Practice Of Petri Nets In Manufacturing 1st Edition

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Modeling Discrete-Event Systems with GPenSIM Reggie Davidrajuh 2018-02-28 Modeling Discrete-Event Systems with GPenSIM describes the design and applications of General Purpose Petri Net Simulator (GPenSIM), which is a software tool for modeling, simulation, and performance analysis of discrete-event systems. The brief explains the principles of modelling discrete-event systems, as well as the design and applications of GPenSIM. It is based on the author's lectures that were given on "modeling, simulation, and performance analysis of discrete event systems". The brief uses GPenSIM to enable the efficient modeling of complex and large-scale discrete-event systems. GPenSIM, which is based on MATLAB®, is designed to allow easy integration of Petri

net models with a vast number of toolboxes that are available on the MATLAB®. The book offers an approach for developing models that can interact with the external environment; this will help readers to solve problems in industrial diverse fields. These problems include: airport capacity evaluation for aviation authorities; finding bottlenecks in supply chains; scheduling drilling operations in the oil and gas industry; and optimal scheduling of jobs in grid computing. This brief is of interest to researchers working on the modeling, simulation and performance evaluation of discrete-event systems, as it shows them the design and applications of an efficient modeling package. Since the book also explains the basic principles of modeling discrete-event systems in a step-by-step manner, it is also of interest to final-year undergraduate and postgraduate students.

Nutritional Care of the Patient with Gastrointestinal Disease - Alan L Buchman 2015-08-06

This evidence-based book serves as a clinical manual as well as a reference guide for the diagnosis and management of common nutritional issues in relation to gastrointestinal disease. Chapters cover nutrition assessment; macro- and micronutrient absorption; malabsorption; food allergies; prebiotics and dietary fiber; probiotics and intestinal microflora; nutrition and GI cancer; nutritional management of reflux; nutrition in IBS and IBD; nutrition in acute and chronic pancreatitis; enteral nutrition; parenteral nutrition; medical and endoscopic therapy of obesity; surgical therapy of obesity; pharmacologic nutrition, and nutritional counseling.

Application and Theory of Petri Nets - Lars M. Kristensen 2011-06-28

This book constitutes the refereed proceedings of the 32nd International Conference on Applications and Theory of Petri Nets and Other Models of Concurrency, PETRI NETS 2011, held in Newcastle, UK, in June 2011. The 13 regular

papers and 4 tool papers presented were carefully reviewed and selected from 49 submissions. The book also contains 3 full paper length invited talks. All current issues on research and development in the area of Petri nets and related models of concurrent systems are addressed.

Analysis and Design of Hybrid Systems 2006 - Christos Cassandras 2006-11-21

This volume contains the proceedings of Analysis and Design of Hybrid Systems 2006: the 2nd IFAC Conference on Analysis and Design of Hybrid Systems, organized in Alghero (Italy) on June 7-9, 2006. ADHS is a series of triennial meetings that aims to bring together researchers and practitioners with a background in control and computer science to provide a survey of the advances in the field of hybrid systems, and of their ability to take up the challenge of analysis, design and verification of efficient and reliable control systems. ADHS'06 is the second Conference of this series after ADHS'03 in Saint Malo. 65 papers selected through careful reviewing process Plenary lectures presented by three distinguished speakers Featuring interesting new research topics

Petri Nets in Flexible and Agile Automation - MengChu Zhou 2012-12-06

Over the past two decades, research in the theory of Petri nets and the development of graphical tools has yielded a powerful methodology. The contributions in Petri Nets in Flexible and Agile Automation present theoretical development of Petri nets as well as in industrial applications to areas such as discrete- event control design, scheduling, performance evaluation and deadlock avoidance. These contributions also include comparative studies of Petri nets and other approaches. A primary theme of this book is to provide a unified approach to the applications of Petri nets in flexible and agile automation and, in that regard, a common

notation and terminology is used. The book also allows readers to evaluate the benefits and applicability of state-of-the-art Petri net methods and apply CAD tools to problems of interest. Petri Nets in Flexible and Agile Automation is not only an essential reference for researchers, it is also a very useful tool for engineers, analysts and managers who are responsible for the design, implementation and operation of the next generation of manufacturing systems.

