Project Scheduling A Research Handbook International Series In Operations Research Management Science

This textbook teaches the basic concepts and methods of project management but also explains how to convert them to useful results in practice. Project management offers a promising working area for theoretical and practical applications, and developing software and decision support systems (DSS). This book specifically focuses on project planning and control, with an emphasis on mathematical modeling. Models and algorithms establish a good starting point for students to study the relevant literature and support pursuing academic work in related fields. The book provides an introduction to theoretical concepts, and it also provides detailed explanations, application examples, and case studies that deal with real-life problems. The chapter topics include questions that underlie critical thinking, interpretation, analytics, and making comparisons. Learning outcomes are defined and the content of the book is structured following these goals. Chapter 1 begins by introducing the basic concepts, methods, and processes of project management. This Chapter constitutes the base for defining and modeling project management problems. Chapter 2 explores the fundamentals of organizing and managing projects from an organization's perspective. Issues related to project team formation, the role of project managers, and organization types are discussed. Chapter 3 is devoted to project planning and network modeling of projects, covering fundamental concepts such as project scope, Work Breakdown Structure (WBS), Organizational Breakdown Structure (OBS), Cost Breakdown Structure (CBS), project network modeling, activity duration, and cost estimating, activity-based costing (ABC), data and knowledge management. Chapter 4 introduces deterministic scheduling models, which can be used in constructing the time schedules. Models employing time-based and finance-based objectives are introduced. The CPM is covered. The unconstrained version of maximizing Net Present Value (NPV) is also treated here together with the case of time-dependent cash flows. Chapter 5 focuses on the time/cost trade-off problem, explaining how to reduce the duration of some of the activities and therefore reduce the project duration at the expense of additional costs. This topic is addressed for both continuous and discrete cases. Chapter 6 discusses models and methods of scheduling under uncertain activity durations. PERT is introduced for minimizing the expected project duration and extended to the PERT-Costing method for minimizing the expected project cost. Simulation is presented as another approach for dealing with the uncertainty in activity durations and costs. To demonstrate the use of the PERT, a case study on constructing an earthquake-resistant residential house is presented. Classifications of resource and schedule types are given in Chapter 7, and exact and heuristic solution procedures for the single- and multi-mode resource constrained project scheduling problem (RCPSP) are presented. The objective of maximizing NPV under resource constraints is addressed, and the capital-constrained project scheduling model is introduced. In Chapter 8, resource leveling, and further resource management problems are introduced. Total adjustment cost and resource availability cost problems are introduced. Various exact models are investigated. A heuristic solution procedure for the resource leveling problem is presented in detail. Also, resource portfolio management policies and the resource portfolio management problem are discussed. A case study on resource leveling dealing with the annual audit project of a major corporation is presented. Project contract types and payment schedules constitute the topics of Chapter 9. Contracts are legal documents reflecting the results of some form of client-contractor negotiations and sometimes of a bidding process, which deserve closer attention. Identification and allocation of risk in contracts, project control issues, disputes, and resolution management are further topics covered in this Chapter. A bidding model is presented to investigate client-contractor negotiations and the bidding process from different aspects. Chapter 10 focuses on processes and methods for project monitoring and control. Earned Value Management is studied to measure the project performance throughout the life of a project and to estimate the expected project time and cost based on the current status of the project. How to incorporate inflation into the analysis is presented. In Chapter 11, qualitative and quantitative techniques including decision trees, simulation, and software applications are introduced. Risk phases are defined and building a risk register is addressed. An example risk breakdown structure is presented. The design of risk management processes is introduced, and risk response planning strategies are discussed. At the end of the Chapter, the quantitative risk analysis is demonstrated at the hand of a team discussion case study. Chapter 12 covers several models and approaches dealing with various stochastic aspects of the decision environment. Stochastic models, generation of robust schedules, use of reactive and fuzzy approaches are presented. Sensitivity and scenario analysis are introduced. Also, simulation analysis, which is widely used to analyze the impacts of uncertainty on project goals, is presented. Chapter 13 addresses repetitive projects that involve the production or construction of similar units in batches such as railway cars or residential houses. Particularly in the construction industry repetitive projects represent a large portion of the work accomplished in this sector of the economy. A case study on the 50 km section of a motorway project is used for demonstrating the handling of repetitive project management. How best to select one or more of a set of candidate projects to maintain a project portfolio is an important problem for project-based organizations with limited resources. The project selection problem is inherently a multi-objective problem and is treated as such in Chapter 14. Several models and solution techniques are introduced. A multi-objective, multi-period project selection and scheduling model is presented. A case study that addresses a project portfolio selection and scheduling problem for the construction of a set of dams in a region is presented. Finally, Chapter 15 discusses three promising research areas in project management in detail: (i) Sustainability and Project Management, (ii) Project Management in the Era of Big Data, and (iii) the Fourth Industrial Revolution and the New Age Project Management. We elaborate on the importance of sustainability in project management practices, discuss how developments in data analytics might impact project life cycle management, and speculate how the infinite possibilities of the Fourth Industrial Revolution and the new technologies will transform project management practices.

