

A Matlab Based Simulation Tool For Building Thermal

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PCM-Based Building Envelope Systems - Benjamin Duraković
2020-01-23

PCM Enhanced Building Envelopes presents the latest research in the field of thermal energy storage technologies that can be applied to solar heating and cooling with the aim of shifting and reducing building energy demand. It discusses both practical and technical issues, as well as the advantages of using common phase change materials (PCMs) in buildings as a more efficient, novel solution for passive solar heating/cooling strategies. The book includes qualitative and quantitative descriptions of the science, technology and practices of PCM-based building envelopes, and reflects recent trends by placing emphasis on energy storage solutions within building walls, floors, ceilings, façades, windows, and shading devices. With the aim of assessing buildings' energy performance, the book provides advanced modeling and simulation tools as a theoretical basis for the analysis of PCM-based building envelopes in terms of heat storage and transfer. This book will be of interest to all those dealing with building energy analysis such as researchers, academics, students and professionals in the fields of mechanical and civil engineering and architectural design

Energy Efficiency in Buildings - José Manuel Andújar 2020-04-28

Buildings are one of the main causes of the emission of greenhouse gases in the world. Europe alone is responsible for more than 30% of emissions, or about 900 million tons of CO₂ per year. Heating and air conditioning are the main cause of greenhouse gas emissions in buildings. Most buildings currently in use were built with poor energy efficiency criteria or, depending on the country and the date of construction, none at all. Therefore, regardless of whether construction regulations are becoming stricter, the real challenge nowadays is the energy rehabilitation of existing buildings. It is currently a priority to reduce (or, ideally, eliminate) the waste of energy in buildings and, at the same time, supply the necessary energy through renewable sources. The first can be achieved by improving the architectural design, construction methods, and materials used, as well as the efficiency of the facilities and systems; the second can be achieved through the integration of renewable energy (wind, solar, geothermal, etc.) in buildings. In any case, regardless of whether the energy used is renewable or not, the efficiency must always be taken into account. The most profitable and clean energy is that which is not consumed.

Sustainability in Energy and Buildings - Anne Hakansson 2013-03-29

This volume contains the proceedings of the Fourth International Conference on Sustainability in Energy and Buildings, SEB12, held in Stockholm, Sweden, and is organized by KTH Royal Institute of Technology, Stockholm, Sweden in partnership with KES International. The International Conference on Sustainability in Energy and Buildings focuses on a broad range of topics relating to sustainability in buildings but also encompassing energy sustainability more widely. Following the success of earlier events in the series, the 2012 conference includes the themes Sustainability, Energy, and Buildings and Information and Communication Technology, ICT. The SEB'12 proceedings include invited participation and paper submissions across a broad range of renewable energy and sustainability-related topics relevant to the main theme of Sustainability in Energy and Buildings. Applicable areas include technology for renewable energy and sustainability in the built environment, optimization and modeling techniques, information and communication technology usage, behavior and practice, including applications.

Transient Analysis of Power Systems - Juan A. Martinez-Velasco
2015-01-27

The simulation of electromagnetic transients is a mature field that plays

an important role in the design of modern power systems. Since the first steps in this field to date, a significant effort has been dedicated to the development of new techniques and more powerful software tools. Sophisticated models, complex solution techniques and powerful simulation tools have been developed to perform studies that are of supreme importance in the design of modern power systems. The first developments of transients tools were mostly aimed at calculating over-voltages. Presently, these tools are applied to a myriad of studies (e.g. FACTS and Custom Power applications, protective relay performance, simulation of smart grids) for which detailed models and fast solution methods can be of paramount importance. This book provides a basic understanding of the main aspects to be considered when performing electromagnetic transients studies, detailing the main applications of present electromagnetic transients (EMT) tools, and discusses new developments for enhanced simulation capability. Key features: Provides up-to-date information on solution techniques and software capabilities for simulation of electromagnetic transients. Covers key aspects that can expand the capabilities of a transient software tool (e.g. interfacing techniques) or speed up transients simulation (e.g. dynamic model averaging). Applies EMT-type tools to a wide spectrum of studies that range from fast electromagnetic transients to slow electromechanical transients, including power electronic applications, distributed energy resources and protection systems. Illustrates the application of EMT tools to the analysis and simulation of smart grids.

Beginning MATLAB and Simulink - Sulaymon Eshkabilov 2019-11-28

Employ essential and hands-on tools and functions of the MATLAB and Simulink packages, which are explained and demonstrated via interactive examples and case studies. This book contains dozens of simulation models and solved problems via m-files/scripts and Simulink models which help you to learn programming and modeling essentials. You'll become efficient with many of the built-in tools and functions of MATLAB/Simulink while solving engineering and scientific computing problems. Beginning MATLAB and Simulink explains various practical issues of programming and modelling in parallel by comparing MATLAB and Simulink. After reading and using this book, you'll be proficient at using MATLAB and applying the source code from the book's examples as templates for your own projects in data science or engineering. What You Will Learn Get started using MATLAB and Simulink Carry out data visualization with MATLAB Gain the programming and modeling essentials of MATLAB Build a GUI with MATLAB Work with integration and numerical root finding methods Apply MATLAB to differential equations-based models and simulations Use MATLAB for data science projects Who This Book Is For Engineers, programmers, data scientists, and students majoring in engineering and scientific computing.

