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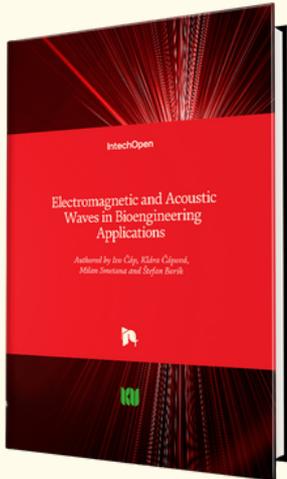
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ENGINEERING PHYSICS

Electromagnetic and Acoustic Waves in Bioengineering Applications

Edited by Ivo Čáp, University of Žilina, Slovakia
Co-editors: Klára Čápková, University of Žilina, Slovakia
Milan Smetana, University of Žilina, Slovakia
Štefan Borik, University of Žilina, Slovakia

The book deals with the analysis of oscillations, mechanical and electromagnetic waves, and their use in medicine. Each chapter contains the theoretical basis and the use of relevant phenomena in medical practice. Description of oscillations is important for understanding waves and the nature of magnetic resonance. A chapter on mechanical...

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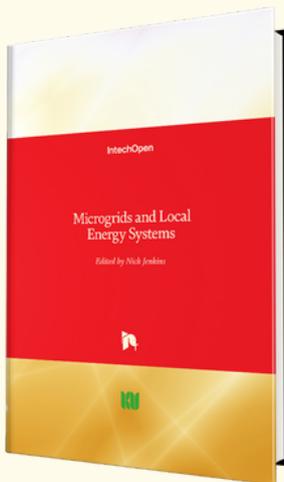
CONSTRUCTION ENGINEERING

Advances and Technologies in Building Construction and Structural Analysis

Edited by Alireza Kaboli, UNSW Sydney, Australia
Co-editor: Sara Shirowzhan, UNSW Sydney, Australia

This Edited Volume “Advances and Technologies in Building Construction and Structural Analysis” is a collection of reviewed and relevant research chapters, offering a comprehensive overview of recent developments in the field of advances and technologies in building construction and structural analysis. The book comprises single chapters authored by various researchers and edited by an expert active in the alternative medicine research area. All chapters are complete in themselves but united under a...

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POWER ELECTRONICS

Microgrids and Local Energy Systems

Edited by Nick Jenkins, Cardiff University, United Kingdom

This book addresses important topical questions of microgrids and local energy systems. It begins with an investigation of the electrical protection of microgrids followed by a study of the power converters used and the utilization of multi-objective optimization for the selection of component ratings. Subsequent chapters address peer-to-peer energy trading in microgrids, local district heating and cooling systems, neighborhood generators used to supplement the utility electricity supplies in Iraq, and regulatory impediments to micro-wind generation in the United States.

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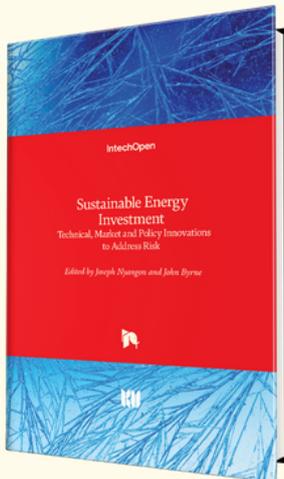
PETROCHEMICAL ENGINEERING

Swelling Elastomers in Petroleum Drilling and Development - Applications, Performance Analysis, and Material Modeling

Edited by Sayyad Zahid Qamar, Sultan Qaboos University, Oman
Co-editors: Maaz Akhtar, N.E.D. University of Engineering and Technology, Pakistan
Tasneem Pervez, Sultan Qaboos University, Oman

Swelling elastomers are being increasingly used as sealing elements in many applications in the petroleum industry. Pre- and post-swelling material characterization and performance analysis under actual field conditions are very important before the actual deployment of swell packers. The main theme of this research monograph is the...

