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Fault-Diagnosis Systems An Introduction from Fault Detection to Fault Tolerance Springer Science & Business Media
With increasing demands for efficiency and product quality plus progress in the integration of automatic control systems in high-cost mechatronic and safety-critical processes, the field of supervision (or monitoring), fault detection and fault diagnosis plays an important role. The book gives an introduction into advanced methods of fault detection and diagnosis (FDD). After definitions of important terms, it considers the reliability, availability, safety and systems integrity of technical processes. Then fault-detection methods for single signals without models such as limit and trend checking and with harmonic and stochastic models, such as Fourier analysis, correlation and wavelets are treated. This is followed by fault detection with process models using the relationships between signals such as parameter estimation, parity equations, observers and principal component analysis. The treated fault-diagnosis methods include classification methods from Bayes classification to neural networks with decision trees and inference methods from approximate reasoning with fuzzy logic to hybrid fuzzy-neuro systems. Several practical examples for fault detection and diagnosis of DC motor drives, a centrifugal pump, automotive suspension and tire demonstrate applications. **Fault-Tolerant Systems Elsevier** *Fault-Tolerant Systems is the first book on fault tolerance design with a systems approach to both hardware and software. No other text on the market takes this approach, nor offers the comprehensive and up-to-date treatment that Koren and Krishna provide. This book incorporates case studies that highlight six different computer systems with fault-tolerance techniques implemented in their design. A complete ancillary package is available to lecturers, including online solutions manual for instructors and PowerPoint slides. Students, designers, and architects of high performance processors will value this comprehensive overview of the field. The first book on fault tolerance design with a systems approach Comprehensive coverage of both hardware and software fault tolerance, as well as information and time redundancy Incorporated case studies highlight six different computer systems with fault-tolerance techniques implemented in their design Available to lecturers is a complete ancillary package including online solutions manual for instructors and PowerPoint slides* **Diagnosis and Fault-tolerant Control 1 Data-driven and Model-based Fault Diagnosis Techniques John Wiley & Sons** *This book presents recent advances in fault diagnosis strategies for complex dynamic systems. Its impetus derives from the need for an overview of the challenges of the fault diagnosis technique, especially for those demanding systems that require reliability, availability, maintainability and safety to ensure efficient operations. Moreover, the need for a high degree of tolerance with respect to possible faults represents a further key point, primarily for complex systems, as modeling and control are inherently challenging, and maintenance is both expensive and safety-critical. Diagnosis and Fault-tolerant Control 1 also presents and compares different diagnosis schemes using established case studies that are widely used in related literature. The main features of this book regard the analysis, design and implementation of proper solutions for the problems of fault diagnosis in safety critical systems. The design of the considered solutions involves robust data-driven, model-based approaches.* **Fault-tolerant Control Systems Design and Practical Applications Springer Science & Business Media** *The seriesAdvancesinIndustrialControl aims to report and encourage te- nologytransfer in controlengineering. The rapid development of controlte- nology has an impact on all areas of the control discipline. New theory, new controllers, actuators, sensors, new industrial processes, computer methods, new applications, new philosophies. . . , new challenges. Much of this devel- ment work resides in industrial reports, feasibility study papers, and the - ports of advanced collaborative projects. The series o?ers an opportunity for researchers to present an extended exposition of such new work in all aspects of industrial control for wider and rapid dissemination. Control system design and technology continues to develop in many d- ferent directions. One theme that the Advances in Industrial Control series is following is the application of nonlinear control design methods, and the series has some interesting new commissions in progress. However, another theme of interest is how to endow the industrial controller with the ability to overcome faults and process degradation. Fault detection and isolation is a broad ?eld with a research literature spanning several decades. This topic deals with three questions: • How is the presence of a fault detected? • What is the cause of the fault? • Where is it located? However, there has been less focus on the question of how to use the control system to accommodate and overcome the performance deterioration caused by the identi?ed sensor or actuator fault.* **Hybrid Fault Tolerance Techniques to Detect Transient Faults in Embedded Processors Springer** *This book describes fault tolerance techniques based on software and hardware to create hybrid techniques. They are able to reduce overall performance degradation and increase error detection when associated with applications implemented in embedded processors. Coverage begins with an extensive discussion of the current state-of-the-art in fault tolerance techniques. The authors*