Building Performance Simulation for Design and Operation - Jan L.M. Hensen 2019-04-24

When used appropriately, building performance simulation has the potential to reduce the environmental impact of the built environment, to improve indoor quality and productivity, as well as to facilitate future innovation and technological progress in construction. Since publication of the first edition of Building Performance Simulation for Design and Operation, the discussion has shifted from a focus on software features to a new agenda, which centres on the effectiveness of building performance simulation in building life cycle processes. This new edition provides a unique and comprehensive overview of building performance simulation for the complete building life cycle from conception to demolition, and from a single building to district level. It contains new chapters on building information modelling, occupant behaviour modelling, urban physics modelling, urban building energy modelling

and renewable energy systems modelling. This new edition keeps the same chapter structure throughout including learning objectives, chapter summaries and assignments. Moreover, the book:

- Provides unique insights into the techniques of building performance modelling and simulation and their application to performance-based design and operation of buildings and the systems which service them.
- Provides readers with the essential concepts of computational support of performance-based design and operation.
- Provides examples of how to use building simulation techniques for practical design, management and operation, their limitations and future direction. It is primarily intended for building and systems designers and operators, and postgraduate architectural, environmental or mechanical engineering students.

Modeling, Design, and Optimization of Net-Zero Energy Buildings - Andreas Athienitis 2015-03-30

Building energy design is currently going through a period of major changes. One key factor of this is the adoption of net-zero energy as a long term goal for new buildings in most developed countries. To achieve this goal a lot of research is needed to accumulate knowledge and to utilize it in practical applications. In this book, accomplished international experts present advanced modeling techniques as well as in-depth case studies in order to aid designers in optimally using simulation tools for net-zero energy building design. The strategies and technologies discussed in this book are, however, also applicable for the design of energy-plus buildings. This book was facilitated by International Energy Agency's Solar Heating and Cooling (SHC) Programs and the Energy in Buildings and Communities (EBC) Programs through the joint SHC Task 40/EBC Annex 52: Towards Net Zero Energy Solar Buildings R&D collaboration. After presenting the fundamental concepts, design strategies, and technologies required to achieve net-zero energy in buildings, the book discusses different design processes and tools to support the design of net-zero energy buildings (NZEBS). A substantial chapter reports on four diverse NZEBs that have been operating for at least two years. These case studies are extremely high quality because they all have high resolution measured data and the authors were intimately involved in all of them from conception to operating. By comparing the projections made using the respective design tools with the actual performance data, successful (and unsuccessful) design techniques and processes, design and simulation tools, and technologies are identified. Written by both academics and practitioners (building designers) and by North Americans as well as Europeans, this book provides a very broad perspective. It includes a detailed description of design processes and a list of appropriate tools for each design phase, plus methods for parametric analysis and mathematical optimization. It is a guideline for building designers that draws from both the profound theoretical background and the vast practical experience of the authors.

A Handbook of Sustainable Building Design and Engineering - Dejan Mumovic 2018-10-30

The second edition of this authoritative textbook equips students with the tools they will need to tackle the challenges of sustainable building design and engineering. The book looks at how to design, engineer and monitor energy efficient buildings, how to adapt buildings to climate change, and how to make buildings healthy, comfortable and secure. New material for this edition includes sections on environmental masterplanning, renewable technologies, retrofitting, passive house design, thermal comfort and indoor air quality. With chapters and case studies from a range of international, interdisciplinary authors, the book is essential reading for students and professionals in building engineering, environmental design, construction and architecture.

Advances in Design, Simulation and Manufacturing III - Vitalii Ivanov 2020-06-04

This book reports on topics at the interface between manufacturing and materials engineering, with a special emphasis on design and simulation issues. Specifically, it covers the development of CAx technologies for product design, the implementation of smart manufacturing systems and Industry 4.0 strategies, topics in technological assurance, numerical simulation and experimental studies on cutting, milling, grinding, pressing and profiling processes, as well as the development and implementation of new advanced materials. Based on the 3rd International Conference on Design, Simulation, Manufacturing: The Innovation Exchange (DSMIE-2020), held on June 9-12, 2020 in Kharkiv, Ukraine, this first volume in a two-volume set provides academics and professionals with extensive information on the latest trends, technologies, challenges and practice-oriented lessons learned in the above-mentioned areas.