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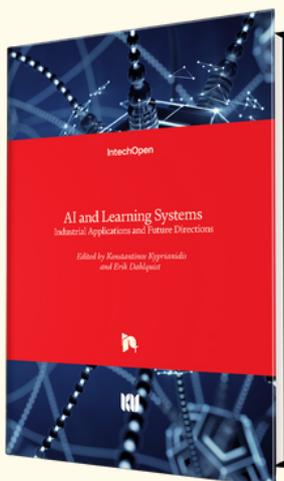
RENEWABLE ENERGY

Sustainable Energy Investment - Technical, Market and Policy Innovations to Address Risk

Edited by Joseph Nyangon, University of Delaware, United States
Co-editor: John Byrne, University of Delaware, United States

This book examines the technical, market, and policy innovations for unlocking sustainable investment in the energy sector. While finalizing this book, the COVID-19 pandemic is cutting a devastating swath through the global economy, causing the biggest fall in energy sector investment, exacerbating the global trade finance gap, worsening signs of growing income inequality, and devastating the health and livelihoods of millions. What is the parallel between the COVID-19 pandemic and the climate change...

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AUTOMATION ENGINEERING

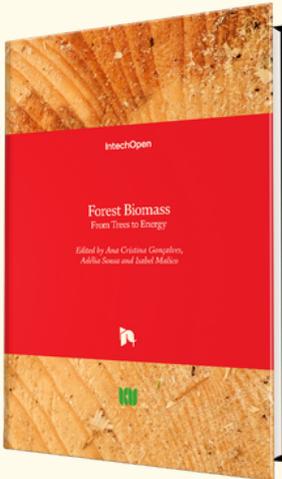
AI and Learning Systems - Industrial Applications and Future Directions

Edited by Konstantinos Kyprianidis, Mälardalen University, Sweden
Co-editor: Erik Dahlquist, Mälardalen University, Sweden

Over the last few years, interest in the industrial applications of AI and learning systems has surged. This book covers the recent developments and provides a broad perspective of the key challenges that characterize the field of Industry 4.0 with a focus on applications of AI. The target audience for this book includes engineers involved in automation system design, operational planning, and decision support. Computer science practitioners and industrial automation platform developers will also benefit...

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BIOENERGY

Forest Biomass - From Trees to Energy

Edited by Ana Cristina Gonçalves, University of Évora, Portugal
Co-editors: Adélia Sousa, University of Évora, Portugal
Isabel Malico, University of Évora, Portugal

Forests are responsible for the largest net biomass carbon production. They store the most standing biomass and carbon and thus they are an important source of bioenergy. Their importance is linked to their relative abundance and uniformity worldwide and the neutrality of CO₂ emissions from biomass conversion to energy. Yet, the use of biomass for energy presents risks related to forest system sustainability and demands for new environmentally sustainable strategies for its use. This book provides a comprehensive...

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INDUSTRIAL ENGINEERING

Smart Manufacturing - When Artificial Intelligence Meets the Internet of Things

Edited by Tan Yen Kheng, Printed Power LTD, Singapore

Smart manufacturing uses big data, the Internet of things (IoT) and the Internet of Services (IoS), and flexible and dynamic workforces to cope with ever-increasing demand in low-volume, high-mix production. Companies worldwide are already pivoting towards dynamic and reconfigurable production as a smarter way to build and make things. As such, this book discusses the next generation of manufacturing, which will involve the transformational convergence of intelligent machines, powerful computing and analytics, and unprecedented networking of people, products, and services.

ISBN: 978-1-83962-649-4 | ©2021 | HARDCOVER



AEROSPACE ENGINEERING

Safety and Risk Assessment of Civil Aircraft during Operation

Edited by Longbiao Li, Nanjing University of Aeronautics and Astronautics, China

This book introduces safety and risk analysis methods for aircraft and aero-engines, design approaches for increasing safety and decreasing risk during operation, air traffic controllers' attitudes to mistakes hazards, theories and models of human error occurrence during aircraft maintenance processes, and damage and failure analysis for composite structures.

