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## KEY=REUSABLE - ANDREW JUNE

**Optimal Trajectory Reconfiguration and Retargeting for the X-33 Reusable Launch Vehicle** This thesis considers the problem of generating optimal entry trajectories for a reusable launch vehicle following a control surface failure. The thesis builds upon the work of Dr. David Doman, Dr. Michael Oppenheimer and Dr. Michael Bolender of the Air Vehicles Directorate, Air Force Research Lab Dayton Ohio. The primary focus of this work is to demonstrate the feasibility of inner loop reconfiguration and outer loop trajectory retargeting and replanning for the X-33 reusable launch vehicle (RLV) following the imposition of a control surface failure. The trajectory generation model employs path constraints generated by an AFRL trim deficiency algorithm coupled with an inner loop control allocator and aerodynamic database that captures the full 6-DOF vehicle aerodynamic effects while utilizing an outer loop 3-DOF model. The resulting optimal trajectory does not violate the trim deficiency constraints and provides additional margins for trajectories flown during failure conditions. The footprints generated by the thesis show that contemporary footprint analysis for vehicles experiencing control surface failures are overly optimistic when compared to those footprints that consider vehicle aerodynamic stability and realistic landable attitudes at the threshold of the landing runway. The results of the thesis also show the performance reductions resulting from decoupling the inner and outer loop and that trajectories can be generated to the landing runway without using a region of terminal area energy management. Optimal Trajectory Reconfiguration and Retargeting for a Reusable Launch Vehicle Autonomous reusable launch vehicles (RLV) are being pursued as low-cost alternatives to expendable launch vehicles and the Shuttle. The employment of autonomous reusable launch vehicles requires additional guidance and control robustness to fulfill the role of an adaptive human pilot, in the event of failures or unanticipated conditions. The guidance and control of these vehicles mandate new guidance strategies that are able to identify and adapt to vehicle failures during the flight and still return to earth safely. This work utilizes an online trim algorithm that provides the outer loop with the feasible range of Mach number and angle of attack, for which the vehicle can be rotationally trimmed. The algorithm allows one to include 6-degree-of-freedom (DOF) trim effects and constraints in a reduced order dynamical model which is used in the solution of an optimal control problem. A direct pseudospectral method is used to solve a two-point-boundary-value problem which determines the optimal entry trajectory subject to appropriate constraints such as normal load, dynamic pressure limits, heat load limits, and state dependent constraints. Fault Tolerant Optimal Trajectory Generation for Reusable Launch Vehicles Preprint Reconfigurable inner-loop control laws improve the fault tolerance of a vehicle to control effector failures; however, in order to preserve stability, the unfailed effectors may be deployed to off-nominal positions to compensate for undesirable perturbations caused by the failed effectors. The effectors acting under the influence of a reconfigurable control law can produce significant perturbations to the nominal forces produced by the wing and body and can also affect the range of flight conditions over which the vehicle can be controlled. Three degree-of-freedom (3 DOF) dynamical models used in trajectory optimization for aerospace vehicles typically include wing-body aerodynamic force effects but ignore the aerodynamic forces produced by the control surfaces. In this work, a method for including these trim effects as well as control induced trajectory constraints in a 3 DOF model is presented. Journal of Guidance, Control, and Dynamics A Publication of the American Institute of Aeronautics and Astronautics Devoted to the Technology of Dynamics and Control Mons anthologie montoise Aerospace America The Lion Way Learning Plus Intelligent Optimization CreateSpace Learning and Intelligent Optimization (LION) is the combination of learning from data and optimization applied to solve complex and dynamic problems. The LION way is about increasing the automation level and connecting data directly to decisions and actions. More power is directly in the hands of decision makers in a self-service manner, without resorting to intermediate layers of data scientists. LION is a complex array of mechanisms, like the engine in an automobile, but the user (driver) does not need to know the inner workings of the engine in order to realize its tremendous benefits. LION's adoption will create a prairie fire of innovation which will reach most businesses in the next decades. Businesses, like plants in wildfire-prone ecosystems, will survive and prosper by adapting and embracing LION