Offering real-world strategies gleaned from years of professional experience, this book contains the essential tools to prepare a well-organized, efficient, and effective working production schedule for successful construction outcomes. The only guide to address the day-to-day needs with hands-on problem resolution strategies, the author views the industry from an insider's perspective and depicts the integral role of a project scheduler in the design of lucrative schemes and layouts for contemporary residential, commercial, industrial, and civil construction ventures. It builds the necessary skills for project schedulers, one of the fastest-growing career specialties in the construction industry.

The performance of an company depends both on its technologicalexpertise and its managerial and organizational effectiveness.Production management is an important part of the process formanufacturing firms. The organization of production relies ingeneral on the implementation of a certain number of basicfunctions, among which the scheduling function plays an essentialrole. This title presents recently developed methods for resolvingscheduling issues. The basic concepts and the methods of productionscheduling are introduced and advanced techniques are discussed,providing readers with a comprehensive and accessible guide toemploying this process.

This book provides a theoretical and application-oriented analysis of deterministic scheduling problems in advanced planning and computer systems. The text examines scheduling problems across a range of parameters: job priority, release times, due dates, processing times, precedence constraints, resource usage and more, focusing on such topics as computer systems and supply chain management. Discussion includes single and parallel processors, flexible shops and manufacturing systems, and resource-constrained project scheduling. Many applications from industry and service operations management and case studies are described. The handbook will be useful to a broad audience, from researchers to practitioners, graduate and advanced undergraduate students.

Proceedings of 3rd International Conference on Computer Science, Applied Mathematics and Applications - ICCSAMA 2015

Principles of Sequencing and Scheduling

4th International Conference, ICAOR 2012, Bangkok, Thailand, July 25-27, 2012, Proceedings

Advances in Natural Computation

A Research Handbook

AsiaSim 2013

Our objectives in writing Project Scheduling: A Research Handbook are threefold: (1) Provide a unified scheme for classifying the numerous project scheduling problems occurring in practice and studied in the literature; (2) Provide a unified and up-to-date treatment of the state-of-the-art procedures developed for their solution; (3) Alert the reader to various important problems that are still in need of considerable research effort. Project Scheduling: A Research Handbook has been divided into four parts. Part I consists of three chapters on the scope and relevance of project scheduling, on the nature of project scheduling, and finally on the introduction of a unified scheme that will be used in subsequent chapters for the identification and classification of the project scheduling problems studied in this book. Part II focuses on the time analysis of project networks. Part III carries the discussion further into the crucial topic of scheduling under scarce resources. Part IV deals with robust scheduling and stochastic scheduling issues. Numerous tables and figures are used throughout the book to enhance the clarity and effectiveness of the discussions. For the interested and motivated reader, the problems at the end of each chapter should be considered as an integral part of the presentation.

This book surveys the current state-of-the-art in operations research. The book summarizes the current developments and theoretical achievements in the field, including project uncertainty and grid resource management. It further covers the range of the key models in the field, including deterministic, probabilistic, single- and multi-mode, single- and multi-objective, and a general model on discrete-continuous resources.