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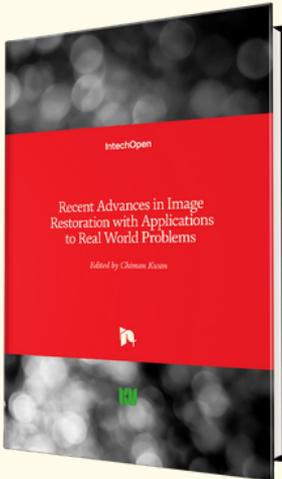


IMAGE PROCESSING

Recent Advances in Image Restoration with Applications to Real World Problems

Edited by Chimam Kwan, Signal Processing, Inc., United States

In the past few decades, imaging hardware has improved tremendously in terms of resolution, making widespread usage of images in many diverse applications on Earth and planetary missions. However, practical issues associated with image acquisition are still affecting image quality. Some of these issues such as blurring, measurement noise, mosaicing artifacts, low spatial or spectral resolution, etc. can seriously affect the accuracy of the aforementioned applications. This book intends to provide the reader with a glimpse of the latest developments and recent advances in image restoration...

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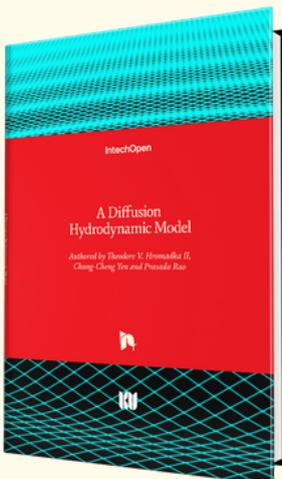
BIOTECHNOLOGY

Fluorescence Methods for Investigation of Living Cells and Microorganisms

Edited by Natalia Grigoryeva, St. Petersburg Federal Research Center of Russian Academy of Sciences, Scientific-Research Centre for Ecological Safety, Russia

Fluorescence methods play a leading role in the investigation of biological objects. They are the only non-destructive methods for investigating living cells and microorganisms in vivo. Using intrinsic and artificial fluorescence methods provides deep insight into mechanisms underlying physiological and biochemical processes. This book covers a wide range of modern methods involved in experimental biology. It illustrates the use of fluorescence microscopy and spectroscopy, confocal laser scanning microscopy, flow...

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HYDRAULICS

A Diffusion Hydrodynamic Model

Edited by Theodore V. Hromadka II, United States Military Academy, United States
Co-editors: Prasada Rao, California State University, Fullerton, United States
Chung-Cheng Yen, Tetra Tech, Irvine, California, United States

The Diffusion Hydrodynamic Model (DHM), as presented in the 1987 USGS publication, was one of the first computational fluid dynamics computational programs based on the groundwater program MODFLOW, which evolved into the control volume modeling approach. Over the following decades, others developed similar computational programs that either used the methodology and approaches presented in the DHM directly or were its extensions that included additional components and capacities. Our goal is to demonstrate that the DHM, which was developed in an age preceding computer...

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BIOINFORMATICS

Artificial Intelligence in Oncology Drug Discovery and Development

*Edited by John Cassidy, Cambridge Cancer Genomics, United Kingdom
Co-editor: Belle Taylor, Cambridge Cancer Genomics, United Kingdom*

There exists a profound conflict at the heart of oncology drug development. The efficiency of the drug development process is falling, leading to higher costs per approved drug, at the same time personalised medicine is limiting the target market of each new medicine. Even as the global economic burden of cancer increases, the current paradigm in drug development is unsustainable. In this book, we discuss the development of techniques in machine learning for improving the efficiency of oncology drug...

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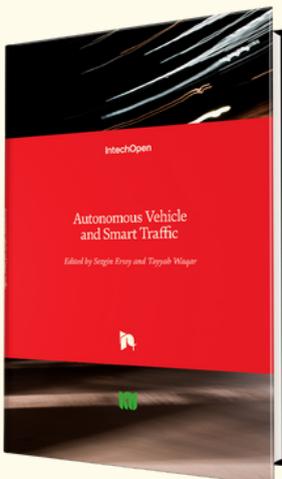
ELECTROMECHANICS

Modelling and Control of Switched Reluctance Machines

*Edited by Rui Araújo, University of Porto, Portugal
Co-editor: José Camacho, Federal University of Uberlandia, Brasil*

Today, switched reluctance machines (SRMs) play an increasingly important role in various sectors due to advantages such as robustness, simplicity of construction, low cost, insensitivity to high temperatures, and high fault tolerance. They are frequently used in fields such as aeronautics, electric and hybrid vehicles, and wind power generation. This book is a comprehensive resource on the design, modeling, and control of SRMs with methods that demonstrate their good performance as motors and generators.