techniques, or they risk being transformed from giant trees to ashes by the spreading competition. Spacecraft Formation Flying Dynamics, Control and Navigation Elsevier Space agencies are now realizing that much of what has previously been achieved using hugely complex and costly single platform projects—large unmanned and manned satellites (including the present International Space Station)—can be replaced by a number of smaller satellites networked together. The key challenge of this approach, namely ensuring the proper formation flying of multiple craft, is the topic of this second volume in Elsevier's Astrodynamics Series, Spacecraft Formation Flying: Dynamics, control and navigation. In this unique text, authors Alfriend et al. provide a coherent discussion of spacecraft relative motion, both in the unperturbed and perturbed settings, explain the main control approaches for regulating relative satellite dynamics, using both impulsive and continuous maneuvers, and present the main constituents required for relative navigation. The early chapters provide a foundation upon which later discussions are built, making this a complete, standalone offering. Intended for graduate students, professors and academic researchers in the fields of aerospace and mechanical engineering, mathematics, astronomy and astrophysics, Spacecraft Formation Flying is a technical yet accessible, forward-thinking guide to this critical area of astrodynamics. The first book dedicated to spacecraft formation flying, written by leading researchers and professors in the field Develops the theory from an astrodynamical viewpoint, emphasizing modeling, control and navigation of formation flying satellites on Earth orbits Examples used to illustrate the main developments, with a sample simulation of a formation flying mission included to illustrate high fidelity modeling, control and relative navigation FPGA Implementations of Neural Networks Springer Science & Business Media During the 1980s and early 1990s there was significant work in the design and implementation of hardware neurocomputers. Nevertheless, most of these efforts may be judged to have been unsuccessful: at no time have hardware neurocomputers been in wide use. This lack of success may be largely attributed to the fact that earlier work was almost entirely aimed at developing custom neurocomputers, based on ASIC technology, but for such niche uses this technology was never sufficiently developed or competitive enough to justify large-scale adoption. On the other hand, gate-arrays of the period mentioned were never large enough nor fast enough for serious artificial neural network (ANN) applications. But technology has now improved: the capacity and performance of current FPGAs are such that they present a much more realistic alternative. Consequently neurocomputers based on FPGAs are now a much more practical proposition than they have been in the past. This book summarizes some work towards this goal and consists of 12 papers that were selected, after review, from a number of submissions. The book is nominally divided into three parts: Chapters 1 through 4 deal with foundational issues; Chapters 5 through 11 deal with a variety of implementations; and Chapter 12 looks at the lessons learned from a large-scale project and also reconsiders design issues in light of current and future technology. Embedded Systems Design with FPGAs Springer Science & Business Media This book presents the methodologies and for embedded systems design, using field programmable gate array (FPGA) devices, for the most modern applications. Coverage includes state-of-the-art research from academia and industry on a wide range of topics, including applications, advanced electronic design automation (EDA), novel system architectures, embedded processors, arithmetic, and dynamic reconfiguration. The Zynq Book Embedded Processing with the Arm Cortex-A9 on the Xilinx Zynq-7000 All Programmable Soc This book is about the Zynq-7000 All Programmable System on Chip, the family of devices from Xilinx that combines an application-grade ARM Cortex-A9 processor with traditional FPGA logic fabric. Catering for both new and experienced readers, it covers fundamental issues in an accessible way, starting with a clear overview of the device architecture, and an introduction to the design tools and processes for developing a Zynq SoC. Later chapters progress to more advanced topics such as embedded systems development, IP block design and operating systems. Maintaining a 'real-world' perspective, the book also compares Zynq with other device alternatives, and considers end-user applications. The Zynq Book is accompanied by a set of practical tutorials hosted on a companion website. These tutorials will guide the reader through first steps with Zynq, following on to a complete, audio-based embedded systems design. Tagungsband des 3. Kongresses Montage Handhabung Industrieroboter Springer-Verlag Der MHI e.V. ist ein Netzwerk leitender Universitätsprofessoren