Production Scheduling Rodrigo Righi 2012-01-11

Generally speaking, scheduling is the procedure of mapping a set of tasks or jobs (studied objects) to a set of target resources efficiently. More specifically, as a part of a larger planning and scheduling process, production scheduling is essential for the proper functioning of a manufacturing enterprise. This book presents ten chapters divided into five sections. Section 1 discusses rescheduling strategies, policies, and methods for production scheduling. Section 2 presents two chapters about flow shop scheduling. Section 3 describes heuristic and metaheuristic methods for treating the scheduling problem in an efficient manner. In addition, two test cases are presented in Section 4. The first uses simulation, while the second shows a real implementation of a production scheduling system. Finally, Section 5 presents some modeling strategies for building production scheduling systems. This book will be of interest to those working in the decision-making branches of production, in various operational research areas, as well as computational methods design. People from a diverse background ranging from academia and research to those working in industry, can take advantage of this volume.

Design of Reconfigurable Logic Controllers - Andrei Karatkevich 2015-12-23

This book presents the original concepts and modern techniques for specification, synthesis, optimisation and implementation of parallel

logical control devices. It deals with essential problems of reconfigurable control systems like dependability, modularity and portability. Reconfigurable systems require a wider variety of design and verification options than the application-specific integrated circuits. The book presents a comprehensive selection of possible design techniques. The diversity of the modelling approaches covers Petri nets, state machines and activity diagrams. The preferences of the presented optimization and synthesis methods are not limited to increasing of the efficiency of resource use. One of the biggest advantages of the presented methods is the platform independence, the FPGA devices and single board computers are some of the examples of possible platforms. These issues and problems are illustrated with practical cases of complete control systems. If you expect a new look at the reconfigurable systems designing process or need ideas for improving the quality of the project, this book is a good choice.g process or need ideas for improving the quality of the project, this book is a good choice.

Petri Nets - Jean-Marie Proth 1996

The move of manufacturing systems towards automation, integration and flexibility has increased the importance of the design phase in the life cycle of a manufacturing system. Petri Nets are the only set of tools which can support functional specification, modelling and evaluation of the future behaviour of the manufacturing system. This book is dedicated to the use of Petri Nets for specifying, modelling and evaluating the performances of manufacturing systems. The first part of the book presents the theory of Petri Nets, covering most of the recent developments. Applications of Petri Nets to modelling, evaluation and management of manufacturing systems are addressed in the second part. Numerous worked examples and solved exercises are included. Specific algorithms for planning and

scheduling are provided. This book will be of great interest to students, factory engineers, managers and designers in both the academic and industrial worlds.

System Modeling and Control with Resource-Oriented Petri Nets - MengChu Zhou 2018-09-03

Petri nets are widely used in modeling, analysis, and control of discrete event systems arising from manufacturing, transportation, computer and communication networks, and web service systems. However, Petri net models for practical systems can be very large, making it difficult to apply such models to real-life problems. System Modeling and Control with Resource-Oriented Petri Nets introduces a new resource-oriented Petri net (ROPN) model that was developed by the authors. Not only does it successfully reduce model size, but it also offers improvements that facilitate effective modeling, analysis, and control of automated and reconfigurable manufacturing systems. Presenting the latest research in this novel approach, this cutting-edge volume provides proven theories and methodologies for implementing cost and time-saving improvements to contemporary manufacturing systems. It provides effective tools for deadlock avoidance—deadlock-free routing and deadlock-free scheduling. The authors supply simple and complex industrial manufacturing system examples to illustrate time-tested concepts, theories, and approaches for solving real-life application problems. Written in a clear and concise manner, the text covers applications to automated and reconfigurable manufacturing systems, automated guided vehicle (AGV) systems, semiconductor manufacturing systems, and flexible assembly systems. Explaining complex concepts in a manner that is easy to understand, the authors provide the understanding and tools needed for more effective modeling, analysis, performance evaluation, control, and scheduling of

engineering processes that will lead to more flexible and efficient manufacturing systems.

New Trends in Design of Control Systems 1994 - J. Mikles 2014-05-23

Computer control systems are developing rapidly, therefore an insight of the latest trends in the design of control systems will increase the success of future developments. This publication brings together the latest key papers on research and development trends in this field, allowing both academics and industrial practioners to find new insights and gain from each other's experience.