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AUTONOMOUS VEHICLE

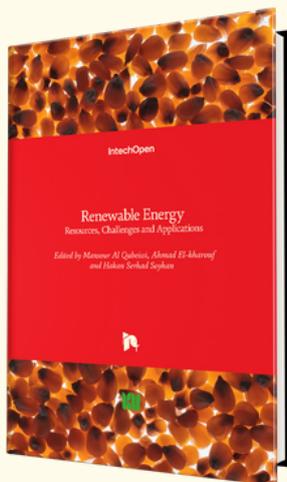
Autonomous Vehicle and Smart Traffic

*Edited by Sezgin Ersoy, Marmara University, Turkey
Co-editor: Tayyab Waqar, Arcelik AŞ, Turkey*

Long-term forecasting of technology has become extremely difficult due to the rapid realization of any suggested idea. Communication and software technologies can compensate for the problems that may arise during the transition period between idea generation and realization. However, this rapid process can cause problems for the automotive industry and transportation systems. Autonomous vehicles are currently a hot topic within the transportation sector. This development is related to the compatibility of vehicles of the near future with the development of the infrastructure...

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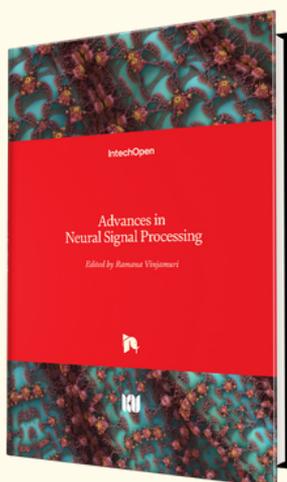
RENEWABLE ENERGY

Renewable Energy - Resources, Challenges and Applications

*Edited by Mansour Al Qubeissi, Coventry University, United Kingdom
Co-editors: Ahmad El-Kharouf, University of Birmingham, United Kingdom
Hakan Serhad Soyhan, Sakarya University, Turkey*

The demand for secure, affordable and clean energy is a priority call to humanity. Challenges associated with conventional energy resources, such as depletion of fossil fuels, high costs and associated greenhouse gas emissions, have stimulated interests in renewable energy resources. For instance, there have been clear gaps and rushed thoughts about replacing fossil-fuel driven engines with electric vehicles without...

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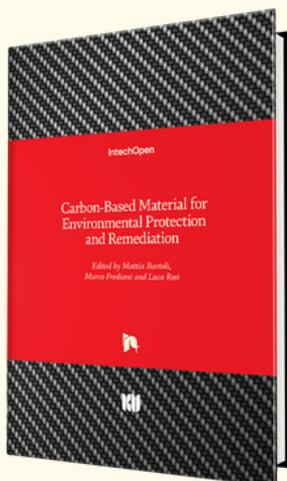
ELECTROPHYSIOLOGY

Advances in Neural Signal Processing

Edited by Ramana Vinjamuri, University of Maryland, Baltimore County, United States

Neural signal processing is a specialized area of signal processing aimed at extracting information or decoding intent from neural signals recorded from the central or peripheral nervous system. This has significant applications in the areas of neuroscience and neural engineering. These applications are famously known in the area of brain-machine interfaces. This book presents recent advances in this flourishing field of neural signal processing with demonstrative applications.