"STAIRS 2006 is the third European Starting AI Researcher Symposium, an international meeting aimed at AI researchers, from all countries, at the beginning of their career: PhD students or people holding a PhD for less than one year. The topics of the papers included range from traditional AI areas to AI applications, such as Agents, Automated Reasoning, Belief Revision, Case-based Reasoning, Constraints, Data Mining & Information Extraction, Genetic Algorithms, Human Computer Interaction, Interactive Sensory Systems (Speech, Multi-Model Processing), Knowledge Representation, Logic Programming, Machine Learning, Natural Language Processing, Neural Networks, Nonmonotonic Reasoning, Planning & Scheduling, Reasoning about Action and Change, Robotics, Search, Semantic Web, Spatial & Temporal Reasoning and Uncertainty."

This volume contains the extended versions of papers presented at the 3rd International Conference on Computer Science, Applied Mathematics and Applications (ICCSAMA 2015) held on 11-13 May, 2015 in Metz, France. The book contains 5 parts: 1. Mathematical programming and optimization: theory, methods and software, Operational research and decision making, Machine learning, data security, and bioinformatics, Knowledge information system, Software engineering. All chapters in the book discuss theoretical and algorithmic as well as practical issues connected with computation methods & optimization methods for knowledge engineering and machine learning techniques.

Methods, Techniques, and Advancements

Results of the Workshop on Computational Optimization WCO 2014

Handbook on Scheduling

Population-Based Approaches to the Resource-Constrained and Discrete-Continuous Scheduling

Handbook of Research on Technology Project Management, Planning, and Operations

The Sixth International Symposium on Neural Networks (ISNN 2009)

Data Envelopment Analysis (DEA) is a relatively new "data-oriented" approach for evaluating the performances of a set of entities called Decision-Making Units (DMUs) which convert multiple inputs into multiple outputs. DEA has been used in evaluating the performances of many different kinds of entities engaged in many different kinds of activities in many different contexts. It has opened up possibilities for use in cases which have been resistant to other approaches because of the complex and often unknown nature of the relations between the multiple inputs and outputs involved in many of these activities, which are often reported in non-commeasurable units. DEA has also been used to supply new insights into activities and entities that have previously been evaluated by othermethods. This handbook is intended to represent a milestone in the progression of DEA. Written by experts, who are often major contributors to the topics to be covered, it includes a comprehensive review and discussion of basic DEA models, extensions to the basic DEA methods, and a collection of DEA applications in the areas of banking, education, sports, retail, health care, and a review of current DEA software technology. This handbook's chapters are organized into three categories: (i) basic DEA models, concepts, and their extensions; (ii) DEA

applications; and (iii) xii Preface DEA software packages. The first category consists of eleven chapters.

This era of science and engineering has attracted researchers tasked with evaluating performance and optimization of problems in the field of operations research. The book covers mathematical analysis, methods and applications involving processes such as system performance, optimization, inventory theory, reliability theory, and queueing theory. Operations Research: Methods, Techniques, and Advancements explores recent and innovative methods and advancements associated with the mathematical theory of operations research. It offers a detailed overview of mathematical modelling for general industrial systems and emphasizes the latest ideas for the benefit of society and the research community. Intended for a broad range of readers, this book is useful to academicians, industrialists, researchers, students, academia and specialists from various disciplines and those working in the industry.

Due to the increasing importance of product differentiation and collapsing product life cycles, a growing number of value-adding activities in the industry and service sector are organized in projects. Projects come in many forms, often taking considerable time and consuming a large amount of resources. The management and scheduling of projects represents a challenging task, and project performance may have a considerable impact on an organization's competitiveness. This handbook presents state-of-the-art approaches to project management and scheduling. More than sixty contributions written by leading experts in the field provide an authoritative survey of recent developments. The book serves as a comprehensive reference, both, for researchers and project management professionals. The handbook consists of two volumes. Volume 1 is devoted to single-modal and multi-modal project scheduling. Volume 2 presents multi-project problems, project scheduling under uncertainty and vagueness, managerial approaches and a separate part on applications, case studies and information systems.

This collection of recent studies spans a range of computational intelligence applications, emphasizing their application to challenging real-world problems. Covers Intelligent agent-based algorithms, Hybrid intelligent systems, Machine learning and more.

From Theory to Applications

Application of Mathematics and Optimization in Construction Project Management

Proceedings of the 4th International Conference on Modelling, Computation and Optimization in Information Systems and Management Sciences - MCO 2021

Handbook of Genetic Programming Applications

From Theory to Practice

Advances in Manufacturing, Production Management and Process Control

The implementation discussion is illustrated with a real-world example of the methods and system in use.