Lectures on Concurrency and Petri Nets - Jörg Desel 2004-07-09

This tutorial volume originates from the 4th Advanced Course on Petri Nets, ACPN 2003, held in Eichsttt, Germany in September 2003. In addition to lectures given at ACPN 2003, additional chapters have been commissioned to give a well-balanced presentation of the state of the art in the area. This book will be useful as both a reference for those working in the area as well as a study book for the reader who is interested in an up-to-date overview of research and development in concurrent and distributed systems; of course, readers specifically interested in theoretical or applicational aspects of Petri nets will appreciate the book as well.

Safety, Reliability and Risk Analysis - R.D.J.M. Steenbergen 2013-09-18

During the last decade there have been increasing societal concerns over sustainable developments focusing on the conservation of the environment, the welfare and safety of the individual and at the same time the optimal allocation of available natural and financial resources. As a consequence the methods of risk and reliability analysis are becomi

Production Engineering and Management under Fuzziness - Cengiz Kahraman 2010-05-19

Production engineering and management involve a series of planning and control activities in a production system. A

production system can be as small as a shop with only one machine or as big as a global operation including many manufacturing plants, distribution centers, and retail locations in multiple continents. The product of a production system can also vary in complexity based on the material used, technology employed, etc. Every product, whether a pencil or an airplane, is produced in a system which depends on good management to be successful. Production management has been at the center of industrial engineering and management science disciplines since the industrial revolution. The tools and techniques of production management have been so successful that they have been adopted to various service industries, as well. The book is intended to be a valuable resource to undergraduate and graduate students interested in the applications of production management under fuzziness. The chapters represent all areas of production management and are organized to reflect the natural order of production management tasks. In all chapters, special attention is given to applicability and wherever possible, numerical examples are presented. While the reader is expected to have a fairly good understanding of the fuzzy logic, the book provides the necessary notation and preliminary knowledge needed in each chapter.

Theory and Practice of Control and Systems - A Tornambe 1999-01-04

This volume gathers together all the lectures presented at the 6th IEEE Mediterranean Conference. It focuses on the mathematical aspects in the theory and practice of control and systems, including stability and stabilizability, robust control, adaptive control, robotics and manufacturing; these topics are under intense investigation and development in the engineering and mathematics communities. The volume should have immediate appeal for a large group of engineers and mathematicians

who are interested in very abstract as well as very concrete aspects of control and system theory. Contents: Quantified Multivariate Polynomial Inequalities: The Mathematics of (Almost) All Practical Control Design Problems (P Dorato)Digital Second Order Sliding Mode Control with Uncertainties Estimation for a Class of SISO Nonlinear Systems (G Bartolini et al.)Development and Identification of a Hierarchical System of Models for Rapid Prototyping of Si Engines (I Arsie et al.)Identification of Uncertainty Models for Robust Control Design (S Malan et al.)Second Order Chattering-Free Sliding Mode Control for Some Classes of Multi-Input Uncertain Nonlinear Systems (G Bartolini et al.)Sliding Mode Output Regulation of Linear and Nonlinear Systems with Relative Degree One (L Marconi et al.)Output Control of Nonlinear Systems with Multiple Discrete Delays (M Dalla Mora et al.)Analytical Synthesis of Least Curvature 2D Paths for Underwater Applications (G Indiveri et al.)Modelling and Control of Nonsmooth Hybrid Mechanical Systems (B Brogliato)Global Temperature Stabilization of Chemical Reactors with Bounded Control (R Antonelli & A Astolfi)Detection and Accommodation of Second Order Distributed Parameter Systems with Abrupt Changes in Input Term: Existence and Approximation (M A Demetriou et al.)Discrete-Event Models of Manufacturing Systems (E Canuto)Optimization of Internal Forces in Force-Closure Grasps (A Bicchi et al.)Loading Parts and Tools in a Flexible Manufacturing System (D Pacciarelli)and other papers Readership: Researchers in control & system theory, electrical & electronic engineering, mechanical & knowledge engineering and robotics.

