

## **Solution Skogestad Multivariable Feedback Control**

This book provides an introduction to the analysis and design of robust multivariable control, and focuses on control engineering and not system theory. Main topics covered in this book are: multivariable systems; model uncertainty and robustness; interactions between design and control; decentralized control and other special control structures; overview of methods for controller design and model reduction.

"Linear and Nonlinear Multivariable Feedback Control presents a highly original, unified control theory of both linear and nonlinear multivariable (also known as multi-input multi-output (MIMO)) feedback systems as a straightforward extension of classical control theory. It shows how the classical engineering methods look in the multidimensional case and how practising engineers or researchers can apply them to the analysis and design of linear and nonlinear MIMO systems."--BOOK JACKET.

This accessible book pioneers feedback concepts for control mixing. It reviews research results appearing over the last decade, and contains control designs for stabilization of channel, pipe and bluff body flows, as well as control designs for the opposite problem of mixing enhancement.

This book gathers the refereed proceedings of the Applied Informatics and Cybernetics in Intelligent Systems Section of the 9th Computer Science On-line Conference 2020 (CSOC 2020), held on-line in April 2020. Modern cybernetics and computer engineering in

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connection with intelligent systems are an essential aspect of ongoing research. This book addresses these topics, together with automation and control theory, cybernetic applications, and the latest research trends. This book presents real-world problems and exploratory research in computational statistics, mathematical modeling, artificial intelligence and software engineering in the context of the intelligent systems. This book constitutes the refereed proceedings of the 3rd Computational Methods in Systems and Software 2019 (CoMeSySo 2019), a groundbreaking online conference that provides an international forum for discussing the latest high-quality research results.

Robust control has been a topic of active research in the last three decades culminating in  $H_2/H_\infty$  and  $\mu$  design methods followed by research on parametric robustness, initially motivated by Kharitonov's theorem, the extension to non-linear time delay systems, and other more recent methods. The two volumes of Recent Advances in Robust Control give a selective overview of recent theoretical developments and present selected application examples. The volumes comprise 39 contributions covering various theoretical aspects as well as different application areas. The first volume covers selected problems in the theory of robust control and its application to robotic and electromechanical systems. The second volume is dedicated to special topics in robust control and problem specific solutions. Recent Advances in Robust Control will be a valuable reference for those interested in the recent theoretical advances and for researchers working in the broad field of robotics

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and mechatronics.

Numerous worked examples, exercises and case studies, which make frequent use of MATLAB, are included. MATLAB files for examples and figures, solutions to selected exercises, extra problems and linear state-space models for the case studies are available on the Internet.

Robust Control Design with MATLAB® (second edition) helps the student to learn how to use well-developed advanced robust control design methods in practical cases. To this end, several realistic control design examples from teaching-laboratory experiments, such as a two-wheeled, self-balancing robot, to complex systems like a flexible-link manipulator are given detailed presentation. All of these exercises are conducted using MATLAB® Robust Control Toolbox 3, Control System Toolbox and Simulink®. By sharing their experiences in industrial cases with minimum recourse to complicated theories and formulae, the authors convey essential ideas and useful insights into robust industrial control systems design using major H-infinity optimization and related methods allowing readers quickly to move on with their own challenges. The hands-on tutorial style of this text rests on an abundance of examples and features for the second edition: • rewritten and simplified presentation of theoretical and methodological material including original coverage of linear matrix inequalities; • new Part II forming a tutorial on Robust Control Toolbox 3; • fresh design problems including the control of a two-rotor dynamic system; and • end-of-chapter exercises. Electronic supplements to the written text that can be

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downloaded from [extras.springer.com/isbn](https://extras.springer.com/isbn) include: • M-files developed with MATLAB® help in understanding the essence of robust control system design portrayed in text-based examples; • MDL-files for simulation of open- and closed-loop systems in Simulink®; and • a solutions manual available free of charge to those adopting Robust Control Design with MATLAB® as a textbook for courses. Robust Control Design with MATLAB® is for graduate students and practising engineers who want to learn how to deal with robust control design problems without spending a lot of time in researching complex theoretical developments.