then discuss the best trade-off between software-based and hardware-based techniques and introduce novel hybrid techniques. Proposed techniques increase existing fault detection rates up to 100%, while maintaining low performance overheads in area and application execution time. **Diagnosis and Fault-tolerant Control Volume 2 From Fault Diagnosis to Fault-tolerant Control John Wiley & Sons** This book presents recent advances in fault diagnosis and fault-tolerant control of dynamic processes. Its impetus derives from the need for an overview of the challenges of the fault diagnosis technique and sustainable control, especially for those demanding systems that require reliability, availability, maintainability, and safety to ensure efficient operations. Moreover, the need for a high degree of tolerance with respect to possible faults represents a further key point, primarily for complex systems, as modeling and control are inherently challenging, and maintenance is both expensive and safety-critical. Diagnosis and Fault-tolerant Control 2 also presents and compares different fault diagnosis and fault-tolerant schemes, using well established, innovative strategies for modeling the behavior of the dynamic process under investigation. An updated treatise of diagnosis and fault-tolerant control is addressed with the use of essential and advanced methods including signal-based, model-based and data-driven techniques. Another key feature is the application of these methods for dealing with robustness and reliability. **Robust and Fault-Tolerant Control Neural-Network-Based Solutions Springer** Robust and Fault-Tolerant Control proposes novel automatic control strategies for nonlinear systems developed by means of artificial neural networks and pays special attention to robust and fault-tolerant approaches. The book discusses robustness and fault tolerance in the context of model predictive control, fault accommodation and reconfiguration, and iterative learning control strategies. Expanding on its theoretical deliberations the monograph includes many case studies demonstrating how the proposed approaches work in practice. The most important features of the book include: a comprehensive review of neural network architectures with possible applications in system modelling and control; a concise introduction to robust and fault-tolerant control; step-by-step presentation of the control approaches proposed; an abundance of case studies illustrating the important steps in designing robust and fault-tolerant control; and a large number of figures and tables facilitating the performance analysis of the control approaches described. The material presented in this book will be useful for researchers and engineers who wish to avoid spending excessive time in searching neural-network-based control solutions. It is written for electrical, computer science and automatic control engineers interested in control theory and their applications. This monograph will also interest postgraduate students engaged in self-study of nonlinear robust and fault-tolerant control. **Diagnosis and Fault-Tolerant Control Springer Science & Business Media** This book presents model-based analysis and design methods for fault diagnosis and fault-tolerant control. Architectural and structural models are used to analyse the propagation of the fault through the process, test fault detectability and reveal redundancies that can be used to ensure fault tolerance. Case studies demonstrate the methods presented. The second edition includes new material on reconfigurable control, diagnosis of nonlinear systems, and remote diagnosis, plus new examples and updated bibliography. **Diagnosis and Fault-Tolerant Control Springer** Fault-tolerant control aims at a gradual shutdown response in automated systems when faults occur. It satisfies the industrial demand for enhanced availability and safety, in contrast to traditional reactions to faults, which bring about sudden shutdowns and loss of availability. The book presents effective model-based analysis and design methods for fault diagnosis and fault-tolerant control. Architectural and structural models are used to analyse the propagation of the fault through the process, to test the fault detectability and to find the redundancies in the process that can be used to ensure fault tolerance. It also introduces design methods suitable for diagnostic systems and fault-tolerant controllers for continuous processes that are described by analytical models of discrete-event systems represented by automata. The book is suitable for engineering students, engineers in industry and researchers who wish to get an overview of the variety of approaches to process diagnosis and fault-tolerant control. The authors have extensive teaching experience with graduate and PhD students, as well as with industrial experts. Parts of this book have been used in courses for this audience. The authors give a comprehensive introduction to the main ideas of diagnosis and fault-tolerant control and present some of their most recent research achievements obtained together with their research groups in a close cooperation with European research projects. The third edition resulted from a major re-structuring and