Augmented Marked Graphs - King Sing Cheung 2014-06-26 Petri nets are a formal and theoretically rich model for the modelling and analysis of systems. A subclass of Petri nets, augmented marked

graphs possess a structure that is especially desirable for the modelling and analysis of systems with concurrent processes and shared resources. This monograph consists of three parts: Part I provides the conceptual background for readers who have no prior knowledge on Petri nets; Part II elaborates the theory of augmented marked graphs; finally, Part III discusses the application to system integration. The book is suitable as a first self-contained volume on augmented marked graphs, and will be useful to both researchers and practitioners in the fields of Petri nets and system integration.

Petri Nets for Systems Engineering - Claude Girault 2013-03-14

Using formal methods for the specification and verification of hardware and software systems is becoming increasingly important as systems increase in size and complexity. The aim of the book is to illustrate progress in formal methods based on Petri net formalisms. It presents both practical and theoretical foundations for the use of Petri nets in complex system engineering tasks. In doing so it bridges the gap between Petri nets and the systems modeling and implementation process. It contains a collection of examples arising from different fields, such as flexible manufacturing, telecommunication and workflow management systems.

Deadlock Resolution in Automated Manufacturing Systems - ZhiWu Li 2009-02-12

Deadlock problems in flexible manufacturing systems (FMS) have received more and more attention in the last two decades. Petri nets are one of the more promising mathematical tools for tackling deadlocks in various resource allocation systems. In a system modeled with Petri nets, siphons are tied to the occurrence of deadlock states as a structural object. The book systematically introduces the novel theory of siphons, traps, and elementary siphons of

Petri nets as well as the deadlock control strategies for FMS developed from it. Deadlock prevention methods are examined comparatively. The many FMS examples presented to demonstrate the concepts and results of this book range from the simple to the complex. Importantly, to inspire and motive the reader's interest in further research, a number of interesting and open problems in this area are proposed at the end of each chapter.

Formal Methods in Manufacturing Systems: Recent Advances - Li, Zhiwu 2013-05-31

Evolving technologies in mass production have led to the development of advanced techniques in the field of manufacturing. These technologies can quickly and effectively respond to various market changes, necessitating processes that focus on small batches of multiple products rather than large, single-product lines. Formal Methods in Manufacturing Systems: Recent Advances explores this shifting paradigm through an investigation of contemporary manufacturing techniques and formal methodologies that strive to solve a variety of issues arising from a market environment that increasingly favors flexible systems over traditional ones. This book will be of particular use to industrial engineers and students of the field who require a detailed understanding of current trends and developments in manufacturing tools. This book is part of the Advances in Civil and Industrial Engineering series collection.

Handbook of Production Management Methods - Gideon Halevi 2001-10-22

This unique book provides a guide to the selection of appropriate production and manufacturing methods for postgraduate and professional manufacturing engineers. It starts by helping the reader to identify the required objectives of industrial management for their particular situation. Having identified the objectives an analytical assessment of the

available production and management methods is made. The analytical system presents an objective method of production selection. For example, this practical book will help the reader to decide whether or not a local Just-in-Time process is needed or a full chain JIT method is needed. Alternatively the problem may be deciding between set-up time reduction or changeover time reduction. Should TQM be ceded to PCIs? This book covers nearly all methods of production and manufacturing and will prove the most comprehensive guide to choosing and using these methods. Only book of its kind available Widest coverage of methods available Analytical approach to decision making

Advances in Petri Nets Tauseef Aized 2010-09-27

The world is full of events which cause, end or affect other events. The study of these events, from a system point of view, is very important. Such systems are called discrete event dynamic systems and are of a subject of immense interest in a variety of disciplines, which range from telecommunication systems and transport systems to manufacturing systems and beyond. There has always been an intense need to formulate methods for modelling and analysis of discrete event dynamic systems. Petri net is a method which is based on a well-founded mathematical theory and has a wide application. This book is a collection of recent advances in theoretical and practical applications of the Petri net method and can be useful for both academia and industry related practitioners.