The underlying theory on which much modern robust and nonlinear control is based can be difficult to grasp. This volume is a collection of lecture notes presented by experts in advanced control engineering. The book is designed to provide a better grounding in the theory underlying several important areas of control. It is hoped the book will help the reader to apply otherwise abstruse ideas of nonlinear control in a variety of real systems. The book reports on the latest theoretical and experimental advances in the field of active flow and combustion control. It covers new developments in actuator technology and sensing, in robust and optimal open- and closed-loop control, as well as in model reduction for control. It collects contributions presented during the third edition of the Active Flow and Combustion Control conference, held in September 10-12, 2014 at the Technische Universität Berlin (Germany). This conference, as well as the research presented in the book, have been supported by the

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collaborative research center SFB 1029 -Substantial efficiency increase in gas turbines through direct use of coupled unsteady combustion and flow dynamics, funded by the DFG (German Research Foundation). The goal of the Encyclopedia of Optimization is to introduce the reader to a complete set of topics that show the spectrum of research, the richness of ideas, and the breadth of applications that has come from this field. The second edition builds on the success of the former edition with more than 150 completely new entries, designed to ensure that the reference addresses recent areas where optimization theories and techniques have advanced. Particularly heavy attention resulted in health science and transportation, with entries such as "Algorithms for Genomics", "Optimization and Radiotherapy Treatment Design", and "Crew Scheduling".

Fifteen contributions provide an up-to-date treatment of issues in system modeling, system analysis, design and synthesis methods, and nonlinear systems. Coverage includes the application of multidimensional Laplace transforms to the modeling of nonlinear elements, a survey of customized computer algebra modeling programs for multibody dynamical systems, robust control of linear systems using a new linear programming approach, the development and testing of a new branch-and-bound algorithm for global optimization using symbolic algebra techniques, and dynamic sliding mode control design using symbolic algebra tools.

This book highlights the latest achievements concerning the theory, methods and practice of fault diagnostics,

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fault tolerant systems and cyber safety. When considering the diagnostics of industrial processes and systems, increasingly important safety issues cannot be ignored. In this context, diagnostics plays a crucial role as a primary measure of the improvement of the overall system safety integrity level. Obtaining the desired diagnostic coverage or providing an appropriate level of inviolability of the integrity of a system is now practically inconceivable without the use of fault detection and isolation methods. Given the breadth and depth of its coverage, the book will be of interest to researchers faced with the challenge of designing technical and medical diagnosis systems, as well as junior researchers and students in the fields of automatic control, robotics, computer science and artificial intelligence.

The seven volumes LNCS 12249-12255 constitute the refereed proceedings of the 20th International Conference on Computational Science and Its Applications, ICCSA 2020, held in Cagliari, Italy, in July 2020. Due to COVID-19 pandemic the conference was organized in an online event. Computational Science is the main pillar of most of the present research, industrial and commercial applications, and plays a unique role in exploiting ICT innovative technologies. The 466 full papers and 32 short papers presented were carefully reviewed and selected from 1450 submissions. Apart from the general track, ICCSA 2020 also include 52 workshops, in various areas of computational sciences, ranging from computational science technologies, to specific areas of computational sciences, such as software engineering, security, machine learning and

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artificial intelligence, blockchain technologies, and of applications in many fields.

Recent developments in model-predictive control promise remarkable opportunities for designing multi-input, multi-output control systems and improving the control of single-input, single-output systems. This volume provides a definitive survey of the latest model-predictive control methods available to engineers and scientists today. The initial set of chapters present various methods for managing uncertainty in systems, including stochastic model-predictive control. With the advent of affordable and fast computation, control engineers now need to think about using “computationally intensive controls,” so the second part of this book addresses the solution of optimization problems in “real” time for model-predictive control. The theory and applications of control theory often influence each other, so the last section of Handbook of Model Predictive Control rounds out the book with representative applications to automobiles, healthcare, robotics, and finance. The chapters in this volume will be useful to working engineers, scientists, and mathematicians, as well as students and faculty interested in the progression of control theory. Future developments in MPC will no doubt build from concepts demonstrated in this book and anyone with an interest in MPC will find fruitful information and suggestions for additional reading.