aus dem deutschsprachigen Raum, die sowohl grundlagenorientiert als auch anwendungsnah in der Montage, Handhabung und Industrierobotik erfolgreich forschend tätig sind. Die Gründung der Gesellschaft erfolgte im Frühjahr 2012. Der MHI e.V. hat derzeit 20 Mitglieder, die über ihre Institute und Lehrstühle zurzeit ca. 1.000 Wissenschaftler repräsentieren. Die übergeordnete Zielsetzung des MHI e.V. ist die Förderung der Zusammenarbeit von deutschsprachigen Wissenschaftlerinnen und Wissenschaftlern untereinander, sowie mit der Industrie im Bereich Montage, Handhabung und Industrierobotik zur Beschleunigung der Forschung, Optimierung der Lehre und zur Verbesserung der internationalen Wettbewerbsfähigkeit der deutschen Industrie in diesem Bereich. Das Kolloquium fokussiert auf einen akademischen Austausch auf hohem Niveau, um die gewonnenen Forschungsergebnisse zu verteilen, synergetische Effekte und Trends zu bestimmen, die Akteure persönlich zu verbinden und das Forschungsfeld sowie die MHI-Gemeinschaft zu stärken. Interior-point Polynomial Algorithms in Convex Programming SIAM Specialists working in the areas of optimization, mathematical programming, or control theory will find this book invaluable for studying interior-point methods for linear and quadratic programming, polynomial-time methods for nonlinear convex programming, and efficient computational methods for control problems and variational inequalities. A background in linear algebra and mathematical programming is necessary to understand the book. The detailed proofs and lack of "numerical examples" might suggest that the book is of limited value to the reader interested in the practical aspects of convex optimization, but nothing could be further from the truth. An entire chapter is devoted to potential reduction methods precisely because of their great efficiency in practice. Large Space Structures & Systems in the Space Station Era A Bibliography with Index Knowledge Discovery, Knowledge Engineering and Knowledge Management 11th International Joint Conference, IC3K 2019, Vienna, Austria, September 17-19, 2019, Revised Selected Papers Springer This book constitutes the revised selected papers of the 11th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management, IC3K 2019, held in Vienna, Austria, in September 2019. The 25 full papers presented were carefully reviewed and selected from 220 submissions. The papers are organized in topical sections on knowledge discovery and information retrieval; knowledge engineering and ontology development; and knowledge management and information systems. Taming Liquid Hydrogen The Centaur Upper Stage Rocket, 1958-2002 Ways of Knowing in HCI Springer Science & Business Media This textbook brings together both new and traditional research methods in Human Computer Interaction (HCI). Research methods include interviews and observations, ethnography, grounded theory and analysis of digital traces of behavior. Readers will gain an understanding of the type of knowledge each method provides, its disciplinary roots and how each contributes to understanding users, user behavior and the context of use. The background context, clear explanations and sample exercises make this an ideal textbook for graduate students, as well as a valuable reference for researchers and practitioners. 'It is an impressive collection in terms of the level of detail and variety.' (M. Sasikumar, ACM Computing Reviews #CR144066) VHDL and FPLDs in Digital Systems Design, Prototyping and Customization Springer Science & Business Media This book represents an attempt to treat three aspects of digital systems, design, prototyping and customization, in an integrated manner using two major

technologies: VHSIC Hardware Description Language (VHDL) as a modeling and specification tool, and Field-Programmable Logic Devices (FPLDs) as an implementation technology. They together make a very powerful combination for complex digital systems rapid design and prototyping as the important steps towards manufacturing, or, in the case of feasible quantities, they also provide fast system manufacturing. Combining these two technologies makes possible implementation of very complex digital systems at the desk. VHDL has become a standard tool to capture features of digital systems in a form of behavioral, dataflow or structural models providing a high degree of flexibility. When augmented by a good simulator, VHDL enables extensive verification of features of the system under design, reducing uncertainties at the latter phases of design process. As such, it becomes an unavoidable modeling tool to model digital systems at various levels of abstraction. Strategic System Assurance and Business Analytics Springer Nature This book systematically examines and quantifies industrial problems by assessing the complexity and safety of large systems. It includes chapters on system performance management, software reliability assessment, testing, quality management, analysis using soft