Computational Finite Element Methods in Nanotechnology -

Sarhan M. Musa 2017-12-19

Computational Finite Element Methods in Nanotechnology demonstrates the capabilities of finite element methods in nanotechnology for a range of fields. Bringing together contributions from researchers around the world, it covers key concepts as well as cutting-edge research and applications to inspire new developments and future interdisciplinary research. In particular, it emphasizes the importance of finite element methods (FEMs) for computational tools in the development of efficient nanoscale systems. The book explores a variety of topics, including: A novel FE-based thermo-electrical-mechanical-coupled model to study mechanical stress, temperature, and electric fields in nano- and microelectronics The integration of distributed element, lumped element, and system-level methods for the design, modeling, and simulation of nano- and micro-electromechanical systems (N/MEMS) Challenges in the simulation of nanorobotic systems and macro-dimensions The simulation of structures and processes such as dislocations, growth of epitaxial films, and precipitation Modeling of self-positioning nanostructures, nanocomposites, and carbon nanotubes and their composites Progress in using FEM to analyze the electric field formed in needleless electrospinning How molecular dynamic (MD) simulations can be integrated into the FEM Applications of finite element analysis in nanomaterials and systems used in medicine, dentistry, biotechnology, and other areas The book includes numerous examples and case studies, as well as recent applications of microscale and nanoscale modeling systems with FEMs using COMSOL Multiphysics® and MATLAB®. A one-stop reference for professionals, researchers, and students, this is also an accessible introduction to computational FEMs in nanotechnology for those new to the field.

Embedded and Multimedia Computing Technology and Service -

James J. (Jong Hyuk) Park 2012-08-31

The 7th International Conference on Embedded and Multimedia Computing (EMC-12), will be held in Gwangju, Korea on September 6 - 8, 2012. EMC-12 will be the most comprehensive conference focused on the various aspects of advances in Embedded and Multimedia (EM) Computing. EMC-12 will provide an opportunity for academic and industry professionals to discuss the latest issues and progress in the area of EM. In addition, the conference will publish high quality papers which are closely related to the various theories and practical applications in EM. Furthermore, we expect that the conference and its publications will be a trigger for further related research and technology improvements in this important subject. The EMC-12 is the next event, in a series of highly successful International Conference on Embedded and Multimedia Computing, previously held as EMC 2011 (China, Aug. 2011), EMC 2010 (Philippines, Aug. 2010), EM-Com 2009 (Korea, Dec. 2009), UMC-08 (Australia, Oct. 2008), ESO-08(China, Dec. 2008), UMS-08 (Korea, April, 2008), UMS-07(Singapore, Jan. 2007), ESO-07(Taiwan, Dec. 2007), ESO-06(Korea, Aug. 2006).

Planning of Eco-efficient Process Chains for Automotive Component Manufacturing - Christopher Schmidt 2021-01-04

This book includes the introduction of emerging manufacturing technologies and planning cases with established technologies. The planning of eco-efficient process chains is crucial for manufacturing companies. However, in the state-of-the-art planning, various barriers exist towards the integration of the environmental dimension. Against this background, a concept for the integration of classic lean and environmental criteria into the three planning phases of process chains is presented. During concept planning, the Technology Assessment Tool supports planners in the identification of eco-efficient technologies. During rough planning, the Value Stream Design Tool enables the derivation of a production line based on workpiece characteristics. For detailed planning, tools for eco-efficient machine and process chain configuration are provided. Three case studies from large-scale automotive component manufacturing with established and emerging technologies demonstrate the tool applicability.

Wireless IP and Building the Mobile Internet - Sudhir Dixit 2003

Written by today's leading experts in industry and academia, this is the first book to take a comprehensive look at the convergence of wireless and Internet technologies that is giving rise to the mobile wireless Internet. This cutting-edge resource provides practitioners with an overview of the elements required to understand and develop future IP (Internet Protocol) based wireless multimedia communications and services.

Building Ventilation - Mat Santamouris 2006-06-01

Ensuring optimum ventilation performance is a vital part of building

design. Prepared by recognized experts from Europe and the US, and published in association with the International Energy Agency's Air Infiltration and Ventilation Centre (AIVC), this authoritative work provides organized, classified and evaluated information on advances in the key areas of building ventilation, relevant to all building types. Complexities in airflow behaviour, climatic influences, occupancy patterns and pollutant emission characteristics make selecting the most appropriate ventilation strategy especially difficult. Recognizing such complexities, the editors bring together expertise on each key issue. From components to computer tools, this book offers detailed coverage on design, analysis and performance, and is an important and comprehensive publication in this field. Building Ventilation will be an invaluable reference for professionals in the building services industry, architects, researchers (including postgraduate students) studying building service engineering and HVAC, and anyone with a role in energy-efficient building design.