A Generalized Framework of Linear Multivariable Control proposes a number of generalized models by using the generalized inverse of matrix, while the usual linear

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Multivariable control theory relies on some regular models. The book supports that in  $H_\infty$  control, the linear fractional transformation formulation is relying on the inverse of the block matrix. If the block matrix is not regular, the  $H_\infty$  control does not apply any more in the normal framework. Therefore, it is very important to relax those restrictions to generalize the classical notions and models to include some non-regular cases. This book is ideal for scholars, academics, professional engineer and students who are interested in control system theory. Presents a comprehensive set of numerical procedures, algorithms, and examples on how to deal with irregular models Provides a summary on generalized framework of linear multivariable control that focuses on generalizations of models and notions Introduces a number of generalized models by using the generalized inverse of matrix

During the last decades, the growth of micro-electronics has reduced the cost of computing power to a level acceptable to industry and has made possible sophisticated control strategies suitable for many applications. Vibration control is applied to all kinds of engineering systems to obtain the desired dynamic behavior, improved accuracy and increased reliability during operation. In this context, one can think of applications related to the control of structures' vibration isolation, control of vehicle dynamics, noise control, control of machines and mechanisms and control of fluid-structure-interaction. One could continue with this list for a long time. Research in the field of vibration control is extremely comprehensive. Problems that are typical for vibration control of nonlinear mechanisms and structures arise in the fields of modeling systems in such a way that the model is suitable for

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control design, to choose appropriate actuator and sensor locations and to select the actuators and sensors.

The objective of the Symposium was to present and discuss methods that contribute to the solution of such problems and to demonstrate the state of the art in the field shown by typical examples. The intention was to evaluate the limits of performance that can be achieved by controlling the dynamics, and to point out gaps in present research and give links for areas of future research. Mainly, it brought together leading experts from quite different areas presenting their points of view.

An instructive reference that will help control researchers and engineers, interested in a variety of industrial processes, to take advantage of a powerful tuning method for the ever-popular PID control paradigm. This monograph presents explicit PID tuning rules for linear control loops regardless of process complexity. It shows the reader how such loops achieve zero steady-position, velocity, and acceleration errors and are thus able to track fast reference signals. The theoretical development takes place in the frequency domain by introducing a general-transfer-function-known process model and by exploiting the principle of the magnitude optimum criterion. It is paralleled by the presentation of real industrial control loops used in electric motor drives. The application of the proposed tuning rules to a large class of processes shows that irrespective of the complexity of the controlled process the shape of the step and frequency response of the control loop exhibits a specific performance. This specific performance, along with the PID explicit solution, formulates the basis for developing an automatic tuning method for the PID controller parameters which is a problem often met in many industry applications—temperature, pH, and humidity control, ratio control in product blending, and boiler-drum level control, for example. The process of the model is

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considered unknown and controller parameters are tuned automatically such that the aforementioned performance is achieved. The potential both for the explicit tuning rules and the automatic tuning method is demonstrated using several examples for benchmark process models recurring frequently in many industry applications.

Written by international experts, this book explores the possibilities for the next 20 years in conducting gravitational experiments in space that would make the most of the new and much-improved existing capabilities. They start from the premise that over the next decade the gravitational physics community will benefit from dramatic improvements in many technologies critical to the tests of gravity. This volume contains a comprehensive presentation of the theory, technology, missions and projects on relativistic gravity in space.