computing techniques, management analytics, and business analytics, with a clear focus on exploring real-world business issues. Through contributions from researchers working in the area of performance, management, and business analytics, it explores the development of new methods and approaches to improve business by gaining knowledge from bulk data. With system performance analytics, companies are now able to drive performance and provide actionable insights for each level and for every role using key indicators, generate mobile-enabled scorecards, time series-based analysis using charts, and dashboards. In the current dynamic environment, a viable tool known as multi-criteria decision analysis (MCDA) is increasingly being adopted to deal with complex business decisions. MCDA is an important decision support tool for analyzing goals and providing optimal solutions and alternatives. It comprises several distinct techniques, which are implemented by specialized decision-making packages. This book addresses a number of important MCDA methods, such as DEMATEL, TOPSIS, AHP, MAUT, and Intuitionistic Fuzzy MCDM, which make it possible to derive maximum utility in the area of analytics. As such, it is a valuable resource for researchers and academicians, as well as practitioners and business experts. Cognitive Search Evolution, Algorithms, and the Brain MIT Press An exploration of the evolution, function, and mechanisms of search for resources in the mind and in the world. Over a century ago, William James proposed that people search through memory much as they rummage through a house looking for lost keys. We scour our environments for territory, food, mates, and information. We search for items in visual scenes, for historical facts, and for the best deals on Internet sites; we search for new friends to add to our social networks, and for solutions to novel problems. What we find is always governed by how we search and by the structure of the environment. This book explores how we search for resources in our minds and in the world. The authors examine the evolution and adaptive functions of search; the neural underpinnings of goal-searching mechanisms across species; psychological models of search in memory, decision making, and visual scenes; and applications of search behavior in highly complex environments such as the Internet. As the range of information, social contacts, and goods continues to expand, how well we are able to search and successfully find what we seek becomes increasingly important. At the same time, search offers cross-disciplinary insights to the scientific study of human cognition and its evolution. Combining perspectives from researchers across numerous domains, this book furthers our understanding of the relationship between search and the human mind. Dynamics of Mechanical Systems CRC Press Mechanical systems are becoming increasingly sophisticated and continually require greater precision, improved reliability, and extended life. To meet the demand for advanced mechanisms and systems, present and future engineers must understand not only the fundamental mechanical components, but also the principles of vibrations, stability, and balance and the use of Newton's laws, Lagrange's equations, and Kane's methods. Dynamics of Mechanical Systems provides a vehicle for mastering all of this. Focusing on the fundamental procedures behind dynamic analyses, the authors take a vector-oriented approach and lead readers methodically from simple concepts and systems through the analysis of complex robotic and bio-systems. A careful presentation that balances theory, methods, and applications gives readers a working knowledge of configuration graphs, Euler parameters, partial velocities and partial angular velocities, generalized speeds and forces, lower body arrays, and Kane's equations. Evolving from more than three decades of teaching upper-level engineering courses, Dynamics of Mechanical Systems enables readers to obtain and refine skills ranging from the ability to perform insightful hand analyses to developing algorithms for numerical/computer analyses. Ultimately, it prepares them to solve real-world problems and make future advances in mechanisms, manipulators, and robotics. Large Space Structures & Systems in the Space Station Era A Bibliography with Indexes Neural Systems for Control Elsevier Control problems offer an industrially important application and a guide to understanding control systems for those working in Neural Networks. Neural Systems for Control represents the most up-to-date developments in the rapidly growing application area of neural networks and focuses on research in natural and artificial neural systems directly applicable to control or making use of modern control theory. The book covers such important new developments in control systems such as intelligent sensors in semiconductor wafer manufacturing; the relation between muscles and cerebral neurons in speech recognition; online compensation of