Construction of a Concept of Neuronal Modeling - Marcus Grum 2021

The business problem of having inefficient processes, imprecise process analyses and simulations as well as non-transparent artificial neuronal network models can be overcome by an easy-to-use modeling concept. With the aim of developing a flexible and efficient approach to modeling, simulating and optimizing processes, this paper proposes a flexible Concept of Neuronal Modeling (CoNM). The modeling concept, which is described by the modeling language designed and its mathematical formulation and is connected to a technical substantiation, is based on a collection of novel sub-artifacts. As these have been implemented as a computational model, the set of CoNM tools carries out novel kinds of Neuronal Process Modeling (NPM), Neuronal Process Simulations (NPS) and Neuronal Process Optimizations (NPO). The efficacy of the designed artifacts was demonstrated rigorously by means of six experiments and a simulator of real industrial production processes. About the author Dr.-Ing. Marcus Grum conducts research on neural networks and knowledge processing. The explainable and ethically justifiable integration of artificial intelligence into economic contexts is a major challenge and the subject of his research. He has worked on numerous research and customer projects in the areas of knowledge management, business process management, and artificial intelligence. He graduated from the studies of computer science as well as economics at the University of Potsdam, the Technical University of Berlin and the Humboldt University of Berlin.

Advances in Complex Societal, Environmental and Engineered Systems - Mohamed Nemiche 2016-12-20

This book addresses recent technological progress that has led to an increased complexity in many natural and artificial systems. The resulting complexity research due to the emergence of new properties and spatio-temporal interactions among a large number of system elements - and between the system and its environment - is the primary focus of this text. This volume is divided into three parts: Part one focuses on societal and ecological systems, Part two deals with approaches for understanding, modeling, predicting and mastering socio-technical systems, and Part three includes real-life examples. Each chapter has its own special features; it is a self-contained contribution of distinguished experts working on different fields of science and technology relevant to the study of complex systems. *Advances in Complex Systems of Contemporary Reality: Societal, Environmental and Engineered Systems* will provide postgraduate students, researchers and managers with qualitative and quantitative methods for handling the many features of complex contemporary reality.

Critical Information Infrastructures Security - Eric Luijff 2013-12-17

This book constitutes the thoroughly refereed post-proceedings of the 8th International Workshop on Critical Information Infrastructures Security, CRITIS 2013, held in Amsterdam, The Netherlands, in September 2013. The 16 revised full papers and 4 short papers were thoroughly reviewed and selected from 57 submissions. The papers are structured in the following topical sections: new challenges, natural disasters, smart grids, threats and risk, and SCADA/ICS and sensors.

Building Performance Analysis - Pieter de Wilde 2018-05-31

Explores and brings together the existent body of knowledge on building performance analysis. Building performance is an important yet surprisingly complex concept. This book presents a comprehensive and systematic overview of the subject. It provides a working definition of building performance, and an in-depth discussion of the role building performance plays throughout the building life cycle. The book also explores the perspectives of various stakeholders, the functions of buildings, performance requirements, performance quantification (both

predicted and measured), criteria for success, and the challenges of using performance analysis in practice. Building Performance Analysis starts by introducing the subject of building performance: its key terms, definitions, history, and challenges. It then develops a theoretical foundation for the subject, explores the complexity of performance assessment, and the way that performance analysis impacts on actual buildings. In doing so, it attempts to answer the following questions: What is building performance? How can building performance be measured and analyzed? How does the analysis of building performance guide the improvement of buildings? And what can the building domain learn from the way performance is handled in other disciplines? Assembles the current body of knowledge on building performance analysis in one unique resource. Offers deep insights into the complexity of using building performance analysis throughout the entire building life cycle, including design, operation and management. Contributes an emergent theory of building performance and its analysis. Building Performance Analysis will appeal to the building science community, both from industry and academia. It specifically targets advanced students in architectural engineering, building services design, building performance simulation and similar fields who hold an interest in ensuring that buildings meet the needs of their stakeholders.

Construction 4.0 - Marco Casini 2021-12-01

At the beginning of the Fourth Industrial Revolution, the advent of digitalization, innovative technologies and materials, and new construction techniques have begun transforming the way that infrastructure, real estate, and other built assets can be designed, constructed, and operated in order to create a more attractive, energy-efficient, comfortable, affordable, safe, and sustainable built environment. Developments in materials and cutting-edge technologies (such as artificial intelligence, robotics, nanotechnology, 3D printing, and biotechnology) have finally started to move the construction towards a new era. Massive changes are occurring as a result of the possibilities created by big data and the Internet of Things, along with the technological advances that are driving down the cost of sensors, data storage, and computer services. *Construction 4.0: Advanced Technology, Tools and Materials for the Digital Transformation of the Construction Industry* presents a thorough review of developments in materials, emerging trends, cutting-edge technologies, and strategies in the fields of smart building design, construction, and operation, providing the reader with a comprehensive guideline on how to exploit the new possibilities offered by the digital revolution. It will be an essential reference resource for academic researchers, material scientists, and civil engineers, undergraduate and graduate students, and other professionals working in the fields of smart eco-efficient construction and cutting-edge technologies applied to construction. Features discussions on how nanomaterials, bio-based materials, and recycled materials are applied in the construction of buildings. Analyzes the lifecycle of materials, buildings and design and construction operations. Covers new methodologies and construction processes. Provides case studies on cutting-edge digital technology such as AI and machine learning. Examines all aspects of sustainability, including end-of-life of buildings. *Sustainable Communication Networks and Application* - P. Karrupusamy 2022