Repetitive Project Scheduling: Theory and Methods is the first book to comprehensively, and systematically, review new methods for scheduling repetitive projects that have been developed in response to the weaknesses of the most popular method for project scheduling, the Critical Path Method (CPM). As projects with significant levels of repetitive scheduling are common in construction and engineering, especially construction of buildings with multiple stories, highways, tunnels, pipelines, power distribution networks, and so on, the book fills a much needed gap, introducing the main repetitive project scheduling methods, both comprehensively and systematically. Users will find valuable information on core methodologies, including how to identify the controlling path and controlling segment, how to convert RSM to a network model, and examples based on practical scheduling problems. Introduces the repetitive scheduling method with analysis of the pros and cons, as well as the latest developments Discusses the two basic theoretical topics, identifying the controlling path and transferring the RSM to a network model Focuses on practical problems and algorithms Provides an essential resource for researchers, managers, and engineers in the field of engineering project and construction management

Project scheduling problems are, generally speaking, the problems of allocating scarce resources over time to perform a given set of activities. The resources are nothing other than the arbitrary means which activities complete for. Also the activities can have a variety of interpretations. Thus, project scheduling problems appear in a large spectrum of real-world situations, and, in consequence, they have been intensively studied for almost fourty years. Almost a decade has passed since the multi-author monograph: R. Slowinski, 1. W~glarz (eds.), Advances in Project Scheduling, Elsevier, 1989, summarizing the state-of-the-art across project scheduling problems, was published. Since then, considerable progress has been made in all directions of modelling and finding solutions to these problems. Thus, the proposal by Professor Frederick S. Hillier to edit a handbook which reports on the recent advances in the field came at an exceptionally good time and motivated me to accept the challenge. Fortunately, almost all leading experts in the field have accepted my invitation and presented their completely new advances often combined with expository surveys. Thanks to them, the handbook stands a good chance of becoming a key reference point on the current state-of-the-art in project scheduling, as well as on new directions in the area. The contents are divided into four parts. The first one, dealing with classical models -exact algorithms, is preceded by a proposition of the classification scheme for scheduling problems.

This contributed volume, written by leading international researchers, reviews the latest developments of genetic programming (GP) and its key applications in solving current real world problems, such as energy conversion and management, financial analysis, engineering modeling and design, and software engineering, to

name a few. Inspired by natural evolution, the use of GP has expanded significantly in the last decade in almost every area of science and engineering. Exploring applications in a variety of fields, the information in this volume can help optimize computer programs throughout the sciences. Taking a hands-on approach, this book provides an invaluable reference to practitioners, providing the necessary details required for a successful application of GP and its branches to challenging problems ranging from drought prediction to trading volatility. It also demonstrates the evolution of GP through major developments in GP studies and applications. It is suitable for advanced students who wish to use relevant book chapters as a basis to pursue further research in these areas, as well as experienced practitioners looking to apply GP to new areas. The book also offers valuable supplementary material for design courses and computation in engineering.

An Introduction to Project Modeling and Planning
Perspectives in Modern Project Scheduling
13th International Conference on Systems Simulation, Singapore, November 6-8, 2013. Proceedings

Recent Models, Algorithms and Applications
Handbook on Project Management and Scheduling Vol.1

Due to the increasing importance of product differentiation and collapsing product life cycles, a growing number of value-adding activities in the industry and service sector are organized in projects. Projects come in many forms, often taking considerable time and consuming a large amount of resources. The management and scheduling of projects represents a challenging task and project performance may have a considerable impact on an organization's competitiveness. This handbook presents state-of-the-art approaches to project management and scheduling. More than sixty contributions written by leading experts in the field provide an authoritative survey of recent developments. The book serves as a comprehensive reference, both, for researchers and project management professionals. The handbook consists of two volumes. Volume 1 is devoted to single-modal and multi-modal project scheduling. Volume 2 presents multi-project problems, project scheduling under uncertainty and vagueness, managerial approaches and a separate part on applications, case studies and information systems.

These proceedings gather contributions presented at the 4th International Conference on Applied Operational Research (ICAOR 2012) in Bangkok, Thailand, July 25-27, 2012, published in the series Lecture Notes in Management Science (LNMS). The conference covers all aspects of Operational Research and Management Science (OR/MS) with a particular emphasis on applications.