re-writing of the former edition, which has been used for a decade by numerous research groups. New material includes distributed diagnosis of continuous and discrete-event systems, methods for reconfigurability analysis, and extensions of the structural methods towards fault-tolerant control. The bibliographical notes at the end of all chapters have been up-dated. The chapters end with exercises to be used in lectures. **Fault-Diagnosis Applications Model-Based Condition Monitoring: Actuators, Drives, Machinery, Plants, Sensors, and Fault-tolerant Systems Springer Science & Business Media** Supervision, condition-monitoring, fault detection, fault diagnosis and fault management play an increasing role for technical processes and vehicles in order to improve reliability, availability, maintenance and lifetime. For safety-related processes fault-tolerant systems with redundancy are required in order to reach comprehensive system integrity. This book is a sequel of the book "Fault-Diagnosis Systems" published in 2006, where the basic methods were described. After a short introduction into fault-detection and fault-diagnosis methods the book shows how these methods can be applied for a selection of 20 real technical components and processes as examples, such as: Electrical drives (DC, AC) Electrical actuators Fluidic actuators (hydraulic, pneumatic) Centrifugal and reciprocating pumps Pipelines (leak detection) Industrial robots Machine tools (main and feed drive, drilling, milling, grinding) Heat exchangers Also realized fault-tolerant systems for electrical drives, actuators and sensors are presented. The book describes why and how the various signal-model-based and process-model-based methods were applied and which experimental results could be achieved. In several cases a combination of different methods was most successful. The book is dedicated to graduate students of electrical, mechanical, chemical engineering and computer science and for engineers. **The Evolution of Fault-Tolerant Computing In the Honor of William C. Carter Springer Science & Business Media** For the editors of this book, as well as for many other researchers in the area of fault-tolerant computing, Dr. William Caswell Carter is one of the key figures in the formation and development of this important field. We felt that the IFIP Working Group 10.4 at Baden, Austria, in June 1986, which coincided with an important step in Bill's career, was an appropriate occasion to honor Bill's contributions and achievements by organizing a one day "Symposium on the Evolution of Fault-Tolerant Computing" in the honor of William C. Carter. The Symposium, held on June 30, 1986, brought together a group of eminent scientists from all over the world to discuss the evolu tion, the state of the art, and the future perspectives of the field of fault-tolerant computing. Historic developments in academia and industry were presented by individuals who themselves have actively been involved in bringing them about. The Symposium proved to be a unique historic event and these Proceedings, which contain the final versions of the papers presented at Baden, are an

authentic reference document. **Software-Implemented Hardware Fault Tolerance Springer Science & Business Media** *This book presents the theory behind software-implemented hardware fault tolerance, as well as the practical aspects needed to put it to work on real examples. By evaluating accurately the advantages and disadvantages of the already available approaches, the book provides a guide to developers willing to adopt software-implemented hardware fault tolerance in their applications. Moreover, the book identifies open issues for researchers willing to improve the already available techniques.* **Fault Detection and Fault-Tolerant Control Using Sliding Modes Springer Science & Business Media** *Fault Detection and Fault-tolerant Control Using Sliding Modes is the first text dedicated to showing the latest developments in the use of sliding-mode concepts for fault detection and isolation (FDI) and fault-tolerant control in dynamical engineering systems. It begins with an introduction to the basic concepts of sliding modes to provide a background to the field. This is followed by chapters that describe the use and design of sliding-mode observers for FDI using robust fault reconstruction. The development of a class of sliding-mode observers is described from first principles through to the latest schemes that circumvent minimum-phase and relative-degree conditions. Recent developments have shown that the field of fault tolerant control is a natural application of the well-known robustness properties of sliding-mode control. A family of sliding-mode control designs incorporating control allocation, which can deal with actuator failures directly by exploiting redundancy, is presented. Various realistic case studies, specifically highlighting aircraft systems and including results from the implementation of these designs on a motion flight simulator, are described. A reference and guide for researchers in fault detection and fault-tolerant control, this book will also be of interest to graduate students working with nonlinear systems and with sliding modes in particular. Advances in Industrial Control aims to report and encourage the transfer of technology in control engineering. The rapid development of control technology has an impact on all areas of the control discipline. The series offers an opportunity for researchers to present an extended exposition of new work in all aspects of industrial control.