This book includes high-quality research papers presented at 3rd International Conference on Sustainable Communication Networks and Applications (ICSCN 2021), which is held at Surya Engineering College (SEC), Erode, India, during 29-30 July 2021. This book includes novel and state-of-the-art research discussions that articulate and report all research aspects, including theoretical and experimental prototypes and applications that incorporate sustainability into emerging applications. The book discusses and articulates emerging challenges in significantly reducing the energy consumption of communication systems and also explains development of a sustainable and energy-efficient mobile and wireless communication network. It includes best selected high-quality conference papers in different fields such as Internet of Things, cloud computing, data mining, artificial intelligence, machine learning, autonomous systems, deep learning, neural networks, renewable energy sources, sustainable wireless communication networks, QoS, network sustainability, and many other related areas.

Research Methods in Psycholinguistics and the Neurobiology of Language - Annette M. B. de Groot 2017-10-23

The first comprehensive guide to research methods and technologies in psycholinguistics and the neurobiology of language. Bringing together contributions from a distinguished group of researchers and practitioners, editors Annette M. B. de Groot and Peter Hagoort explore

the methods and technologies used by researchers of language acquisition, language processing, and communication, including: traditional observational and behavioral methods; computational modelling; corpus linguistics; and virtual reality. The book also examines neurobiological methods, including functional and structural neuroimaging and molecular genetics. Ideal for students engaged in the field, *Research Methods in Psycholinguistics and the Neurobiology of Language* examines the relative strengths and weaknesses of various methods in relation to competing approaches. It describes the apparatus involved, the nature of the stimuli and data used, and the data collection and analysis techniques for each method. Featuring numerous example studies, along with many full-color illustrations, this indispensable text will help readers gain a clear picture of the practices and tools described. Brings together contributions from distinguished researchers across an array of related disciplines who explain the underlying assumptions and rationales of their research methods. Describes the apparatus involved, the nature of the stimuli and data used, and the data collection and analysis techniques for each method. Explores the relative strengths and weaknesses of various methods in relation to competing approaches. Features numerous real-world examples, along with many full-color illustrations, to help readers gain a clear picture of the practices and tools described.

Energy and Technical Building Systems - Scientific and Technological Advances - Jarek Kurnitski 2020-01-31

Future buildings require not only energy efficiency but also proper building automation and control system functionalities in order to respond to the needs of occupants and energy grids. These development paths require a focus on occupant needs such as good indoor climate, easy operability, and monitoring. Another area to be tackled is energy flexibility, which is needed to make buildings responsive to the price signals of electricity grids with increasing amounts of fluctuating renewable energy generation installed both in central grids and at building sites. This Special Issue is dedicated to HVAC systems, load shifting, indoor climate, and energy and ventilation performance analyses in buildings. All these topics are important for improving the energy performance of new and renovated buildings within the roadmap of low energy and nearly zero energy buildings. To improve energy performance and, at the same time, occupant comfort and wellbeing, new technical solutions are required. Occupancy patterns and recognition, intelligent building management, demand response and performance of heating, cooling and ventilation systems are some common keywords in the articles of this Special Issue contributing to future highly performing buildings with reliable operation.

Dynamic Systems - Craig A. Kluever 2020-06-23

The simulation of complex, integrated engineering systems is a core tool in industry which has been greatly enhanced by the MATLAB® and Simulink® software programs. The second edition of *Dynamic Systems: Modeling, Simulation, and Control* teaches engineering students how to leverage powerful simulation environments to analyze complex systems. Designed for introductory courses in dynamic systems and control, this textbook emphasizes practical applications through numerous case studies—derived from top-level engineering from the AMSE Journal of Dynamic Systems. Comprehensive yet concise chapters introduce fundamental concepts while demonstrating physical engineering applications. Aligning with current industry practice, the text covers essential topics such as analysis, design, and control of physical engineering systems, often composed of interacting mechanical, electrical, and fluid subsystem components. Major topics include mathematical modeling, system-response analysis, and feedback control systems. A wide variety of end-of-chapter problems—including conceptual problems, MATLAB® problems, and Engineering Application problems—help students understand and perform numerical simulations for integrated systems.

Active Building Energy Systems - Vahid Vahidinasab 2022

This book provides a comprehensive study on state-of-the-art developments in the control, operation, and market participation of active buildings (ABs). Active buildings can support the broader energy system by intelligent integration of renewable-based energy technologies for heating, cooling, electricity, and transport. This important reference analyzes the key features of modern control and operation techniques applied to these systems. Contributions from an international team of experts present practical methods with evidence and case studies from applications to real-world or simulated active buildings. Sample computer codes and analytical examples aid in the understanding of the presented methods. The book will support researchers working on the

control and operation of buildings as an energy system, smart cities and smart grids, and microgrids, as well as researchers and developers from the building and energy engineering, economic, and operation research fields. Provides an in-depth review of building-level energy systems technologies; Covers codes, standards, and requirements for active building control systems; Includes sample computer code and analytical examples.

