Intelligent Technologies & Robotics

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ISBN : 978-3-319-91721-4

Ponce-Ortega, José María, Hernández-Pérez, Luis Germán, Universidad Michoacana de San Nicolás de Hidalgo, Morelia, Mexico

Optimization of Process Flowsheets through Metaheuristic Techniques

• Provides a general methodology for optimizing process flowsheets through external links with metaheuristic algorithms
• Explains, step by step and with screenshots, how to link process simulators with optimization using metaheuristic techniques
• Provides tutorial videos and several examples for practice

This textbook presents a general multi-objective optimization framework for optimizing chemical processes by implementing a link between process simulators and metaheuristic techniques. The proposed approach is general and shows how to implement links between different process simulators such as Aspen Plus®, HYSIS®, Super Pro Designer® linked to a variety of metaheuristic techniques implemented in Matlab®, Excel®, C++, and others, eliminating the numerical complications through the optimization process. Furthermore, the proposed framework allows the use of thermodynamic, design and constitutive equations implemented in the process simulator ...

Contents
Chapter 1- Introduction.- Chapter 2- Process simulators.- Chapter 3- Metaheuristic optimization programs.- Chapter 4- interlinking between process simulators and optimization programs.- Chapter 5- Performance evaluation.- Chapter 6- Optimization of industrial process 1.- Chapter 7- Optimization of industrial process 2.- Chapter 8- Bibliography.- Appendix.

Fields of Interest
Computational Intelligence; Industrial Chemistry/Chemical Engineering; Simulation and Modeling

Content Level
Upper undergraduate

Product category
Undergraduate textbook

Available

Bibliography
1st ed. 2019,XVII, 110 p. 92 illus., 53 illus. in color. Hardcover
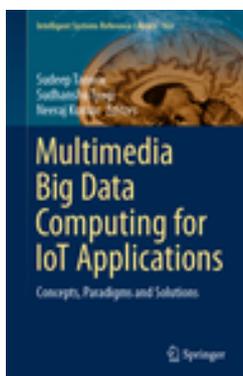
Medium Type
Book

Imprint
Springer

Order Quantity

ISBN : 978-981-13-8758-6

Tanwar, S., Tyagi, S., Kumar, N. (Eds.), Institute of Technology, Nirma University, Ahmedabad, India

Multimedia Big Data Computing for IoT Applications

Concepts, Paradigms and Solutions

• Examines the unique nature and complexity of MMBD computing for IoT applications
• Includes of case studies to demonstrate the process model
• Discusses the layered architecture of MMBD computing and compares the life cycle of both big data and MMBD

This book considers all aspects of managing the complexity of Multimedia Big Data Computing (MMBD) for IoT applications and develops a comprehensive taxonomy. It also discusses a process model that addresses a number of research challenges associated with MMBD, such as scalability, accessibility, reliability, heterogeneity, and Quality of Service (QoS) requirements, presenting case studies to demonstrate its application. Further, the book examines the layered architecture of MMBD computing and compares the life cycle of both big data and

MMBD. Written by leading experts, it also includes numerous solved examples, technical descriptions, ...

Contents
Multimedia Big data computing for IoT .- Energy Conservation in MMBD Computing and IoT – A Challenge.- An Architecture for the Real-Time Data Stream Monitoring in IoT.- Deep learning for Multimedia data in IoT.- Random Forest based Sarcastic Tweet Classification using multiple feature Collection.- Peak Average Power Ratio reduction in FBMC using SLM & PTS techniques.- Intelligent Personality Analysis on Indicators in IoT-MMBD Enabled Environment.- Data Reduction in MMBD Computing.- Large Scale MMBD Management and Retrieval.- Data Reduction Technique for Capsule Endoscopy.- Multimedia Social Big Data: Mining.- Advertisement prediction in ...

Fields of Interest
Computational Intelligence; Systems and Data Security; Big Data; Multimedia Information Systems; Information Systems Applications (incl. Internet)

Content Level
Graduate

Product category
Graduate/advanced undergraduate textbook

Available

Bibliography
1st ed. 2020,XIV, 477 p. 191 illus., 121 illus. in color.(Intelligent Systems Reference Library, Volume 163) Hardcover
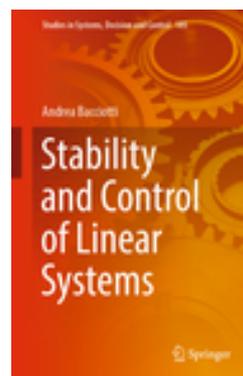
Medium Type
Book

Imprint
Springer

Order Quantity

ISBN : 978-3-030-02404-8

Bacciotti, Andrea, Politecnico di Torino, Turin, Italy

Stability and Control of Linear Systems

• Includes end-of-chapter summaries, notes and examples
• Focuses on stability and feedback stabilization
• Provides necessary mathematical background information

This advanced textbook introduces the main concepts and advances in systems and control theory, and highlights the importance of geometric ideas in the context of possible extensions to the more recent developments in nonlinear systems theory. Although inspired by engineering applications, the content is presented within a strong theoretical framework and with a solid mathematical background, and the reference models are always finite dimensional, time-invariant multivariable linear systems. The book focuses on the time domain approach, but also considers the frequency domain approach, discussing the relationship between the two approaches, ...