* **Introduction to Human Factors and Ergonomics for Engineers CRC Press** *Emphasizing customer oriented design and operation, Introduction to Human Factors and Ergonomics for Engineers explores the behavioral, physical, and mathematical foundations of the discipline and how to apply them to improve the human, societal, and economic well being of systems and organizations. The book discusses product design, such as tools, machines, or systems as well as the tasks or jobs people perform, and environments in which people live. The authors explore methods of obtaining these objectives, uniquely approaching the topic from an engineering perspective as well as a psychological standpoint. The 22 chapters of this book, coupled with the extensive appendices, provide valuable tools for students and practicing engineers in human centered design and operation of equipment, work place, and organizations in order to optimize performance, satisfaction, and effectiveness. Covering physical and cognitive ergonomics, the book is an excellent source for valuable information on safe, effective, enjoyable, and productive design of products and services that require interaction between humans and the environment.* **Fault Tolerant Drive By Wire Systems: Impact on Vehicle Safety and Reliability Bentham Science Publishers** *This e-book details state-of-the-art drive by wire technology. Readers are made aware about the challenges ahead that need be addressed in order for this technology to gain a foothold in the automotive industry. The eBook presents a systematic analysis of* **Methods, Models and Tools for Fault Tolerance Springer** *The growing complexity of modern software systems increases the di?culty of ensuring the overall dependability of software-intensive systems. Complexity of environments, in which systems operate, high dependability requirements that systems have to meet, as well as the complexity of infrastructures on which they rely make system design a true engineering challenge. Mastering system complexity requires design techniques that support clear thinking and rigorous validation and veri?cation. Formal design methods help to achieve this. Coping with complexity also requires architectures that are t- erant of faults and of unpredictable changes in environment. This issue can be addressed by fault-tolerant design techniques. Therefore, there is a clear need of methods enabling rigorous modelling and development of complex fault-tolerant systems. This bookaddressessuchacuteissues indevelopingfault-tolerantsystemsas: – Veri?cation and re?nement of fault-tolerant systems – Integrated approaches to developing fault-tolerant systems – Formal foundations for error detection, error recovery, exception and fault handling – Abstractions, styles and patterns for rigorousdevelopment of fault tolerance – Fault-tolerant software architectures – Development and application of tools supporting rigorous design of depe- able systems – Integrated platforms for developing dependable systems – Rigorous approaches to speci?cation and design of fault tolerance in novel computing systems TheeditorsofthisbookwereinvolvedintheEU(FP-6)projectRODIN(R- orous Open Development Environment for Complex Systems), which brought together researchers from the fault tolerance and formal methods communi- 1 ties. In 2007 RODIN organized the MeMoT workshop held in conjunction with the Integrated Formal Methods 2007 Conference at Oxford University.* **Application-Layer Fault-Tolerance Protocols IGI Global** *"This book increases awareness of the need for application-level fault-tolerance (ALFT) through introduction of problems and qualitative analysis of solutions"--Provided by publisher.* **Design and Analysis of Fault-tolerant Digital Systems Addison-Wesley Diagnosis, Fault Detection & Tolerant Control Springer Nature** *This book focuses on unhealthy cyber-physical systems. Consisting of 14 chapters, it discusses recognizing the beginning of the fault, diagnosing the appearance of the fault, and stopping the system or switching to a special control mode known as fault-tolerant control. Each chapter includes the background, motivation, quantitative development (equations), and case studies/illustration/tutorial (simulations, experiences, curves, tables, etc.). Readers can easily tailor the techniques presented to accommodate their ad hoc applications.* **Robust Integration of Model-Based Fault Estimation and Fault-Tolerant Control Springer Nature** *Robust Integration of Model-Based Fault Estimation and Fault-Tolerant Control is a systematic examination of methods used to overcome the inevitable system uncertainties arising when a fault estimation (FE) function and a fault-tolerant controller interact as they are employed together to compensate for system faults and maintain robustly acceptable system performance. It covers the important subject of robust integration of FE and FTC with the aim of guaranteeing closed-loop stability. The reader's understanding of the theory is supported by the extensive use of tutorial examples, including some MATLAB®-based material available from the Springer website and by industrial-applications-based material. The text is structured into three parts: Part I examines the basic concepts of FE and FTC, providing extensive insight into the importance of and challenges involved in their integration; Part II describes five effective strategies for the integration of FE and FTC: sequential, iterative, simultaneous, adaptive-decoupling, and robust decoupling; and Part III begins to extend the proposed strategies to nonlinear and large-scale systems and covers their application in the fields of renewable energy, robotics and networked systems. The strategies presented are applicable to a broad range of control problems, because in the absence of faults the FE-based FTC naturally reverts to conventional observer-based control. The book is a useful*