Actuator saturation is probably the most frequent nonlinearity encountered in control applications. Input saturation leads to controller windup, removable by structural modification during compensator realization and plant windup which calls for additional dynamics. This book presents solutions to the windup prevention problem for stable and unstable single-input-single-output and multiple-input-multiple-output (MIMO) systems.

Proceedings of the IUTAM Symposium on Smart Structures and Structronic Systems, held in Magdeburg, Germany, 26-29 September 2000

At publication, The Control Handbook immediately became the definitive resource that engineers working with modern control systems required. Among its many accolades, that first edition was cited by the AAP as the Best Engineering Handbook of 1996. Now, 15 years later, William Levine has once again compiled the most comprehensive and authoritative resource on control engineering. He has fully

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reorganized the text to reflect the technical advances achieved since the last edition and has expanded its contents to include the multidisciplinary perspective that is making control engineering a critical component in so many fields. Now expanded from one to three volumes, *The Control Handbook, Second Edition* organizes cutting-edge contributions from more than 200 leading experts. The third volume, *Control System Advanced Methods*, includes design and analysis methods for MIMO linear and LTI systems, Kalman filters and observers, hybrid systems, and nonlinear systems. It also covers advanced considerations regarding — Stability Adaptive controls System identification Stochastic control Control of distributed parameter systems Networks and networked controls As with the first edition, the new edition not only stands as a record of accomplishment in control engineering but provides researchers with the means to make further advances. Progressively organized, the first two volumes in the set include: *Control System Fundamentals* *Control System Applications*

*Design of Observer-based Compensators* facilitates and adds transparency to design in the frequency domain which is not as well-established among control engineers as time domain design. The presentation of the design procedures starts with a review of the time domain results; therefore, the book also provides quick access to state space methods for control system design. Frequency domain design of observer-based compensators of all orders is covered. The design of decoupling and disturbance rejecting controllers is presented, and solutions are given to the linear quadratic and the model matching problems. The pole assignment design is facilitated by a new parametric approach in the frequency domain. Anti-windup control is also investigated in the framework of the polynomial approach. The discrete-time results for disturbance rejection and linear quadratic control are also

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presented. The book contains worked examples that can easily be reproduced by the reader, and the results are illustrated by simulations.

As industrial processes and their corresponding control models increase in complexity, the data provided by traditional point sensors is no longer adequate to ensure product quality and cost-effective operation. Process Imaging for Automatic Control demonstrates how in-process imaging technologies surpass the limitations of traditional monitoring systems by providing real-time multidimensional measurement and control data. Combined with suitable data extraction and control schemes, such systems can optimize the performance of a wide variety of industrial processes. Contributed by leading international experts, Process Imaging for Automatic Control offers authoritative, comprehensive coverage of this new area of process control technology, including: Basic goals of process modeling and their application to automatic control Direct imaging devices and applications, such as machine vision and spatial measurement of flow velocity, pressure, shear, pH, and temperature Various techniques, hardware implementations, and image reconstruction methods for process tomography Image enhancement and restoration State estimation methods State space control system models, control strategies, and implementation issues Five chapters devoted to case studies and advanced applications From theory to practical implementation, this book is the first to treat the entire range of imaging techniques and their application to process control. Supplying broad coverage with more than 270 illustrations and nearly 700 cited references, it presents an accessible introduction to this rapidly growing, interdisciplinary technology.

This book presents both basic and advanced

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concepts and techniques for the monitoring and control of chemical and biochemical processes. It also covers aspects of the implementation of these different robust techniques. The book offers a balanced view of the theoretical and practical issues of control systems and provides different cases to illustrate the controller and observer design procedures and their dynamic effects in the closed-loop.

Cyber-physical systems play a crucial role in connecting aspects of online life to physical life. By studying emerging trends in these systems, programming techniques can be optimized and strengthened to create a higher level of effectiveness. *Solutions for Cyber-Physical Systems Ubiquity* is a critical reference source that discusses the issues and challenges facing the implementation, usage, and challenges of cyber-physical systems. Highlighting relevant topics such as the Internet of Things, smart-card security, multi-core environments, and wireless sensor nodes, this scholarly publication is ideal for engineers, academicians, computer science students, and researchers that would like to stay abreast of current methodologies and trends involving cyber-physical system progression.