The three volume set LNCS 3610, LNCS 3611, and LNCS 3612 constitutes the refereed proceedings of the First International Conference on Natural Computation, ICNC 2005, held in Changsha, China, in August 2005 as a joint event with the Second International Conference on Fuzzy Systems and Knowledge Discovery FSKD 2005 (LNAI volumes 3613 and 3614). The program committee selected 313 carefully revised full papers and 189 short papers for presentation in three volumes from 1887 submissions. The first volume includes all the contributions related to learning algorithms and architectures in neural networks, neurodynamics, statistical neural network models and support vector machines, and other topics in neural network models; cognitive science, neuroscience informatics, bioinformatics, and bio-medical engineering, and neural network applications such as communications and computer networks, expert system and informatics, and financial engineering. The second volume concentrates on neural network applications as pattern recognition and diagnostics, robotics and intelligent control, signal processing and multi-media, and other neural network applications; evolutionary learning, artificial immune systems, evolutionary theory, membrane, molecular, DNA computing, and ant colony systems. The third volume deals with evolutionary methodology, quantum computing, swarm intelligence and intelligent agents; natural computation applications as bioinformatics and bio-medical engineering, robotics and intelligent control, and other applications of natural computation; hardware implementations of natural computation, and fuzzy neural systems as well as soft computing.

This volume of Advances in Soft Computing and Lecture Notes in Computer th Science vols. 5551, 5552 and 5553, constitute the Proceedings of the 6 Inter- tional Symposium of Neural Networks (ISNN 2009) held in Wuhan, China during May 26–29, 2009. ISNN is a prestigious annual symposium on neural networks with past events held in Dalian (2004), Chongqing (2005), Chengdu (2006), N- jing (2007) and Beijing (2008). Over the past few years, ISNN has matured into a well-established series of international conference on neural networks and their applications to other fields. Following this tradition, ISNN 2009 provided an a- demic forum for the participants to disseminate their new research findings and discuss emerging areas of research. Also, it created a stimulating environment for the participants to interact and exchange information on future research challenges and opportunities of neural networks and their applications. ISNN 2009 received 1,235 submissions from about 2,459 authors in 29 co- tries and regions (Australia, Brazil, Canada, China, Democratic People's Republic of Korea, Finland, Germany, Hong Kong, Hungary, India, Islamic Republic of Iran, Japan, Jordan, Macao, Malaysia, Mexico, Norway, Qatar, Republic of Korea, Singapore, Spain, Taiwan, Thailand, Tunisia, United Kingdom, United States, Venezuela, Vietnam, and Yemen) across six continents (Asia, Europe, North America, South America, Africa, and Oceania). Based on rigorous reviews by the Program Committee members and reviewers, 95 high-quality papers were selected to be published in this volume.

Resource Allocation in Project Management

First International Conference, ICNC 2005, Changsha, China, August 27-29, 2005, ProceedingsPart III
Proceedings of the 22nd ISPE Inc. International Conference on Concurrent Engineering, July 20-23, 2015
Operations Research
Modelling, Computation and Optimization in Information Systems and Management Sciences
Models and Algorithms for Computer and Manufacturing Systems

"This book provides a compendium of terms, definitions and explanations of concepts, processes and acronyms that reflect the growing trends, issues, and applications of technology project management"--Provided by publisher.

This book constitutes the refereed proceedings of the 13th International Conference on Systems Simulation, Asia Simulation 2013, held in Singapore, in November 2013. The 45 revised full papers presented together with 18 short papers were carefully reviewed and selected from numerous submissions. The papers address issues such as agent based simulation, scheduling algorithms, simulation methods and tools, simulation and visualization, modeling methodology, simulation in science and engineering, high performance computing and simulation and parallel and distributed simulation.