resource for researchers and engineers working in the area of fault-tolerant control systems, and supplementary material for a graduate- or postgraduate-level course on fault diagnosis and FTC. Advances in Industrial Control reports and encourages the transfer of technology in control engineering. The rapid development of control technology has an impact on all areas of the control discipline. The series offers an opportunity for researchers to present an extended exposition of new work in all aspects of industrial control. **Fault Diagnosis Models, Artificial Intelligence, Applications Springer Science & Business Media** This comprehensive work presents the status and likely development of fault diagnosis, an emerging discipline of modern control engineering. It covers fundamentals of model-based fault diagnosis in a wide context, providing a good introduction to the theoretical foundation and many basic approaches of fault detection. **Fault Diagnosis and Fault Tolerance for Mechatronic Systems: Recent Advances Springer** This book will play a central role in ensuring safe and reliable behaviour of intelligent and autonomous systems. It collects some of the most recent results in fault diagnosis and fault tolerant systems, with particular emphasis on mechatronic systems. **Fault-Tolerant Design Springer Science & Business Media** This textbook serves as an introduction to fault-tolerance, intended for upper-division undergraduate students, graduate-level students and practicing engineers in need of an overview of the field. Readers will develop skills in modeling and evaluating fault-tolerant architectures in terms of reliability, availability and safety. They will gain a thorough understanding of fault tolerant computers, including both the theory of how to design and evaluate them and the practical knowledge of achieving fault-tolerance in electronic, communication and software systems. Coverage includes fault-tolerance techniques through hardware, software, information and time redundancy. The content is designed to be highly accessible, including numerous examples and exercises. Solutions and powerpoint slides are available for instructors. **Fault-Tolerance Techniques for Spacecraft Control Computers John Wiley & Sons** Translation of: Hang tian qi kong zhi ji suan ji rong cuop ji shu. **Fault-tolerant Flight Control and Guidance Systems Practical Methods for Small Unmanned Aerial Vehicles Springer Science & Business Media** This book offers a complete overview of fault-tolerant flight control techniques. Discussion covers the necessary equations for the modeling of small UAVs, a complete system based on extended Kalman filters, and a nonlinear flight control and guidance system. **Software Diversity in Computerized Control Systems Springer Science & Business Media** Software Diversity is one of the fault-tolerance means to achieve dependable systems. In this volume, some experimental systems as well as real-life applications of software diversity are presented. The history, the current state-of-the-art and future perspectives are given. Although this technique is used quite successfully in industrial applications, further research is necessary to solve some open questions. We hope to report on new results and applications in another volume of this series within some years. Acknowledgements The idea of the workshop was put forward by the chairpersons of IFIP WG lOA, J. -c. Laprie, J. F. Meyer and Y. Tohma, in January 1986, and the edi tor of this volume was asked to organize the workshop. This volume was edited with the assistance of the editors of the series, A. AviZienis, H. Kopetz and J. -C. Laprie, who also had the function of reviewers. Karlsruhe, October 1987 U. Voges, Editor Table of Contents

Analysis and Synthesis of Fault-Tolerant Control Systems John Wiley & Sons In recent years, control systems have become more sophisticatedin order to meet increased performance and safety requirements formodern technological systems. Engineers are becoming more awarethat conventional feedback control design for a complex system mayresult in unsatisfactory performance, or even instability, in theevent of malfunctions in actuators, sensors or other systemcomponents. In order to circumvent such weaknesses, new approachesto control system design have emerged which can tolerate componentmalfunctions while maintaining acceptable stability andperformance. These types of control systems are often known asfault-tolerant control systems (FTCS). More precisely, FTCS arecontrol systems which possess the ability to accommodate componentfailure automatically. Analysis and Synthesis of Fault-Tolerant Control Systemscomprehensively covers the analysis and synthesis methods of faulttolerant control systems. It unifies the methods for developingcontrollers and filters for a wide class of dynamical systems andreports on the recent technical advances in design methodologies.MATLAB® is used throughout the book, to demonstrate methods ofanalysis and design. Key features: • Provides advanced theoretical methods and typicalpractical applications • Provides access to a spectrum of control design methodsapplied to industrial systems • Includes case studies and illustrative examples • Contains end-of-chapter problems Analysis and Synthesis of Fault-Tolerant Control Systemsis a comprehensive reference for researchers and practitionersworking in this area, and is also a valuable source of informationfor graduates and senior undergraduates in control, mechanical,aerospace, electrical and mechatronics engineering departments. **Fault Tolerant Computer Architecture Morgan & Claypool Publishers** For many years, most computer architects have pursued one primary goal: performance. Architects have translated the ever-increasing abundance of ever-faster transistors provided by Moore's law into remarkable increases in performance. Recently, however, the bounty provided by Moore's law has been accompanied by several challenges that have arisen as devices have become smaller, including a decrease in dependability due to physical faults. In this book, we focus on the dependability challenge and the fault tolerance solutions that architects are developing to overcome it. The two main purposes of this book are to explore the key ideas in fault-tolerant computer architecture and to present the current state-of-the-art - over approximately the past 10 years - in academia and industry. Table of Contents: Introduction / Error Detection / Error Recovery / Diagnosis / Self-Repair / The Future **Security and Fault Tolerance in Internet of Things Springer** This book covers various aspects of security, privacy and reliability in Internet of Things (IoT) and Cyber-Physical System design, analysis and testing. In particular, various established theories and practices both from academia and industry are presented and suitably organized targeting students, engineers and researchers. Fifteen leading academicians and practitioners wrote this book, pointing to the open problems and biggest challenges on which research in the near future will be focused. **Fault-Tolerance Techniques for High-Performance Computing Springer** This timely text presents a comprehensive overview of fault tolerance techniques for high-performance computing (HPC). The text opens with a detailed introduction to the concepts of checkpoint protocols and scheduling algorithms, prediction, replication, silent error detection and correction, together with some application-specific techniques such as ABFT.

Emphasis is placed on analytical performance models. This is then followed by a review of general-purpose techniques, including several checkpoint and rollback recovery protocols. Relevant execution scenarios are also evaluated and compared through quantitative models. Features: provides a survey of resilience methods and performance models; examines the various sources for errors and faults in large-scale systems; reviews the spectrum of techniques that can be applied to design a fault-tolerant MPI; investigates different approaches to replication; discusses the challenge of energy consumption of fault-tolerance methods in extreme-scale systems. **Fault-Tolerant Real-Time Systems The Problem of Replica Determinism Springer Science & Business Media** Real-time computer systems are very often subject to dependability requirements because of their application areas. Fly-by-wire airplane control systems, control of power plants, industrial process control systems and others are required to continue their function despite faults. Fault-tolerance and real-time requirements thus constitute a kind of natural combination in process control applications. Systematic fault-tolerance is based on redundancy, which is used to mask failures of individual components. The problem of replica determinism is thereby to ensure that replicated components show consistent behavior in the absence of faults. It might seem trivial that, given an identical sequence of inputs, replicated computer systems will produce consistent outputs. Unfortunately, this is not the case. The problem of replica non-determinism and the presentation of its possible solutions is the subject of Fault-Tolerant Real-Time Systems: The Problem of Replica Determinism. The field of automotive electronics is an important application area of fault-tolerant real-time systems. Systems like anti-lock braking, engine control, active suspension or vehicle dynamics control have demanding real-time and fault-tolerance requirements. These requirements have to be met even in the presence of very limited resources since cost is extremely important. Because of its interesting properties Fault-Tolerant Real-Time Systems gives an introduction to the application area of automotive electronics. The requirements of automotive electronics are a topic of discussion in the remainder of this work and are used as a benchmark to evaluate solutions to the problem of replica determinism. **Design and Analysis of Reliable and Fault-Tolerant Computer Systems World Scientific** Covering both the theoretical and practical aspects of fault-tolerant mobile systems, and fault tolerance and analysis, this book tackles the current issues of reliability-based optimization of computer networks, fault-tolerant mobile systems, and fault tolerance and reliability of high speed and hierarchical networks. The book is divided into six parts to facilitate coverage of the material by course instructors and computer systems professionals. The sequence of chapters