reconfigurable control for spacecraft aircraft and other systems; applications to rolling mills, robotics and process control; the usage of past output data to identify nonlinear systems by neural networks; neural approximate optimal control; model-free nonlinear control; and neural control based on a regulation of physiological investigation/blood pressure control. All researchers and students dealing with control systems will find the fascinating Neural Systems for Control of immense interest and assistance. Focuses on research in natural and artificial neural systems directly applicable to control or making use of modern control theory Represents the most up-to-date developments in this rapidly growing application area of neural networks Takes a new and novel approach to system identification and synthesis Satellite Orbits Models, Methods and Applications Springer Science & Business Media This modern presentation guides readers through the theory and practice of satellite orbit prediction and determination. Starting from the basic principles of orbital mechanics, it covers elaborate force models as well as precise methods of satellite tracking. The accompanying CD-ROM includes source code in C++ and relevant data files for applications. The result is a powerful and unique spaceflight dynamics library, which allows users to easily create software extensions. An extensive collection of frequently updated Internet resources is provided through WWW hyperlinks. The Design Warrior's Guide to FPGAs Devices, Tools and Flows Elsevier Field Programmable Gate Arrays (FPGAs) are devices that provide a fast, low-cost way for embedded system designers to customize products and deliver new versions with upgraded features, because they can handle very complicated functions, and be reconfigured an infinite number of times. In addition to introducing the various architectural features available in the latest generation of FPGAs, The Design Warrior's Guide to FPGAs also covers different design tools and flows. This book covers information ranging from schematic-driven entry, through traditional HDL/RTL-based simulation and logic synthesis, all the way up to the current state-of-the-art in pure C/C++ design capture and synthesis technology. Also discussed are specialist areas such as mixed hardware/software and DSP-based design flows, along with innovative new devices such as field programmable node arrays (FPNAs). Clive "Max" Maxfield is a bestselling author and engineer with a large following in the electronic design automation (EDA) and embedded systems industry. In this comprehensive book, he covers all the issues of interest to designers working with, or contemplating a move to, FPGAs in their product designs. While other books cover fragments of FPGA technology or applications this is the first to focus exclusively and comprehensively on FPGA use for embedded systems. First book to focus exclusively and comprehensively on FPGA use in embedded designs World-renowned best-selling author Will help engineers get familiar and succeed with this new technology by providing much-needed advice on choosing the right FPGA for any design project Resilience of Luxury Companies in Times of Change Walter de Gruyter GmbH & Co KG Resilience of Luxury Companies in Times of Change is a book for executives and Masters' level students taking courses in luxury management. It offers an insight into the current and emergent business models and strategies luxury companies apply to remain resilient in times of change. It explores a variety of business models answering the following key questions: What is each brand's value proposition used to attract a consumer's willingness to pay? What is each brand's target audience? How do brands navigate and expand their markets? And how do luxury companies organize their resources to design and develop products and services to continually sell to their customers? The answers to these questions provide the foundation of a luxury company's business strategy and, as a result, its brand architecture. The authors also explore the patterns that have emerged in the ownership, management and the manufacturing in luxury goods companies, where dominance is usually found in certain countries. This book focuses on six key industries in the luxury product sector: fashion, automotive, hospitality, furniture, cosmetics and jewellery. It provides an international perspective with examples drawn from Europe, USA, the Middle East, China and Japan. Through these examples and cases, the authors analyze how luxury companies are facing the challenges posed by external shocks and an extensive need for digitalization. Using concepts and theories from macroeconomics (such as globalisation) and corporate and business strategy, the book aims to connect the dots between theory and practice. Resilience of Luxury Companies in Times of Change provides perspectives of the past, present and future - how luxury companies have evolved over time and managed to stay resilient