This book addresses two of the most difficult and computationally intractable classes of problems: discrete resource constrained scheduling, and discrete-continuous scheduling. The first part of the book discusses problems belonging to the first class, while the second part deals with problems belonging to the second class. Both parts together offer valuable insights into the possibility of implementing modern techniques and tools with a view to obtaining high-quality solutions to practical and, at the same time, computationally difficult problems. It offers a valuable source of information for practitioners dealing with the real-world scheduling problems in industry, management and administration. The authors have been working on the respective problems for the last decade, gaining scientific recognition through publications and active participation in the international scientific conferences, and their results are obtained using population-based methods. Dr E. Ratajczk-Ropel explores multiple agent and A-Team concepts, while Dr A. Skakovski focuses on evolutionary algorithms with a particular focus on the population learning paradigm.

Project SchedulingA Research HandbookSpringer Science & Business Media
Transdisciplinary Lifecycle Analysis of Systems
Advanced Computational Methods for Knowledge Engineering
Evolving Toolbox for Complex Project Management
Applications and Implementations
Project Scheduling with Time Windows and Scarce Resources
Just-in-Time Scheduling

From the Preface: This festschrift is devoted to recognize the career of a man who not only witnessed the growth of operations research from its inception, but also contributed significantly to this growth. Dr. Salah E. Elmaghraby received his doctorate degree from Cornell University in 1958, and since then, his scholarly contributions have enriched the fields of production planning and scheduling and project scheduling. This collection of papers is contributed in his honor by his students, colleagues, and acquaintances. It offers a tribute to the inspiration received from his work, and from his guidance and advice over the years, and recognizes the legacy of his many contributions. Dr. Elmaghraby is a pioneer in the area of project scheduling (in particular, project planning and control through network models, for which he coined the term 'activity networks'.) In his initial work in this area, he developed an algebra based on signal flow graphs and semi-Markov processes for analyzing generalized activity networks involving activities with probabilistic durations. This work led to the development of what was later known as the Graphical Evaluation and Review Technique (GERT), and GERT simulation models. He has made fundamental contributions in determining criticality indices for activities, in developing methodologies for project compression and time/cost analysis, and in the use of stochastic and chance-constrained programming and Petri Nets for the analysis of activity networks. This volume brings together fourteen contributions, which can be viewed under the following three main themes: operations research and its application in production planning; project scheduling, and production scheduling, inspired by, and in many cases based on, Dr. Elmaghraby's work in these areas. The first five chapters are devoted to the first theme, followed by four chapters each devoted to the other two, respectively. An additional chapter is devoted to the vulnerability of multimodal freight systems.

This book discusses the latest advances in manufacturing and process control, with a special emphasis on digital manufacturing and intelligent technologies for manufacturing and industrial processes control. The human aspect of the developed technologies and products, their interaction with the users, as well as sustainability issues, are covered in detail. Development of new products using 3D printers, rapid prototyping systems, remote fabrication, and other advanced

techniques, is described in detail, highlighting the state-of-the-art and current challenges. Other key topics include digital modeling systems and additive manufacturing, together with their applications in a number of fields, e.g in bioengineering/biomedicine, in the aerospace, maritime and military fields or for archeological and historical purposes, such as preserving structures, but not limited to this. The book is based on three AHFE 2018 affiliated conferences i.e. the AHFE 2018 International Conference on Advanced Production Management and Process Control, the AHFE 2018 International Conference on Human Aspects of Advanced Manufacturing, and the AHFE 2018 International Conference on Additive Manufacturing, Modeling Systems and 3D Prototyping, which were held on July 21-25, 2018, in Orlando, Florida, USA.

Concurrent Engineering (CE) is based on the premise that different phases of a product's lifecycle should be conducted concurrently and initiated as early as possible within the Product Creation Process (PCP). It has become the substantive basic methodology in many industries, including automotive, aerospace, machinery, shipbuilding, consumer goods, process industry and environmental engineering. CE aims to increase the efficiency of the PCP and reduce errors in later phases while incorporating considerations for full lifecycle and through-life operations. This book presents the proceedings of the 22nd ISPE Inc. (International Society for Productivity Enhancement) International Conference on Concurrent Engineering (CE2015) entitled 'Transdisciplinary Lifecycle Analysis of Systems', and held in Delft, the Netherlands, in July 2015. It is the second in the series 'Advances in Transdisciplinary Engineering'. The book includes 63 peer reviewed papers and 2 keynote speeches arranged in 10 sections: keynote speeches; systems engineering; customization and variability management; production oriented design, maintenance and repair; design methods and knowledge-based engineering; multidisciplinary product management; sustainable product development; service oriented design; product lifecycle management; and trends in CE. Containing papers ranging from the theoretical and conceptual to the highly pragmatic, this book will be of interest to all engineering professionals and practitioners; researchers, designers and educators.