in each part ensures the gradual coverage of issues from the basics to the most recent developments. A useful set of references, including electronic sources, is listed at the end of each chapter. Contents:Fundamental Concepts in Fault Tolerance and Reliability AnalysisFault Modeling, Simulation and DiagnosisError Control and Self-Checking CircuitsFault Tolerance in Multiprocessor SystemsFault-Tolerant Routing in Multi-Computer NetworksFault Tolerance and Reliability in Hierarchical Interconnection NetworksFault Tolerance and Reliability of Computer NetworksFault Tolerance in High Speed Switching NetworksFault Tolerance in Distributed and Mobile Computing SystemsFault Tolerance in Mobile NetworksReliability and Yield Enhancement of VLSI/WSI CircuitsDesign of fault-tolerant Processor ArraysAlgorithm-Based Fault ToleranceSystem Level Diagnosis ISystem Level Diagnosis IIFault Tolerance and Reliability of RAID SystemsHigh Availability in Computer Systems Readership: Computer engineers, computer scientists, information scientists, graduate and senior undergraduate students in information science and computer engineering. Keywords:Fault Tolerance;Reliability;Availability;Fault Modeling;Fault Diagnosis;Network ReliabilityKey Features:Comprehensive coverage of issues in fault tolerance and reliability analysisSimple treatment of difficult issues via examples with figures, tables and graphs **Fault-Tolerant Design and Control of Automated Vehicles and Processes Insights for the Synthesis of Intelligent Systems Springer** This book summarizes strategies, methods, algorithms, frameworks and systems for the fault-tolerant design and control of automated vehicles and processes. Intelligent systems may be able to accommodate inevitable faults, but this ability requires targeted design processes and advanced control systems. This book explains the respective elements involved in automated vehicles and processes. It provides detailed descriptions of fault-tolerant design, not offered in the existent scientific literature. With regard to fault-tolerant control, the focus is on innovative methods, which can accommodate not only uncertainties, but also shared and flexible redundant elements. The book is intended to present a concise guide for researchers in the field of fault-tolerant design and control, and to provide concrete insights for design and control engineers working in the field of automated vehicles and processes. **Fehlertolerierende Rechensysteme / Fault-tolerant Computing Systems Automatisierungssysteme, Methoden, Anwendungen / Automation Systems, Methods, Applications 4. Internationale GI/ITG/GMA-Fachtagung 4th International GI/ITG/GMA Conference Baden-Baden, 20.–22. September 1989, Proceedings Springer Science & Business Media** Dieses Buch enthält die Beiträge der 4. GI/ITG/GMA-Fachtagung über Fehlertolerierende Rechensysteme, die im September 1989 in einer Reihe von Tagungen in München 1982, Bonn 1984 sowie Bremerhaven 1987 veranstaltet wurde. Die 31 Beiträge, darunter 4 eingeladene, sind teils in deutscher, überwiegend aber in englischer Sprache verfa€t. Insgesamt wird durch diese Beiträge die Entwicklung der Konzeption und Implementierung fehlertoleranter Systeme in den letzten zwei Jahren vor allem in Europa dokumentiert. Sämtliche Beiträge berichten über neue Forschungs- oder Entwicklungsergebnisse. **Control Systems, Robotics and AutomatioN – Volume XVI Fault Analysis and Control EOLSS Publications** This Encyclopedia of Control Systems, Robotics, and Automation is a component of the global Encyclopedia of Life Support Systems EOLSS, which is an integrated compendium of twenty one Encyclopedias. This 22-volume set contains 240 chapters, each of size 5000-30000 words, with perspectives, applications and extensive illustrations. It is the only publication of its kind carrying state-of-the-art knowledge in the fields of Control Systems, Robotics, and Automation and is aimed, by virtue of the several applications, at the following five major target audiences: University and College Students, Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers and NGOs. **Dependability of Networked Computer-based Systems Springer Science & Business Media** The measurement of dependability attributes on real systems is a very time-consuming and costly affair, making analytical or simulation modeling the only viable solutions. Dependability of Networked Computer-based Systems explores reliability, availability and safety modeling of networked computer-based systems used in life-critical applications such as avionics, nuclear power plants, automobiles and chemical process industries. Dependability of Networked Computer-based Systems gives an overview of basic dependability modeling concepts and addresses new challenges in dependability modeling of networked computer-based systems, as well as new trends, their capabilities and limitations. It covers a variety of dependability modeling methods: stochastic processes, Markov and semi-Markov models, response-time distribution, stochastic Petri-net-based modeling formalisms, and Monte Carlo simulation models. Dependability of Networked Computer-based Systems provides students and researchers with a detailed