Contents
Introduction.- Unforced linear systems.- Stability of unforced linear systems.- Linear systems with forcing term.- Controllability and observability of linear systems.- External stability.- Stabilization.- Frequency domain approach.- Appendix A: Internal stability notions.- Appendix B: Laplace Transform.

Fields of Interest
Control and Systems Theory; Systems Theory, Control; Ordinary Differential Equations; Engineering Mathematics

Content Level
Graduate

Product category
Graduate/advanced undergraduate textbook

Available

Bibliography
1st ed. 2019,XVII, 189 p. 8 illus.(Studies in Systems, Decision and Control, Volume 185) Hardcover
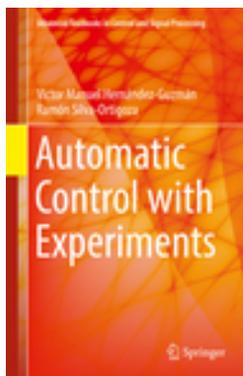
Medium Type
Book

Imprint
Springer

Order Quantity

ISBN : 978-3-319-75803-9

Hernández-Guzmán, Victor Manuel, Silva-Ortigoza, Ramón, Universidad Autonoma de Queretaro, Facultad de Ingenieria, Querétaro, Mexico

Automatic Control with Experiments

• Offers detailed experimental case studies on the application of control theory to mechanical systems, oscillator circuits, limit cycles in mechanical systems, radio-frequency circuits and electromechanical systems
• Equips readers with the knowledge to construct their own prototypes
• Examines solutions to linear ordinary differential equations using the Laplace transform in order to help readers understand stability concepts as well as time and frequency response of linear systems

This textbook presents theory and practice in the context of automatic control education. It presents the relevant theory in the first eight chapters, applying them later on to the control of several real plants. Each plant is studied following a uniform procedure: a) the plant's function is described, b) a mathematical model is obtained, c) plant construction is explained in such a way that the reader can build his or her own plant to conduct experiments, d) experiments are conducted to determine the plant's parameters, e) a controller is designed using the theory discussed in the first eight chapters, f) practical controller implementation ...

Contents
Chapter 1: Introduction.- Chapter 2: Physical system modeling.- Chapter 3: Ordinary linear differential equations.- Chapter 4: Stability criteria and steady state error.- Chapter 5: Time response-based design.- Chapter 6: Frequency response-based design.- Chapter 7: The state variables approach.- Chapter 8: Advanced topics in control.- Chapter 9: Feedback electronic circuits.- Chapter 10: Velocity control of a PM brushed DC motor.- Chapter 11: Position control of a PM brushed DC motor.- Chapter 12: Control of a servomechanism with flexibility.- Chapter 13: Control of a magnetic levitation system.-

Chapter 14: Control of a ball and beam ...

Fields of Interest
Control and Systems Theory; Systems Theory, Control; Power Electronics, Electrical Machines and Networks; Industrial and Production Engineering

Content Level
Upper undergraduate

Product category
Undergraduate textbook

Available

Bibliography
1st ed. 2019,XVI, 992 p. 633 illus., 91 illus. in color.(Advanced Textbooks in Control and Signal Processing) Hardcover

Medium Type
Book

Imprint
Springer

Order Quantity

ISBN : 978-981-10-8296-2

Keviczky, L., Bars, R., Hetthéssy, J., Bányász, C., Hungarian Academy of Sciences, Budapest, Hungary

Control Engineering

• Broadens readers' understanding of the analysis and synthesis of continuous and sampled data control systems
• Provides numerous examples that help readers to learn quickly
• Includes a separate,related exercise book that provides Matlab/Simulink exercises for all topics discussed in the textbook, helping readers to understand the theory and apply it in order to solve control problems

This book offers fundamental information on the analysis and synthesis of continuous and sampled data control systems. It includes all

the required preliminary materials (from mathematics, signals and systems) that are needed in order to understand control theory, so readers do not have to turn to other textbooks. Sampled data systems have recently gained increasing importance, as they provide the basis for the analysis and design of computer-controlled systems. Though the book mainly focuses on linear systems, input/output approaches and state space descriptions are also provided. Control structures such as feedback, feed forward, internal ...

Contents

Introduction.- Description of continuous linear systems in the time, operator and frequency domain.- Description of continuous time systems in state space.- The negative feedback.- Stability of linear control systems.- Regulator design in the frequency domain.- Control of stable processes.- Design of conventional regulators.- Control systems with state feedback.- General polynomial method for controller design.- Sampled data control systems.- Sampled data controller design for stable discrete-time processes.- Design of conventional sampled data regulators.- State feedback in sampled data systems.- General polynomial method for the design of ...