Fractional Order Signal Processing - Saptarshi Das 2011-09-15

The book tries to briefly introduce the diverse literatures in the field of fractional order signal processing which is becoming an emerging topic among an interdisciplinary community of researchers. This book is aimed at postgraduate and beginning level research scholars who would like to work in the field of Fractional Order Signal processing (FOSP). The readers should have preliminary knowledge about basic signal processing techniques. Prerequisite knowledge of fractional calculus is not essential and is explicated at relevant places in connection to the appropriate signal processing topics. Basic signal processing techniques like filtering, estimation, system identification, etc. in the light of fractional order calculus are presented along with relevant application areas. The readers can easily extend these concepts to varied disciplines like image or speech processing, pattern recognition, time series forecasting, financial data analysis and modeling, traffic modeling in communication channels, optics, biomedical signal processing, electrochemical applications and many more. Adequate references are provided in each category so that the researchers can delve deeper into each area and broaden their horizon of understanding. Available MATLAB tools to simulate FOSP theories are also introduced so that the readers can apply the theoretical concepts right-away and gain practical insight in the specific domain.

Modelling and Development of Intelligent Systems - Dana Simian 2021-02-12

This volume constitutes the refereed proceedings of the 7th International Conference on Modelling and Development of Intelligent Systems, MDIS 2020, held in Sibiu, Romania, in October 2020. Due to the COVID-19 pandemic the conference was held online. The 25 revised full papers presented in the volume were carefully reviewed and selected from 57 submissions. The papers are organized in topical sections on evolutionary computing; intelligent systems for decision support; machine learning; mathematical models for development of intelligent systems; modelling and optimization of dynamic systems; ontology engineering.

Design and Analysis of Robust Kanban System in an Uncertain Environment - Li, Zhe 2013-11-19

Hygrothermal Numerical Simulation Tools Applied to Building Physics - João M.P.Q. Delgado 2012-12-15

This book presents a critical review on the development and application of hygrothermal analysis methods to simulate the coupled transport processes of Heat, Air, and Moisture (HAM) transfer for one or multidimensional cases. During the past few decades there has been relevant development in this field of study and an increase in the professional use of tools that simulate some of the physical phenomena that are involved in Heat, Air and Moisture conditions in building components or elements. Although there is a significant amount of hygrothermal models referred in the literature, the vast majority of them are not easily available to the public outside the institutions where they were developed, which restricts the analysis of this book to only 14 hygrothermal modelling tools. The special features of this book are (a) a state-of-the-art of numerical simulation tools applied to building physics, (b) the boundary conditions importance, (c) the material properties, namely, experimental methods for the measurement of relevant transport properties, and (d) the numerical investigation and application. The main benefit of the book is that it discusses all the topics related to numerical simulation tools in building components (including state-of-the-art and applications) and presents some of the most important theoretical and numerical developments in building physics, providing a self-contained major reference that is appealing to both the scientists and the engineers. At the same time, this book will be going to the encounter of a variety of scientific and engineering disciplines, such as civil and mechanical engineering, architecture, etc... The book is divided in several chapters that intend to be a resume of the current state of knowledge for benefit of professional colleagues.

An Introduction to Reservoir Simulation Using MATLAB/GNU Octave - Knut-Andreas Lie 2019-06-30

This book provides a self-contained introduction to the simulation of flow

and transport in porous media, written by a developer of numerical methods. The reader will learn how to implement reservoir simulation models and computational algorithms in a robust and efficient manner. The book contains a large number of numerical examples, all fully equipped with online code and data, allowing the reader to reproduce results, and use them as a starting point for their own work. All of the examples in the book are based on the MATLAB Reservoir Simulation Toolbox (MRST), an open-source toolbox popular popularity in both academic institutions and the petroleum industry. The book can also be seen as a user guide to the MRST software. It will prove invaluable for researchers, professionals and advanced students using reservoir simulation methods. This title is also available as Open Access on Cambridge Core.

Intelligence and Security Informatics - Michael Chau 2016-03-28

This book constitutes the refereed proceedings of the 11th Pacific Asia Workshop on Intelligence and Security Informatics, PAISI 2016, held in Auckland, New Zealand, in April 2016 in conjunction with PAKDD 2016, the 20th Pacific-Asia Conference on Knowledge Discovery and Data Mining. The 7 revised full papers presented together with 7 short papers were carefully reviewed and selected from 23 submissions. The papers cover network-based data analytics, data and text mining, and cyber security and infrastructure protection.

Runtime Verification - Ezio Bartocci 2015-09-19

This book constitutes the refereed proceedings of the 6th International Conference on Runtime Verification, RV 2015, held in Vienna, Austria, in September 2015. The 15 revised full papers presented together with 4 short papers, 2 tool papers, 4 tutorials, 3 invited talks, and 2 software competition papers were carefully reviewed and selected from 45 submissions. The discussion of the conference centers around two main aspects. The first is to understand whether the runtime verification techniques can practically complement the traditional methods proving programs correct before their execution, such as model checking and theorem proving. The second concerns with formal methods and how their application can improve traditional ad-hoc monitoring techniques used in performance monitoring, hardware design emulation and simulation, etc.