*Modelling and Precision Control of Systems with Hysteresis* covers the piezoelectric and other smart materials that are increasingly employed as

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actuators in precision engineering, from scanning probe microscopes (SPMs) in life science and nano-manufacturing, to precision active optics in astronomy, including space laser communication, space imaging cameras, and the micro-electro-mechanical systems (MEMS). As smart materials are known for having hysteretic dynamics, it is necessary to overcome issues with a broadband range of frequencies. This book offers both the mathematical tools for modeling the systems and applications, including complete case studies and source code for the experiments to help both academics and researchers in the industry to achieve precision in the control of Smart Actuator systems. Provides a comprehensive identification of typical complex hysteresis Presents control algorithm design for systems with hysteresis Contain numerous real life examples and two complete case studies Source code to examples are provided Structured Controllers for Uncertain Systems focuses on the development of easy-to-use design strategies for robust low-order or fixed-structure controllers (particularly the industrially ubiquitous PID controller). These strategies are based on a recently-developed stochastic optimization method termed the "Heuristic Kalman Algorithm" (HKA) the use of which results in a simplified methodology that enables the solution of the structured control problem without a profusion of user-defined

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parameters. An overview of the main stochastic methods employable in the context of continuous non-convex optimization problems is also provided and various optimization criteria for the design of a structured controller are considered;  $H^\infty$ ,  $H_2$ , and mixed  $H_2/H^\infty$  each merits a chapter to itself. Time-domain-performance specifications can be easily incorporated in the design.

Quantitative Process Control Theory explains how to solve industrial system problems using a novel control system design theory. This easy-to-use theory does not require designers to choose a weighting function and enables the controllers to be designed or tuned for quantitative engineering performance indices such as overshoot. In each chapter, a s

This book thoroughly covers the fundamentals of the QFT robust control, as well as practical control solutions, for unstable, time-delay, non-minimum phase or distributed parameter systems, plants with large model uncertainty, high-performance specifications, nonlinear components, multi-input multi-output characteristics or asymmetric topologies. The reader will discover practical applications through a collection of fifty successful, real world case studies and projects, in which the author has been involved during the last twenty-five years, including commercial wind turbines, wastewater treatment plants, power systems,

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satellites with flexible appendages, spacecraft, large radio telescopes, and industrial manufacturing systems. Furthermore, the book presents problems and projects with the popular QFT Control Toolbox (QFTCT) for MATLAB, which was developed by the author.

This compact monograph is focused on disturbance attenuation in nonsmooth dynamic systems, developing an  $H^\infty$  approach in the nonsmooth setting. Similar to the standard nonlinear  $H^\infty$  approach, the proposed nonsmooth design guarantees both the internal asymptotic stability of a nominal closed-loop system and the dissipativity inequality, which states that the size of an error signal is uniformly bounded with respect to the worst-case size of an external disturbance signal. This guarantee is achieved by constructing an energy or storage function that satisfies the dissipativity inequality and is then utilized as a Lyapunov function to ensure the internal stability requirements.

Advanced  $H^\infty$  Control is unique in the literature for its treatment of disturbance attenuation in nonsmooth systems. It synthesizes various tools, including Hamilton–Jacobi–Isaacs partial differential inequalities as well as Linear Matrix Inequalities. Along with the finite-dimensional treatment, the synthesis is extended to infinite-dimensional setting, involving time-delay and distributed parameter systems. To help illustrate this synthesis, the book

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focuses on electromechanical applications with nonsmooth phenomena caused by dry friction, backlash, and sampled-data measurements. Special attention is devoted to implementation issues. Requiring familiarity with nonlinear systems theory, this book will be accessible to graduate students interested in systems analysis and design, and is a welcome addition to the literature for researchers and practitioners in these areas.