Robust Project Scheduling is to review the fundamentals of robust project scheduling through the deployment of proactive/reactive project scheduling procedures.

Joint proceedings of the AHFE 2018 International Conference on Advanced Production Management and Process Control, the AHFE International Conference on Human Aspects of Advanced Manufacturing, and the AHFE International Conference on Additive Manufacturing, Modeling Systems and 3D Prototyping, July 21-25, 2018, Loews Sapphire Falls Resort at Universal Studios, Orlando, Florida, USA

Handbook on Data Envelopment Analysis

Resource-Constrained Project Scheduling

Recent Advances in Computational Optimization

STAIRS 2006

Models, Algorithms, Extensions and Applications

The book is devoted to structural issues, algorithms, and applications of resource allocation problems in project management. Special emphasis is given to a unifying framework within which a large variety of project scheduling problems can be treated. Those problems involve general temporal constraints among project activities, different types of scarce resources, and a broad class of regular and nonregular objective functions ranging from time-based and financial to resource levelling functions. The diversity of the models proposed allows for covering many features arising in scheduling applications beyond the field of project management such as short-term production planning in the manufacturing or process industries.

As supply chain management has matured, maintaining the precise flow of goods to manage schedules (and minimize inventories) on a just-in-time basis still presents major challenges. This has inspired an array of models and algorithms to help ensure the precise flow of components and final products into inventories to meet just-in-time requirements. This is the first survey of the theoretical work on computer systems models and algorithms utilized in just-in-time scheduling.

The topic of this book is known as dynamic scheduling, and is used to refer to three dimensions of project management and scheduling: the construction of a baseline schedule and the analysis of a project schedule's risk as preparation of the project control phase during project progress. This dynamic scheduling point of view implicitly assumes that the usability of a project's baseline schedule is rather limited and only acts as a point of reference in the project life cycle. Consequently, a project schedule should especially be considered as nothing more than a predictive model that can be used for resource efficiency calculations, time and cost risk analyses, project tracking and performance measurement, and so on. In this book, the three dimensions of dynamic scheduling are highlighted in detail and are based on and inspired by a combination of academic research studies at Ghent University (www.ugent.be), in-company trainings at Vlerick Business School (www.vlerick.com) and consultancy projects at OR-AS (www.or-as.be). First, the construction of a project baseline schedule is a central theme throughout the various chapters of the book, and is discussed from a complexity point of view with and without the presence of project resources. Second, the creation of an awareness of the weak parts in a baseline schedule is discussed at the end of the two baseline scheduling parts as schedule risk analysis techniques that can be applied on top of the baseline schedule. Third, the baseline schedule and its risk analyses can be used as guidelines during the project control step where actual deviations can be corrected within the margins of the project's time and cost reserves. The second edition of this book has seen corrections, additions and amendments in detail throughout the book. Moreover Chapter 15 on "Dynamic Scheduling with ProTrack" has been completely rewritten and extended with a section on "ProTrack as a research tool".

This book provides both the research and practitioner communities with a comprehensive coverage of the metaheuristic methodologies that have proven to be successful in a wide variety of real-world problem settings. Moreover, it is these metaheuristic strategies that hold particular promise for success in the future. The various chapters serve as stand alone presentations giving both the necessary background underpinnings as well as practical guides for implementation.

Project Scheduling
Intelligent Support Systems for Marketing Decisions
Project Scheduling Handbook
Project Management with Dynamic Scheduling
A Festschrift in Honor of Salah Elmaghraby
Robust Project Scheduling