despite the challenges they have faced through the different eras. Aircraft Control Allocation John Wiley & Sons Aircraft Control Allocation Wayne Durham, Virginia Polytechnic Institute and State University, USA Kenneth A. Bordignon, Embry-Riddle Aeronautical University, USA Roger Beck, Dynamic Concepts, Inc., USA An authoritative work on aircraft control allocation by its pioneers Aircraft Control Allocation addresses the problem of allocating supposed redundant flight controls. It provides introductory material on flight dynamics and control to provide the context, and then describes in detail the geometry of the problem. The book includes a large section on solution methods, including 'Banks' method', a previously unpublished procedure. Generalized inverses are also discussed at length. There is an introductory section on linear programming solutions, as well as an extensive and comprehensive appendix dedicated to linear programming formulations and solutions. Discrete-time, or frame-wise allocation, is presented, including rate-limiting, nonlinear data, and preferred solutions. Key features: Written by pioneers in the field of control allocation. Comprehensive explanation and discussion of the major control allocation solution methods. Extensive treatment of linear programming solutions to control allocation. A companion web site contains the code of a MATLAB/Simulink flight simulation with modules that incorporate all of the major solution methods. Includes examples based on actual aircraft. The book is a vital reference for researchers and practitioners working in aircraft control, as well as graduate students in aerospace engineering. Managing Chronicity in Unequal States Ethnographic perspectives on caring UCL Press By portraying the circumstances of people living with chronic conditions in radically different contexts, from Alzheimer's patients in the UK to homeless people with psychiatric disorders in India, Managing Chronicity in Unequal States offers glimpses of what dealing with medically complex conditions in stratified societies means. While in some places the state regulates and intrudes on the most intimate aspects of chronic living, in others it is utterly and criminally absent. Either way, it is a present/absent actor that deeply conditions people's opportunities and strategies of care. This book explores how individuals, groups and communities navigate uncertain and unequal healthcare systems, in which inherent moral judgements on human worth have long-lasting effects on people's wellbeing. This is key reading for anyone wishing to deconstruct the issues at stake when analysing how care and chronicity are entangled with multiple institutional, economic, and other circumstantial factors. How people access the available informal and formal resources as well as how they react to official diagnoses and decisions are important facets of the management of chronicity. In the arena of care, people with chronic conditions find themselves negotiating restrictions and handling issues of power and (inter)dependency in relationships of inequality and proximity. This is particularly relevant in current times, when care has given in to the lure of the market, and the possibility of living a long and fulfilling life has been drastically reduced, transformed into a 'reward' for the few who have been deemed worthy of it. Optimal Spacecraft Rotational Maneuvers Elsevier This monograph has grown out of the authors' recent work directed toward solving a family of problems which arise in maneuvering modern spacecraft. The work ranges from fundamental developments in analytical dynamics and optimal control to a significant collection of example applications. The primary emphasis herein is upon the most central analytical and numerical methods for determining optimal rotational maneuvers of spacecraft. The authors focus especially upon the large angle nonlinear maneuvers, and also consider large rotational maneuvers of flexible vehicles with simultaneous vibration suppression/arrest. Each chapter includes a list of references. The book provides much new material which will be of great interest to practising professionals and advanced graduate students working in the general areas of spacecraft technology, applied mathematics, optimal control theory, and numerical optimization. Chapter 11 in particular presents new information that will be found widely useful for terminal control and tracking maneuvers. Seize the High Ground The Army in Space and Missile Defense Government Printing Office "[Seize the high ground is a] narrative history of the Army's aerospace experience from the 1950s to the present. The focus is on ballistic missile defense, from the early NIKE-HERCULES missile program through the SAFEGUARD acquisition site allowed by the 1972 ABM