European Control Conference 1995 - 1995-09-05

Proceedings of the European Control Conference 1995, Rome, Italy 5-8 September 1995

Discrete, Continuous, and Hybrid Petri Nets René David 2010-11-09

Petri Nets were introduced and still successfully used to analyze and model discrete event systems especially in

engineering and computer sciences such as in automatic control. Recently this discrete Petri Nets formalism was successfully extended to continuous and hybrid systems. This monograph presents a well written and clearly organized introduction in the standard methods of Petri Nets with the aim to reach an accurate understanding of continuous and hybrid Petri Nets, while preserving the consistency of basic concepts throughout the book. The book is a monograph as well as a didactic tool which is easy to understand due to many simple solved examples and detailed figures. In its second completely reworked edition various sections, concepts and recently developed algorithms are added as well as additional examples/exercises.

Analysis and Design of Hybrid Systems 2003 (ADHS 03) - Sebastian Engell 2003-12-19

Before the Riders came to their remote valley the Yendri led a tranquil pastoral life. When the Riders conquered and enslaved them, only a few escaped to the forests. Rebellion wasn't the Yendri way; they hid, or passively resisted, taking consolation in the prophecies of their spiritual leader. Only one possessed the necessary rage to fight back: Gard the foundling, half-demon, who began a one-man guerrilla war against the Riders. His struggle ended in the loss of the family he loved, and condemnation from his own people. Exiled, he was taken as a slave by powerful mages ruling an underground kingdom. Bitterer and wiser, he found more subtle ways to earn his freedom. This is the story of his rise to power, his vengeance, his unlikely redemption and his maturation into a loving father--as well as a lord and commander of demon armies. Kage Baker, author of the popular and witty fantasy, The Anvil of the World, returns to that magical world for another story of love, adventure, and a fair bit of ironic humor. At the publisher's request, this title is being sold without Digital Rights Management software

(DRM) applied.

Intelligent Systems in Production Engineering and Maintenance – ISPEM 2017 - Anna Burduk 2017-08-16

The volume presents a collection of 44 peer-reviewed articles from the First International Conference on Intelligent Systems in Production Engineering and Maintenance (ISPEM 2017). ISPEM 2017 was organized by the Faculty of Mechanical Engineering, Wrocław University of Science and Technology and was held in Wrocław (Poland) on 28–29 September 2017. The main topics of the conference included the possibility of using widely understood intelligent methods in production engineering. New solutions for innovative plants, research results and case studies taking into account advances in production and maintenance from the point of view of Industry 4.0 were presented and discussed—with special attention paid to applications of intelligent systems, methods and tools in production engineering, maintenance, logistics, quality management, information systems, and product development. The volume is divided into two parts: 1. Intelligent Systems in Production Engineering 2. Intelligent Systems in Maintenance This book is an excellent reference resource for scientists in the field of manufacturing engineering and for top managers in production enterprises.

Hybrid Artificial Intelligent Systems - Francisco Javier Martínez de Pisón 2017-06-12

This volume constitutes the refereed proceedings of the 12th International Conference on Hybrid Artificial Intelligent Systems, HAIS 2017, held in La Rioja, Spain, in June 2017. The 60 full papers published in this volume were carefully reviewed and selected from 130 submissions. They are organized in the following topical sections: data mining, knowledge discovery and big data; bioinspired models and evolutionary computing; learning algorithms; visual analysis and advanced data

processing techniques; data mining applications; and hybrid intelligent applications.

Petri Nets for Modeling of Large Discrete Systems - Reggie Davidrajuh 2021-09-21

This book offers a new Modular Petri Net as a solution to the vast Petri net models. It presents some approaches centering around modules (known as “Petri modules”). The goal of this book is to introduce a methodology in which Petri nets are moved to a new level. In this new level, large Petri net models are made of Petri modules, which are independent and run on different computers. This book also contains the literature study on modular Petri nets and definitions for the newer Petri modules. Also, algorithms for extracting Petri modules, and algorithms for connecting Petri modules, and applications are given in this book. Besides, the ideas and algorithms given in this book are implemented in the software General-purpose Petri Net Simulator (GPenSIM). Hence, with the use of this book the readers/users would be able to know that real-life discrete event systems could be modeled, analyzed, and performance-optimized with GPenSIM.