An updated edition of the text that explores the core topics in scheduling theory The second edition of Principles of Sequencing and Scheduling has been revised and updated to provide comprehensive coverage of sequencing and scheduling topics as well as emerging developments in the field. The text offers balanced coverage of deterministic models and stochastic models and includes new developments in safe scheduling and project scheduling, including coverage of project analytics. These new topics help bridge the gap between classical scheduling and actual practice. The authors—noted experts in the field—present a coherent and detailed introduction to the basic models, problems, and methods of scheduling theory. This book offers an introduction and overview of sequencing and scheduling and covers such topics as single-machine and multi-machine models, deterministic and stochastic problem formulations, optimization and heuristic solution approaches, and generic and specialized software methods. This new edition adds coverage on topics of recent interest in shop scheduling and project scheduling. This important resource: Offers comprehensive coverage of deterministic models as well as recent approaches and developments for stochastic models Emphasizes the application of generic optimization software to basic sequencing problems and the use of spreadsheet-based optimization methods Includes updated coverage on safe scheduling, lognormal modeling, and job selection Provides basic coverage of robust scheduling as contrasted with safe scheduling Adds a new chapter on project analytics, which supports the PERT21 framework for project scheduling in a stochastic environment. Extends the coverage of PERT 21 to include hierarchical scheduling Provides end-of-chapter references and access to advanced Research Notes, to aid readers in the further exploration of advanced topics Written for upper-undergraduate and graduate level courses covering such topics as scheduling theory and applications, project scheduling, and operations scheduling, the second edition of Principles of Sequencing and Scheduling is a resource that covers scheduling techniques and contains the most current research and emerging topics.

This book enhances learning about complex project management principles and practices through the introduction and discussion of a portfolio of tools presented as an evolving toolbox. Throughout the book, industry practitioners examine the toolsets that are part of the toolbox to develop a broader understanding of complex project management challenges and the available tools to address them. This approach establishes a dynamic, structured platform for a comprehensive analysis and assessment of the modern, rapidly changing, multifaceted business environment to teach the next generation of project managers to successfully cope with the ever increasing complexity of the 21st century.

A survey of the state of the art of deterministic resource-constrained project scheduling with time windows. General temporal constraints and several different types of limited resources are considered. A large variety of time-based, financial, and resource-based objectives – important in practice – are studied. A thorough structural analysis of the feasible region of project scheduling problems and a classification and detailed investigation of objective functions are performed, which can be exploited for developing efficient exact and heuristic solution methods. New interesting applications of project scheduling to production and operations management as well as investment projects are discussed in the second edition.

This title presents a large variety of models and algorithmsdedicated to the resource-constrained project scheduling problem(RCPSP), which aims at scheduling at minimal duration a set ofactivities subject to precedence constraints and limited resourceavailabilities. In the first part, the standard variant of RCPSP is presented andanalyzed as a combinatorial optimization problem. Constraintprogramming and integer linear programming formulations are given.Relaxations based on these formulations and also on relatedscheduling problems are presented. Exact methods and heuristics aresurveyed. Computational experiments, aiming at providing anempirical insight on the difficulty of the problem, areprovided. The second part of the book focuses on several other variants ofthe RCPSP and on their solution methods. Each variant takes accountof real-life characteristics which are not

considered in thestandard version, such as possible interruptions of activities,production and consumption of resources, cost-based approaches anduncertainty considerations. The last part presents industrial case studies where the RCPSPplays a central part. Applications are presented in various domainssuch as assembly shop and rolling ingots production scheduling,project management in information technology companies andinstruction scheduling for VLIW processor architectures.

Handbook on Project Management and Scheduling Vol. 2

Repetitive Project Scheduling: Theory and Methods

Applied Operational Research

Baseline Scheduling, Risk Analysis and Project Control

Computational Intelligence in Optimization

Essays in Production, Project Planning and Scheduling

This volume is a comprehensive collection of extended contributions from the Workshop on Computational Optimization 2014, held at Warsaw, Poland, September 7-10, 2014. The book presents recent advances in computational optimization. The volume includes important real problems like parameter settings for controlling processes in bioreactor and other processes, resource constrained project scheduling, infection distribution, molecule distance geometry, quantum computing, real-time management and optimal control, bin packing, medical image processing, localization the abrupt atmospheric contamination source and so on. It shows how to develop algorithms for them based on new metaheuristic methods like evolutionary computation, ant colony optimization, constrain programming and others. This research demonstrates how some real-world problems arising in engineering, economics, medicine and other domains can be formulated as optimization tasks.

Proceedings of the Third Starting AI Researchers' Symposium

Production Scheduling

Temporal and Resource-Constrained Project Scheduling with Regular and Nonregular Objective Functions

Handbook of Metaheuristics