Treaty to the more advanced 'Star Wars' concepts studies toward the end of the century. [What is] covered is not only the technological response to the threat but the organizational and tactical development of the commands and units responsible for the defense mission"--CMH website. Advances in Computational Intelligence Systems Contributions Presented at the 18th UK Workshop on Computational Intelligence, September 5-7, 2018, Nottingham, UK [Springer](#) This book presents the latest trends in and approaches to computational intelligence research and its application to intelligent systems. It covers a long list of interconnected research areas, such as fuzzy systems, neural networks, evolutionary computation, clustering and classification, machine learning, data mining, cognition and robotics, and deep learning. The individual chapters are based on peer-reviewed contributions presented at the 18th Annual UK Workshop on Computational Intelligence (UKCI-2018), held in Nottingham, UK on September 5-7, 2018. The book puts a special emphasis on novel methods and reports on their use in a wide range of applications areas, thus providing both academics and professionals with a comprehensive and timely overview of new trends in computational intelligence. Reconfigurable Computing The Theory and Practice of FPGA-Based Computation [Elsevier](#) Reconfigurable Computing marks a revolutionary and hot topic that bridges the gap between the separate worlds of hardware and software design—the key feature of reconfigurable computing is its groundbreaking ability to perform computations in hardware to increase performance while retaining the flexibility of a software solution. Reconfigurable computers serve as affordable, fast, and accurate tools for developing designs ranging from single chip architectures to multi-chip and embedded systems. Scott Hauck and Andre DeHon have assembled a group of the key experts in the fields of both hardware and software computing to provide an introduction to the entire range of issues relating to reconfigurable computing. FPGAs (field programmable gate arrays) act as the “computing vehicles to implement this powerful technology. Readers will be guided into adopting a completely new way of handling existing design concerns and be able to make use of the vast opportunities possible with reconfigurable logic in this rapidly evolving field. Designed for both hardware and software programmers Views of reconfigurable programming beyond standard programming languages Broad set of case studies demonstrating how to use FPGAs in novel and efficient ways Hardware/Software Co-Design Principles and Practice [Springer Science & Business Media](#) Introduction to Hardware-Software Co-Design presents a number of issues of fundamental importance for the design of integrated hardware software products such as embedded, communication, and multimedia systems. This book is a comprehensive introduction to the fundamentals of hardware/software co-design. Co-design is still a new field but one which has substantially matured over the past few years. This book, written by leading international experts, covers all the major topics including: fundamental issues in co-design; hardware/software co-synthesis algorithms; prototyping and emulation; target architectures; compiler techniques; specification and verification; system-level specification. Special chapters describe in detail several leading-edge co-design systems including Cosyma, LYCOS, and Cosmos. Introduction to Hardware-Software Co-Design contains sufficient material for use by teachers and students in an advanced course of hardware/software co-design. It also contains extensive explanation of the fundamental concepts of the subject and the necessary background to bring practitioners up-to-date on this increasingly important topic. Banking 5.0 How Fintech Will Change Traditional Banks in the 'New Normal' Post Pandemic [Springer Nature](#) Bill Gates' quote, “Banking is necessary, but banks are not,” showcases the opportunity for financial services digital transformation. The next transition from industry 4.0 to 5.0 will impact all sectors, including banking. It will combine information technology and automation, based on artificial intelligence, person-robot collaboration, and sustainability. It is time to analyze this transformation in banking deeply, so that the sector can adequately change to the 'New Normal' and a wholly modified banking model can be properly embedded in the business. This book presents a conceptual model of banking 5.0, detailing its implementation in processes, platforms, people, and partnerships of financial services organizations companies. The last part of the book is then dedicated to future developments. Of interest to academics, researchers, and professionals in banking, financial technology, and financial services, this book also includes business cases in financial services. Reconfigurable Computing From FPGAs to Hardware/Software Codesign [Springer Science & Business Media](#) As the complexity of modern embedded systems increases, it becomes less practical to design monolithic processing platforms. As a result, reconfigurable computing is