 GENERALIZED NETWORKS.....	63
4.1. Maximum flows in generalized networks.....	63
4.2. A combinatorial algorithm for the generalized circulation problem.....	68
4.3. The simplex method for minimum-cost generalized flows.....	71
4.4. Computational results.....	79
§5 MULTICRITERIA FLOWS.....	80
5.1. Fundamental results.....	80
5.2. Complexity results.....	82
5.3. Algorithms.....	90
5.4. An exact method for bicriteria minimum-cost flows.....	95
5.5. Approximative methods for bicriteria flows.....	99
5.6. ϵ -optimality.....	106

5.7. Computational results.....	113
5.8. An application: Optimal computer realization of linear..... algorithms.....	120
§6 PARAMETRIC FLOWS.....	125
6.1. Motivation and fundamental results.....	125
6.2. The number of breakpoints for parametric flow problems.....	128
6.3. Vertical algorithm for the parametric maximum flow problem...	133
6.4. Horizontal algorithm for parametric optimal flows in..... generalized networks.....	141
6.5. Dual reoptimization for parametric changes in the minimum-... cost flow problem.....	149
6.6. Fuzzy network flows.....	152
§7 DETECTING NETWORK STRUCTURE.....	154
7.1. Embedded networks, graph realization, and total..... unimodularity.....	154
7.2. Complexity results.....	157
7.3. Graph realization by means of m-hierarchies.....	159
7.4. Equivalent problem formulations using network flows.....	163
7.5. Numerical investigations to determine embedded networks.....	165
§8 SOLUTION OF NETWORK FLOW PROBLEMS.....	
WITH ADDITIONAL CONSTRAINTS.....	168
8.1. Introduction.....	168
8.2. A primal partitioning algorithm.....	170
8.3. Solution of a class of interval scheduling problems.....	174
LIST OF ALGORITHMS.....	185
LIST OF PROBLEMS.....	186
REFERENCES.....	187
INDEX.....	202