Advances in Manufacturing - Adam Hamrol 2017-10-18

This book covers a variety of topics in material, mechanical, and management engineering, especially in the area of machine design, product assembly, measurement systems, process planning and quality control. It describes cutting-edge methods and applications, together with exemplary case studies. The content is based on papers presented at the 5th International Scientific-Technical Conference (MANUFACTURING 2017) held in Poznan, Poland on 24-26 October 2017. The book brings together engineering and economic topics, is intended as an extensive, timely and practice-oriented reference guide for researchers and practitioners, and is expected to foster better communication and closer cooperation

between universities and their business and industry partners.

Transactions on Petri Nets and Other Models of Concurrency V - Kurt Jensen 2012-03-26

This book presents 12 papers on Petri nets and other models of concurrency, ranging from theoretical work to tool support and industrial applications. Covers model checking and system verification, synthesis, work on specific classes of Petri nets and more.

Manufacturing Systems Control Design - Stjepan Bogdan 2006-08-02

This book covers all the steps from identification of operations and resources to the transformation of virtual models into real-world algorithms. The matrix-based approach presented here is a solution to the real-time application of control in discrete event systems and flexible manufacturing systems (FMS), and offers a sound practical basis for the design of controllers for manufacturing systems.

*Production Scheduling*Pierre Lopez 2013-03-01

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.

Petri Nets - Pawel Pawlewski 2012-08-29

Petri Nets were introduced in the doctoral dissertation by K.A. Petri, titled "Kommunikation mit Automaten" and published in

1962 by University of Bonn. Petri Nets are graphical (the intuitive graphical modeling language) and mathematical (advanced formal analysis method) tool. The concurrence of performed actions is the natural phenomenon due to which Petri Nets are perceived as mathematical tool for modeling concurrent systems. The main idea of this theory was modified by many researchers according to their needs, owing to the unusual "flexibility" of this theory. The present monograph focuses on Petri Nets applications in two main areas: manufacturing (section 1) and computer science (section 2). These two areas have still huge influence on our lives and our world. The theory of Petri Nets is still developing: some directions of investigations are presented in section 3. And at the end there is section 4 including some infesting facts concerning application of Petri Nets in the public area: the analysis and control of public bicycle sharing systems. The monograph shows the results of research works performed with use of Petri Nets in science centers all over the world.

Positive Systems: Theory and Applications - Luca Benvenuti 2003-07-25

The proceedings of the First Multidisciplinary International Symposium on Positive Systems Theory and Applications (POSTA 2003) held in Rome, Italy, August 28-30, 2003. Positive Systems are systems in which the relevant variables assume nonnegative values. These systems are quite common in applications where variables represent positive quantities such as populations, goods, money, time, data packets flowing in a network, densities of chemical species, probabilities, etc. The aim of the symposium was to join together researchers working in the different areas related to positive systems such as telecommunications, economy, biomedicine, chemistry and physics in order to provide a multidisciplinary forum where they have the opportunity to

exchange ideas and compare results in a unifying framework.

Distributed Embedded Controller Development with Petri Nets - Filipe de Carvalho Moutinho 2015-10-12

This book describes a model-based development approach for globally-asynchronous locally-synchronous distributed embedded controllers. This approach uses Petri nets as modeling formalism to create platform and network independent models supporting the use of design automation tools. To support this development approach, the Petri nets class in use is extended with time-domains and asynchronous-channels. The authors' approach uses models not only providing a better understanding of the distributed controller and improving the communication among the stakeholders, but also to be ready to support the entire lifecycle, including the simulation, the verification (using model-checking tools), the implementation (relying on automatic code generators), and the deployment of the distributed controller into specific platforms. Uses a graphical and intuitive modeling formalism supported by design automation tools; Enables verification, ensuring that the distributed controller was correctly specified; Provides flexibility in the implementation and maintenance phases to achieve desired constraints (high performance, low power consumption, reduced costs), enabling porting to different platforms using different communication nodes, without changing the underlying behavioral model.