being adopted widely for more flexible design. Reconfigurable Computers offer the spatial parallelism and fine-grained customizability of application-specific circuits with the postfabrication programmability of software. To make the most of this unique combination of performance and flexibility, designers need to be aware of both hardware and software issues. FPGA users must think not only about the gates needed to perform a computation but also about the software flow that supports the design process. The goal of this book is to help designers become comfortable with these issues, and thus be able to exploit the vast opportunities possible with reconfigurable logic. Numerical Solution of Initial-value Problems in Differential-algebraic Equations [SIAM](#) Many physical problems are most naturally described by systems of differential and algebraic equations. This book describes some of the places where differential-algebraic equations (DAE's) occur. The basic mathematical theory for these equations is developed and numerical methods are presented and analyzed. Examples drawn from a variety of applications are used to motivate and illustrate the concepts and techniques. This classic edition, originally published in 1989, is the only general DAE book available. It not only develops guidelines for choosing different numerical methods, it is the first book to discuss DAE codes, including the popular DASSL code. An extensive discussion of backward differentiation formulas details why they have emerged as the most popular and best understood class of linear multistep methods for general DAE's. New to this edition is a chapter that brings the discussion of DAE software up to date. The objective of this monograph is to advance and consolidate the existing research results for the numerical solution of DAE's. The authors present results on the analysis of numerical methods, and also show how these results are relevant for the solution of problems from applications. They develop guidelines for problem formulation and effective use of the available mathematical software and provide extensive references for further study. A Collection of Technical Papers 16th AIAA International Communications Satellite Systems Conference, February 25-29, 1996, Washington, DC. Automated Rendezvous and Docking of Spacecraft [Cambridge University Press](#) The definitive reference for space engineers on rendezvous and docking/berthing (RVD/B) related issues, this book answers key questions such as: How does the docking vehicle accurately approach the target spacecraft? What technology is needed aboard the spacecraft to perform automatic rendezvous and docking, and what systems are required by ground control to supervise this process? How can the proper functioning of all rendezvous-related equipment, systems and operations be verified before launch? The book provides an overview of the major issues governing approach and mating strategies, and system concepts for rendezvous and docking/berthing. These issues are described and explained such that aerospace engineers, students and even newcomers to the field can acquire a basic understanding of RVD/B. The author would like to extend his thanks to Dr Shufan Wu, GNC specialist and translator of the book's Chinese edition, for his help in the compilation of these important errata. Applications of Cuckoo Search Algorithm and its Variants [Springer Nature](#) This book highlights the basic concepts of the CS algorithm and its variants, and their use in solving diverse optimization problems in medical and engineering applications. Evolutionary-based meta-heuristic approaches are increasingly being applied to solve complicated optimization problems in several real-world applications. One of the most successful optimization algorithms is the Cuckoo search (CS), which has become an active research area to solve N-dimensional and linear/nonlinear optimization problems using simple mathematical processes. CS has attracted the attention of various researchers, resulting in the emergence of numerous variants of the basic CS with enhanced performance since 2019. From Prognostics and Health Systems Management to Predictive Maintenance 1 Monitoring and Prognostics [John Wiley & Sons](#) This book addresses the steps needed to monitor health assessment systems and the anticipation of their failures: choice and location of sensors, data acquisition and processing, health assessment and prediction of the duration of residual useful life. The digital revolution and mechatronics foreshadowed the advent of the 4.0 industry where equipment has the ability to communicate. The ubiquity of sensors (300,000 sensors in the new generations of aircraft) produces a flood of data requiring us to give meaning to information and leads to the need for efficient processing and a relevant interpretation. The process of traceability and capitalization of data is a key element in the context of the evolution of the maintenance towards predictive strategies.