During the past decade model predictive control (MPC), also referred to as receding horizon control or moving horizon control, has become the preferred control strategy for quite a number of industrial processes. There have been many significant advances in this area over the past years, one of the most important ones being its extension to nonlinear systems. This book gives an up-to-date assessment of the current state of the art in the new field of nonlinear model predictive control (NMPC). The main topic areas that appear to be of central importance for NMPC are covered, namely receding horizon control theory, modeling for NMPC, computational aspects of on-line optimization and application issues. The book consists of selected papers presented at the International Symposium on Nonlinear Model Predictive Control – Assessment and Future Directions, which took place from June 3 to 5, 1998, in Ascona, Switzerland. The book is geared towards researchers and practitioners in the

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area of control engineering and control theory. It is also suited for postgraduate students as the book contains several overview articles that give a tutorial introduction into the various aspects of nonlinear model predictive control, including systems theory, computations, modeling and applications.

In the networked control of interconnected systems, the communication network is primarily used for the exchange of measurements amongst the control stations. Plug-and-play control extends the usage of this network towards the exchange of models with the aim to automatically design control stations at runtime. Therefore, every subsystem is equipped with a design agent that initially knows only the model of its subsystem. To design a control station by a design agent, first, a suitable model of the subsystem that interacts with other subsystems has to be set up. Second, local design conditions have to be found that guarantee the adherence of the global control aim. If the designed control station is finally plugged into the control equipment, the overall closed-loop system plays as desired. The focus of this thesis is to enable the design agent to accomplish the controller design. Therefore, three approaches are proposed which focus on the accuracy of the model that is used for the design with respect to the achievable overall closed-loop performance. The main result is a novel concept for the self-organised controller design by means of

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design agents. This concept is applied to achieve fault tolerance and to integrate new subsystems. The proposed methods are tested and evaluated through simulations and experiments on a thermofluid process and a multizone furnace.

This volume collects papers, based on invited talks given at the IMA workshop in Modeling, Stochastic Control, Optimization, and Related Applications, held at the Institute for Mathematics and Its Applications, University of Minnesota, during May and June, 2018. There were four week-long workshops during the conference. They are (1) stochastic control, computation methods, and applications, (2) queueing theory and networked systems, (3) ecological and biological applications, and (4) finance and economics applications. For broader impacts, researchers from different fields covering both theoretically oriented and application intensive areas were invited to participate in the conference. It brought together researchers from multi-disciplinary communities in applied mathematics, applied probability, engineering, biology, ecology, and networked science, to review, and substantially update most recent progress. As an archive, this volume presents some of the highlights of the workshops, and collect papers covering a broad range of topics.

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working with modern control systems required. Among its many accolades, that first edition was cited by the AAP as the Best Engineering Handbook of 1996. Now, 15 years later, William Levine has once again compiled the most comprehensive and authoritative resource on control engineering. He has fully reorganized the text to reflect the technical advances achieved since the last edition and has expanded its contents to include the multidisciplinary perspective that is making control engineering a critical component in so many fields. Now expanded from one to three volumes, *The Control Handbook, Second Edition* brilliantly organizes cutting-edge contributions from more than 200 leading experts representing every corner of the globe. They cover everything from basic closed-loop systems to multi-agent adaptive systems and from the control of electric motors to the control of complex networks. Progressively organized, the three volume set includes: Control System Fundamentals Control System Applications Control System Advanced Methods Any practicing engineer, student, or researcher working in fields as diverse as electronics, aeronautics, or biomedicine will find this handbook to be a time-saving resource filled with invaluable formulas, models, methods, and innovative thinking. In fact, any physicist, biologist, mathematician, or researcher in any number of fields developing or improving products and systems will

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find the answers and ideas they need. As with the first edition, the new edition not only stands as a record of accomplishment in control engineering but provides researchers with the means to make further advances.