Basic Simulation Models of Phase Tracking Devices Using MATLAB - William Tranter 2022-06-01

The Phase-Locked Loop (PLL), and many of the devices used for frequency and phase tracking, carrier and symbol synchronization, demodulation, and frequency synthesis, are fundamental building blocks in today's complex communications systems. It is therefore essential for both students and practicing communications engineers interested in the design and implementation of modern communication systems to understand and have insight into the behavior of these important and ubiquitous devices. Since the PLL behaves as a nonlinear device (at least during acquisition), computer simulation can be used to great advantage in gaining insight into the behavior of the PLL and the devices derived from the PLL. The purpose of this Synthesis Lecture is to provide basic theoretical analyses of the PLL and devices derived from the PLL and simulation models suitable for supplementing undergraduate and graduate courses in communications. The Synthesis Lecture is also suitable for self study by practicing engineers. A significant component of this book is a set of basic MATLAB-based simulations that illustrate the operating characteristics of PLL-based devices and enable the reader to investigate the impact of varying system parameters. Rather than providing a comprehensive treatment of the underlying theory of phase-locked loops, theoretical analyses are provided in sufficient detail in order to explain how simulations are developed. The references point to sources currently available that treat this subject in considerable technical depth and are suitable for additional study. Download MATLAB codes (.zip) Table of Contents: Introduction / Basic PLL Theory / Structures Developed From The Basic PLL / Simulation Models / MATLAB Simulations / Noise Performance Analysis

Multi-Agent Energy Systems Simulation - Tiago Pinto 2020-11-13

The synergy between artificial intelligence and power and energy systems is providing promising solutions to deal with the increasing complexity of the energy sector. Multi-agent systems, in particular, are widely used to simulate complex problems in the power and energy domain as they enable modeling dynamic environments and studying the interactions between the involved players. Multi-agent systems are suitable for dealing not only with problems related to the upper levels of the system, such as the transmission grid and wholesale electricity markets, but also to address challenges associated with the management of distributed generation, renewables, large-scale integration of electric

vehicles, and consumption flexibility. Agent-based approaches are also being increasingly used for control and to combine simulation and emulation by enabling modeling of the details of buildings' electrical devices, microgrids, and smart grid components. This book discusses and highlights the latest advances and trends in multi-agent energy systems simulation. The addressed application topics include the design, modeling, and simulation of electricity markets operation, the management and scheduling of energy resources, the definition of dynamic energy tariffs for consumption and electrical vehicles charging, the large-scale integration of variable renewable energy sources, and mitigation of the associated power network issues.

Development of a MATLAB/Simulink Framework for Phasor-Based Power System Simulation and Component Modeling Based on State Machines - Dirk Fetzer 2018-12-05

Im ersten Teil dieser Arbeit wird ein Algorithmus vorgestellt, der spannungsabhängige Einspeisung von Wirk- und Blindleistung in den Lastfluss-Algorithmus integriert. Es wird eine Beschleunigung von bis zu einer Größenordnung gegenüber dem derzeit gängigen Verfahren, und eine verbesserte Robustheit erreicht. Im zweiten Teil wird ein Phasor-Framework zur dynamischen Simulation von Stromnetzen vorgestellt. Die wesentliche Neuheit ist die Möglichkeit der Integration von Zustandsdiagrammen direkt in die Komponentenmodelle. Damit wird eine wesentlich schnellere Modellentwicklung ermöglicht als mit verfügbaren Tools. Im dritten Teil werden Modelle entwickelt und in das Framework integriert. Der Schwerpunkt liegt auf einem Photovoltaik-Modell welches das dynamische P(V), Q(V) und P(f) Verhalten nach VDE 4105 im Bereich Sekunden bis Minuten abbildet. Im vierten Teil wird das entwickelte Phasor-Framework verwendet, um das Wiederzuschaltverhalten von Photovoltaikanlagen in einem dieselbetriebenen Inselnetz in der Niederspannung zu untersuchen. Die Untersuchung zeigt, dass ein periodisches Ab- und Abschalten von Photovoltaikanlagen vorkommen kann.

Simulation and Optimization in Finance - Dessimlava A. Pachamanova 2010-09-23

An introduction to the theory and practice of financial simulation and optimization In recent years, there has been a notable increase in the use of simulation and optimization methods in the financial industry. Applications include portfolio allocation, risk management, pricing, and capital budgeting under uncertainty. This accessible guide provides an introduction to the simulation and optimization techniques most widely used in finance, while at the same time offering background on the financial concepts in these applications. In addition, it clarifies difficult concepts in traditional models of uncertainty in finance, and teaches you how to build models with software. It does this by reviewing current simulation and optimization methodology-along with available software-and proceeds with portfolio risk management, modeling of random processes, pricing of financial derivatives, and real options applications. Contains a unique combination of finance theory and rigorous mathematical modeling emphasizing a hands-on approach through implementation with software Highlights not only classical applications, but also more recent developments, such as pricing of mortgage-backed securities Includes models and code in both spreadsheet-based software (@RISK, Solver, Evolver, VBA) and mathematical modeling software (MATLAB) Filled with in-depth insights and practical advice, Simulation and Optimization Modeling in Finance offers essential guidance on some of the most important topics in financial management.