Fields of Interest
Control and Systems Theory; Systems Theory, Control; Computer Applications

Content Level
Graduate

Product category
Graduate/advanced undergraduate textbook

Available

Bibliography
1st ed. 2019,XXIV, 532 p. 341 illus., 2 illus. in color.(Advanced Textbooks in Control and Signal Processing) Hardcover
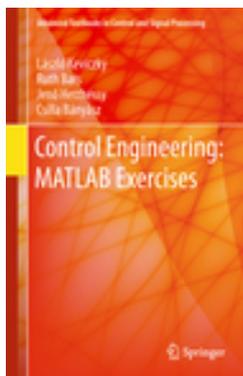
Medium Type
Book

Imprint
Springer

Order Quantity

ISBN : 978-981-10-8320-4

Keviczky, L., Bars, R., Hetthéssy, J., Bányász, C., Hungarian Academy of Sciences, Budapest, Hungary

Control Engineering: MATLAB Exercises

• Contains Matlab/Simulink exercises which complement the textbook Control Engineering and is designed to enrich the understanding of each topic in the textbook
• Each exercise is developed after years of teaching the course in computer labs, presents a didactic approach where students are able to execute each exercise within 2 hours
• Features the newer paradigm of Youla parameterization control as a basic control structure and basic control algorithm

This MATLAB exercise book accompanies the textbook Control Engineering, providing a platform for students to practice problem solving in the analysis and design of continuous and discrete control problems reflected in the main textbook. The book starts off with a brief introduction to MATLAB, control toolbox and Simulink. Subsequent chapters include a short theoretical summary of the topic followed by exercises on solving complex problems using MATLAB commands. These exercises are ideal for students in computer laboratory classes.

Contents
Introduction to MATLAB.- Introduction to MATLAB Control System Toolbox and Simulink.- Analysis of systems in the time-, operator- and frequency domain.- Typical elements of a linear system.- State space description of linear systems.- Feedback and closed loop control structures.- Stability.- Controller design considerations in the time and in the frequency domain.- Control of stable processes.- Series PID Compensation.- State feedback control.- Controlling unstable processes.- Discrete-time systems.- Control of stable discrete -time (sampled data) systems.- Discrete PID control.- State space representation of discrete systems.- State ...

Fields of Interest
Control and Systems Theory; Systems Theory,

Control; Computer Applications

Content Level
Graduate

Product category
Graduate/advanced undergraduate textbook

Available

Bibliography
1st ed. 2019,XVIII, 275 p. 178 illus., 11 illus. in color.(Advanced Textbooks in Control and Signal Processing) Hardcover
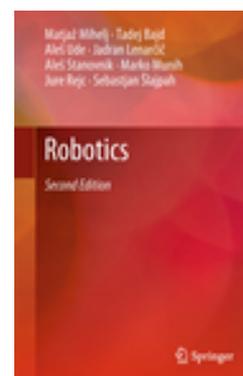
Medium Type
Book

Imprint
Springer

Order Quantity

ISBN : 978-3-319-72910-7

Mihelj, M., Bajd, T., Ude, A., Lenarčič, J., Stanovnik, A., Munih, M., Rejc, J., Šlajpah, S., University of Ljubljana, Ljubljana, Slovenia

Robotics

• Expanded, second edition of the book that won the Outstanding Academic Title distinction from the library magazine CHOICE in 2011
• Includes robotics course material (slides) on extras.springer.com
• Provides an essential introduction for engineers and computer scientists, requiring only a minimal grasp of physics and mathematics

This book introduces readers to robotics, industrial robot mechanisms, and types of robots, e.g. parallel robots, mobile robots and humanoid robots. The book is based on over 20 years of teaching robotics and has been extensively class tested and praised for its simplicity. It addresses the following subjects: a general introduction to robotics; basic characteristics of industrial robot mechanisms; position and movement of an

object, which are described by homogenous transformation matrices; a geometric model of robot mechanisms expanded with robot wrist orientation description in this new edition; a brief introduction to the kinematics and …

Contents

1 Introduction.- 2 Homogenous transformation matrices.- 3 Geometric description of the robot mechanism.- 4 Orientation of robot gripper.- 5 Two-segment robot manipulator.- 6 Robot sensors.- 7 Trajectory planning.- 8 Robot control.- 9 Robot teaching.- 10 Parallel robots.- 11 Collaborative robots.- 12 Mobile robots.- 13 Humanoid robots.- 14 Robot workcells.

Fields of Interest

Control, Robotics, Mechatronics; Artificial Intelligence; Manufacturing, Machines, Tools, Processes

Content Level

Upper undergraduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

2nd ed. 2019,IX, 251 p. 175 illus. Hardcover

Medium Type

Book

Imprint

Springer

Order Quantity