overview of dependability models and analysis techniques. Practicing engineers will also find this text a useful guide to decision-making based on system dependability at the design, operation and maintenance stages. **Model Checking Software 20th International Symposium, SPIN 2013, Stony Brook, NY, USA, July 8-9, 2013, Proceedings Springer** *This book constitutes the refereed proceedings of the 20th International Symposium on Model Checking Software, SPIN 2013, held in Stony Brook, NY, USA, in July 2013. The 18 regular papers, 2 tool demonstration papers, and 2 invited papers were carefully reviewed and selected from 40 submissions. The traditional focus of SPIN has been on explicit-state model checking techniques, as implemented in SPIN and other related tools. While such techniques are still of key interest to the workshop, its scope has broadened over recent years to include techniques for the verification and formal testing of software systems in general.* **Coding Approaches to Fault Tolerance in Combinational and Dynamic Systems Springer Science & Business Media** *Coding Approaches to Fault Tolerance in Combinational and Dynamic Systems describes coding approaches for designing fault-tolerant systems, i.e., systems that exhibit structured redundancy that enables them to distinguish between correct and incorrect results or between valid and invalid states. Since redundancy is expensive and counter-intuitive to the traditional notion of system design, the book focuses on resource-efficient methodologies that avoid excessive use of redundancy by exploiting the algorithmic/dynamic structure of a particular combinational or dynamic system. The first part of Coding Approaches to Fault Tolerance in Combinational and Dynamic Systems focuses on fault-tolerant combinational systems providing a review of von Neumann's classical work on Probabilistic Logics (including some more recent work on noisy gates) and describing the use of arithmetic coding and algorithm-based fault-tolerant schemes in algebraic settings. The second part of the book focuses on fault tolerance in dynamic systems. Coding Approaches to Fault Tolerance in Combinational and Dynamic Systems also discusses how, in a dynamic system setting, one can relax the traditional assumption that the error-correcting mechanism is fault-free by using distributed error correcting mechanisms. The final chapter presents a methodology for fault diagnosis in discrete event systems that are described by Petri net models; coding techniques are used to quickly detect and identify failures. From the Foreword: "Hadjicostis has significantly expanded the setting to processes occurring in more general algebraic and dynamic systems... The book responds to the growing need to handle faults in complex digital chips and complex networked systems, and to consider the effects of faults at the design stage rather than afterwards." George Verghese, Massachusetts Institute of Technology Coding Approaches to Fault Tolerance in Combinational and Dynamic Systems will be of interest to both researchers and practitioners in the area of fault tolerance, systems design and control.* **Digital Avionics Handbook CRC Press** *A perennial bestseller, the Digital Avionics Handbook offers a comprehensive view of avionics. Complete with case studies of avionics architectures as well as examples of modern systems flying on current military and civil aircraft, this Third Edition includes: Ten brand-new chapters covering new topics and emerging trends Significant restructuring to deliver a more coherent and cohesive story Updates to all existing chapters to reflect the latest software and technologies Featuring discussions of new data bus and display concepts involving retina scanning, speech interaction, and synthetic vision, the Digital Avionics Handbook, Third Edition provides practicing and aspiring electrical, aerospace, avionics, and control systems engineers with a pragmatic look at the present state of the art of avionics.* **Software Design for Resilient Computer Systems Springer** *This book addresses the question of how system software should be designed to account for faults, and which fault tolerance features it should provide for highest reliability. With this second edition of Software Design for Resilient Computer Systems the book is thoroughly updated to contain the newest advice regarding software resilience. With additional chapters on computer system performance and system resilience, as well as online resources, the new edition is ideal for researchers and industry professionals. The authors first show how the system software interacts with the hardware to tolerate faults. They analyze and further develop the theory of fault tolerance to understand the different ways to increase the reliability of a system, with special attention on the role of system software in this process. They further develop the general algorithm of fault tolerance (GAFT) with its three main processes: hardware checking, preparation for recovery, and the recovery procedure. For each of the three processes, they analyze the requirements and properties theoretically and give possible implementation scenarios and system software support required. Based on the theoretical results, the authors derive an Oberon-based programming language with direct support of the three processes of GAFT. In the last part of this book, they introduce a simulator, using it as a proof of concept implementation of a novel fault tolerant processor architecture (ERRIC) and its newly developed runtime system feature-wise and performance-wise. Due to the wide reaching nature of the content, this book applies to a host of industries and research areas, including military, aviation, intensive health care, industrial control, and space exploration.*