Adaptive Systems in Control and Signal Processing 1995 - Cs. Banyasz 2014-05-23

Leading academic and industrial researchers working with adaptive systems and signal processing have been given the opportunity to exchange ideas, concepts and solutions at the IFAC Symposia on Adaptive Systems in Control and Signal Processing. This postprint volume contains all those papers which were presented at the 5th IFAC Symposium in Budapest in 1995. The technical program was composed of a number of invited and contributed sessions and a special case study session, providing a good balance between applications and theory oriented papers.

Practical Control of Electric Machines - Rubén Molina Llorente 2020-03-20

This book presents deep analysis of machine control for different applications, focusing on its implementation in embedded systems. Necessary peripherals for various microcontroller families are analysed for machine control and software architecture patterns for high-quality software development processes in motor control units are described. Abundant figures help the reader to understand the theoretical,

simulation and practical implementation stages of machine control. Model-based design, used as a mathematical and visual approach to construction of complex control algorithms, code generation that eliminates hand-coding errors, and co-simulation tools such as Simulink, PSIM and finite element analysis are discussed. The simulation and verification tools refine, and retest the models without having to resort to prototype construction. The book shows how a voltage source inverter can be designed with tricks, protection elements, and space vector modulation. Practical Control of Electric Machines: Model-Based Design and Simulation is based on the author's experience of a wide variety of systems in domestic, automotive and industrial environments, and most examples have implemented and verified controls. The text is ideal for readers looking for an insight into how electric machines play an important role in most real-life applications of control. Practitioners and students preparing for a career in control design applied in electric machines will benefit from the book's easily understood theoretical approach to complex machine control. The book contains mathematics appropriate to various levels of experience, from the student to the academic and the experienced professional. Advances in Industrial Control reports and encourages the transfer of technology in control engineering. The rapid development of control technology has an impact on all areas of the control discipline. The series offers an opportunity for researchers to present an extended exposition of new work in all aspects of industrial control.

System-level Modeling of MEMS - Oliver Brand 2012-12-20

System-level modeling of MEMS - microelectromechanical systems - comprises integrated approaches to simulate, understand, and optimize the performance of sensors, actuators, and microsystems, taking into account the intricacies of the interplay between mechanical and electrical properties, circuitry, packaging, and design considerations. Thereby, system-level modeling overcomes the limitations inherent to methods that focus only on one of these aspects and do not incorporate their mutual dependencies. The book addresses the two most important approaches of system-level modeling, namely physics-based modeling with lumped elements and mathematical modeling employing model order reduction methods, with an emphasis on combining single device models to entire systems. At a clearly understandable and sufficiently

detailed level the readers are made familiar with the physical and mathematical underpinnings of MEMS modeling. This enables them to choose the adequate methods for the respective application needs. This work is an invaluable resource for all materials scientists, electrical engineers, scientists working in the semiconductor and/or sensor industry, physicists, and physical chemists.

Rammed Earth Construction - Daniela Ciancio 2015-01-29

Rammed Earth Construction: Cutting-Edge Research on Traditional and Modern Rammed Earth is a collection of peer-reviewed papers presented at the First International Conference on Rammed Earth Construction (ICREC2015, University of Western Australia, Perth, Western Australia, 10-13 February 2015) by academics, engineers and rammed earth practitioner

Passive Vibration Control of Structures - Suhasini Madhekar 2022-05-05
Research in vibration response control deals not only with prevention of catastrophic failures of structures during natural or accidental/manmade hazards but also ensures the comfort of occupants through serviceability. Therefore, the focus of this book is on the theory of dynamic response control of structures by using different kinds of passive vibration control devices. The strategies used for controlling displacement, velocity, and acceleration response of structures such as buildings, bridges, and liquid storage tanks under the action of dynamic loads emanating from earthquake, wind, wave, and so forth are detailed. The book: Explains fundamentals of vibration response control devices and their practical applications in response mitigation of structures exposed to earthquake, wind, and wave loading Offers a comprehensive overview of each passive damper, its functioning, and mathematical modeling in a dynamical system Covers practical aspects of employing the passive control devices to some of the benchmark problems that are developed from existing buildings and bridges in different countries worldwide Includes MATLAB® codes for determining the dynamic response of single degree of freedom (SDOF) and multi-degree of freedom (MDOF) systems along with computational models of the passive control devices This book is aimed at senior undergraduate students, graduate students, and researchers in civil, earthquake, aerospace, automotive, mechanical engineering, engineering dynamics, and vibration control, including structural engineers, architects, designers, manufacturers, and other professionals.