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Nota di contenuto	Preface; Acknowledgments; Contents; Acronyms; Symbols; List of Figures; List of Tables; Part I Introduction; 1 Motivation; 1.1 Motivation; 1.2 Why Optimal Scheduling?; 1.3 Why this Book?; 1.4 Structure of the Book; 1.5 Main Contributions; References; 2 Scheduling Process; 2.1 Scheduling Process; 2.2 Scheduler Characteristics; 2.3 Satellite Range Scheduling Problems; 2.4 Issues Beyond the Scope of this Text; References; Part II Satellite Range Scheduling; 3 The Satellite Range Scheduling Problem; 3.1 Problem Formulation; 3.1.1 Model for the Scenario; 3.1.2 Model for the Requests 3.1.3 Problem Constraints3.1.3.1 Preemption; 3.1.3.2 Number of Entities; 3.1.3.3 Duration of the Requests; 3.1.3.4 Redundancy; 3.1.3.5

Precedence; 3.1.3.6 Priority; 3.1.4 Schedule Metrics; 3.2 Complexity of SRS; 3.2.1 Introduction to Complexity Theory; 3.2.2 Complexity of the SRS Problem; 3.3 General Scheduling Problems; 3.3.1 Problem Classification; 3.3.2 Problem Reducibility; 3.4 Relating Satellite and General Scheduling Problems; 3.4.1 One Machine Problems; 3.4.1.1 1 rj,pij Uj; 3.4.1.2 1 rj,pij, prec Uj; 3.4.1.3 1 rj,pij wj Uj; 3.4.1.4 1 rj wj Uj; 3.4.1.5 1 rj,pij pij pij wj Uj
3.4.2 Several Identical Machines Problems3.4.2.1 P rj,pij,C Uj; 3.4.3 Several Unrelated Machines Problems; 3.4.3.1 R rj, pij,C wj Uj; 3.4.3.2 R rj, pij,Cx wj Uj; 3.4.3.3 R rj, pij,C, prec wj Uj; 3.4.3.4 R rj, C wj Uj; 3.4.3.5 R rj, C, prec wj Uj; 3.4.3.6 R rj,pij pij pij,C wj Uj; 3.5 Summary; References; 4 Optimal Satellite Range Scheduling; 4.1 Scenario Model for Fixed Interval SRS; 4.2 Optimal Solution for Fixed Interval SRS; 4.2.1 Description of the Algorithm; 4.2.1.1 Event Generation; 4.2.1.2 Graph Creation; 4.2.1.3 Longest Path Calculation
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5.3.2 Stackelberg Equilibrium Solution

Sommario/riassunto

The satellite range scheduling (SRS) problem, an important operations research problem in the aerospace industry consisting of allocating tasks among satellites and Earth-bound objects, is examined in this book. SRS principles and solutions are applicable to many areas, including: Satellite communications, where tasks are communication intervals between sets of satellites and ground stations Earth observation, where tasks are observations of spots on the Earth by satellites Sensor scheduling, where tasks are observations of satellites by sensors on the Earth. This self-contained monograph begins with a structured compendium of the problem and moves on to explain the optimal approach to the solution, which includes aspects from graph theory, set theory, game theory and belief networks. This book is accessible to students, professionals and researchers in a variety of fields, including: operations research, optimization, scheduling theory, dynamic programming and game theory. Taking account of the distributed, stochastic and dynamic variants of the problem, this book presents the optimal solution to the fixed interval SRS problem and how to migrate results into more complex cases. Reference algorithms and traditional algorithms for solving the scheduling problems are provided and compared with examples and simulations in practical scenarios.