Practice of Petri Nets in Manufacturing - F. Dicesare 2012-12-06

M. Silva Significant changes have been occurring in industrialized countries since the Second World War. Production is moving towards sophisticated high qUality products, economy of scale has been replaced by economy of scope, jerky demands are progressively replacing steady demands, and competi tiveness

is becoming a worldwide phenomenon. These trends require highly automated manufacturing systems with small set-up times and high flex ibility. As a consequence, implementation and running costs of modem manufacturing systems are drastically increasing, whereas their fields of application remain limited, and every day become even narrower, which increases the risk of early obsolescence. This is the reason why designers are trying to improve the preliminary design phase, also known as the 'paper study phase'. The preliminary design phase includes, but is not limited to, the func tional specification, and the evaluation of the system. Many tools exist to support the functional specification of manufactur ing systems. IDEFO is one of these tools. It leads, using a top-down ap proach, to a precise functional description of the required system. However, its use cannot be extended further. In general, the evaluation starts with a modeling step, which depends on the evaluation tool used, and ends by applying the model to find out its main dynamic characteristics. Two main approaches can be used to perform this task, namely simulation and math ematical approach. Using simulation, the modeling tool is either a classical computer language, or a simulation language.

Simulation Modelling Practice and Theory - Evon Abu-Taieh 2019-02

Formal Methods in Manufacturing - Javier Campos 2018-09-03

Illustrated with real-life manufacturing examples, Formal Methods in Manufacturing provides state-of-the-art solutions to common problems in manufacturing systems. Assuming some knowledge of discrete event systems theory, the book first delivers a detailed introduction to the most important formalisms used for the modeling, analysis, and control of manufacturing systems (including Petri nets, automata, and max-plus algebra),

explaining the advantages of each formal method. It then employs the different formalisms to solve specific problems taken from today's industrial world, such as modeling and simulation, supervisory control (including deadlock prevention) in a distributed and/or decentralized environment, performance evaluation (including scheduling and optimization), fault diagnosis and diagnosability analysis, and reconfiguration. Containing chapters written by leading experts in their respective fields, Formal Methods in Manufacturing helps researchers and application engineers handle fundamental principles and deal with typical quality goals in the design and operation of manufacturing systems.

Lectures on Petri Nets I: Basic Models - Wolfgang Reisig 1998-11-04

The two-volume set originates from the Advanced Course on Petri Nets held in Dagstuhl, Germany in September 1996; beyond the lectures given there, additional chapters have been commissioned to give a well-balanced presentation of the state of the art in the area. Together with its companion volume "Lectures on Petri Nets II: Applications" this book is the actual reference for the area and addresses professionals, students, lecturers, and researchers who are - interested in systems design and would like to learn to use Petri nets familiar with subareas of the theory or its applications and wish to view the whole area - interested in learning about recent results presented within a unified framework - planning to apply Petri nets in practical situations - interested in the relationship of Petri nets to other models of concurrent systems.

Prototyping of Concurrent Control Systems Implemented in FPGA Devices - Remigiusz Wiśniewski 2016-09-30

This book focuses on prototyping aspects of concurrent control systems and their further implementation and partial reconfiguration in

programmable devices. Further, it lays out a full prototyping flow for concurrent control systems. Based on a given primary specification, a system is described with an interpreted Petri net, which naturally reflects the concurrent and sequential relationships of the design. The book shows that, apart from the traditional option of static configuration of the entire system, the latest programmable devices (especially FPGAs) offer far more sophistication. Partial reconfiguration allows selected parts of the system to be replaced without having to reprogram the entire structure of the device. Approaches to dynamic and static partial reconfiguration of concurrent control systems are presented and described in detail.“/p> The theoretical work is illustrated by examples drawn from various applications, with a milling machine and a traffic-light controller highlighted as representative interpreted Petri nets. Given the ubiquity of concurrent control systems in a huge variety of technological areas including transportation, medicine, artificial intelligence, manufacturing, security and safety and planetary exploration, the innovative software and hardware design methods described here will be of considerable interest to control engineers and systems and circuits researchers in many areas of industry and academia.

Modeling, Simulation, and Control of Flexible Manufacturing Systems -

Automated Technology for Verification and Analysis Kedar Namjoshi 2007-11-04 This book constitutes the refereed proceedings of the 5th International Symposium on Automated Technology for Verification and Analysis, ATVA 2007. The 29 revised full papers presented together with seven short papers address theoretical methods to achieve correct software or hardware systems, including both functional and non functional aspects; as well as applications

of theory in engineering methods and particular domains and handling of practical problems occurring in tools.