The two-volume set LNCS 9779 and LNCS 9780 constitutes the refereed proceedings of the 28th International Conference on Computer Aided Verification, CAV 2016, held in Toronto, ON, USA, in July 2016. The total of 46 full and 12 short papers presented in the proceedings was carefully reviewed and selected from 195 submissions. The papers were organized in topical sections named: probabilistic systems; synthesis; constraint solving; model checking; program analysis; timed and hybrid systems; verification in practice; concurrency; and automata and games.

Noise has various effects on comfort, performance, and human health. For this reason, noise control plays an increasingly central role in the development of modern industrial and engineering applications. Nowadays, the noise control problem excites and attracts the attention of a great number of scientists in different disciplines. Indeed, noise control has a wide variety of applications in manufacturing, industrial operations, and consumer products. The main purpose of this book, organized in 13 chapters, is to present a comprehensive overview of recent advances in noise control and its applications in

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different research fields. The authors provide a range of practical applications of current and past noise control strategies in different real engineering problems. It is well addressed to researchers and engineers who have specific knowledge in acoustic problems. I would like to thank all the authors who accepted my invitation and agreed to share their work and experiences.

Modellbasierte prädiktive Regelungen dienen der Lösung anspruchsvoller Aufgaben der Mehrgrößenregelung mit Beschränkungen der Stell- und Regelgrößen. Sie werden in der Industrie in vielen Bereichen erfolgreich eingesetzt. Mit der MPC Toolbox<sup>TM</sup> des Programmsystems MATLAB<sup>®</sup>/Simulink<sup>®</sup> steht ein Werkzeug zur Verfügung, das sowohl in der industriellen Praxis als auch an Universitäten und Hochschulen verwendet wird. Das vorliegende Buch gibt eine Übersicht über die Grundideen und Anwendungsvorteile des MPC-Konzepts. Es zeigt, wie mit Hilfe der Toolbox MPC-Regelungen entworfen, eingestellt und simuliert werden können. Ausgewählte Beispiele aus dem Bereich der Verfahrenstechnik demonstrieren mögliche Vorgehensweisen und vertiefen das Verständnis. Das Buch richtet sich an in der Industrie tätige Ingenieure, die MPC-Regelungen planen, entwickeln und betreiben, aber auch an Studierende technischer Fachdisziplinen, die in das Arbeitsgebiet MPC einsteigen wollen. Model

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Predictive Control (MPC) is used to solve challenging multivariable-constrained control problems. MPC systems are successfully applied in many different branches of industry. The MPC Toolbox™ of MATLAB®/Simulink® provides powerful tools for industrial MPC application, but also for education and research at technical universities. This book gives an overview of the basic ideas and advantages of the MPC concept. It shows how MPC systems can be designed, tuned, and simulated using the MPC Toolbox. Selected process engineering benchmark examples are used to demonstrate typical design approaches and help deepen the understanding of MPC technologies. The book is aimed at engineers in industry interested in the development and application of MPC systems, as well as students of different technical disciplines seeking an introduction into this field. This book gives an overview of the basic ideas and advantages of the MPC concept. It shows how MPC systems can be designed, tuned, and simulated using the MPC Toolbox. Selected process engineering benchmark examples are used to demonstrate typical design approaches and help deepen the understanding of MPC technologies. The book is aimed at engineers in industry interested in the development and application of MPC systems, as well as students of different technical disciplines seeking an introduction into this field.

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This three volume set LNAI 9244, 9245, and 9246 constitutes the refereed proceedings of the 8th International Conference on Intelligent Robotics and Applications, ICIRA 2015, held in Portsmouth, UK, in August 2015. The 60 papers included in the first volume are organized in topical sections on analysis and control for complex systems; marine vehicles and oceanic engineering; drives and actuators' modeling; biomechatronics in bionic dexterous hand; robot actuators and sensors; intelligent visual systems; estimation and identification; and adaptive control system.

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