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ENVIRONMENTAL SUSTAINABILITY

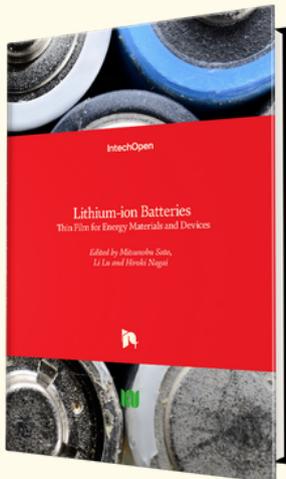
Carbon-Based Material for Environmental Protection and Remediation

*Edited by Mattia Bartoli, Polytechnic of Turin, Italy
Co-editors: Marco Frediani, University of Florence, Italy
Luca Rosi, University of Florence, Italy*

Carbon-Based Material for Environmental Protection and Remediation presents an overview of carbon-based technologies and processes, and examines their usefulness and efficiency for environmental preservation and remediation. Chapters cover topics ranging from pollutants removal to new processes in materials science. Written for interested readers with strong scientific and technological backgrounds, this book will appeal to scientific advisors at private companies, academics, and graduate students.

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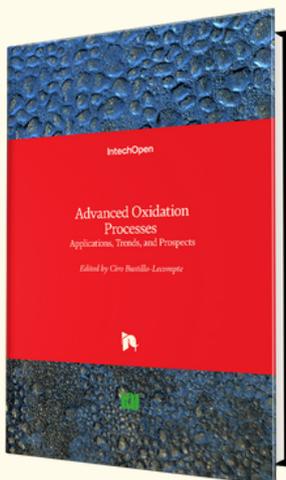
ELECTRICAL ENGINEERING

Lithium-ion Batteries - Thin Film for Energy Materials and Devices

Edited by Mitsunobu Sato, Kogakuin University, Japan
Co-editors: Li Lu, National University of Singapore, Singapore
Hiroki Nagai, Kogakuin University, Japan

The book “Lithium-ion Batteries - Thin Film for Energy Materials and Devices” provides recent research and trends for thin film materials relevant to energy utilization. The book has seven chapters with high quality content covering general aspects of the fabrication method for cathode, anode, and solid electrolyte materials and their thin films. All the chapters have been written by experts from different backgrounds, and the book is the...

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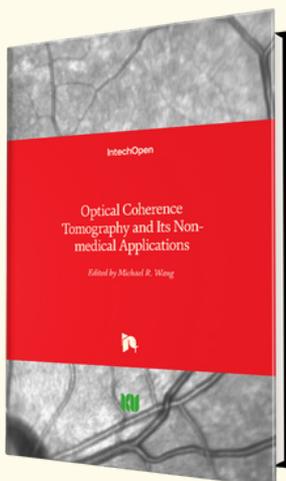
WASTEWATER ENGINEERING

Advanced Oxidation Processes - Applications, Trends, and Prospects

Edited by Ciro Bustillo-Lecompte, Ryerson University, Canada

Advanced Oxidation Processes – Applications, Trends, and Prospects constitutes a comprehensive resource for civil, chemical, and environmental engineers researching in the field of water and wastewater treatment. The book covers the fundamentals, applications, and future work in Advanced Oxidation Processes (AOPs) as an attractive alternative and a complementary treatment option to conventional methods. This book also presents state-of-the-art research on AOPs and heterogeneous catalysis while covering recent progress and trends, including the application of AOPs at the...

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OPTICS AND LASERS

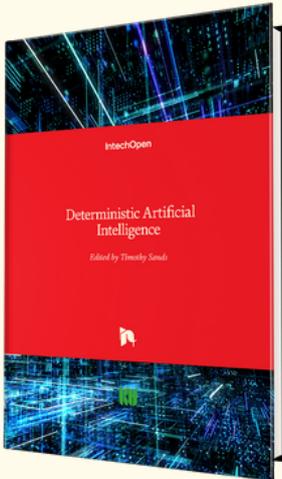
Optical Coherence Tomography and Its Non-medical Applications

Edited by Michael Wang, University of Miami, United States

Optical coherence tomography (OCT) is a promising non-invasive non-contact 3D imaging technique that can be used to evaluate and inspect material surfaces, multilayer polymer films, fiber coils, and coatings. OCT can be used for the examination of cultural heritage objects and 3D imaging of microstructures. With subsurface 3D fingerprint imaging capability, OCT could be a valuable tool for enhancing security in biometric applications. OCT can also be used for the evaluation of fastener flushness for improving aerodynamic performance of high-speed aircraft. More and more OCT non-medical...

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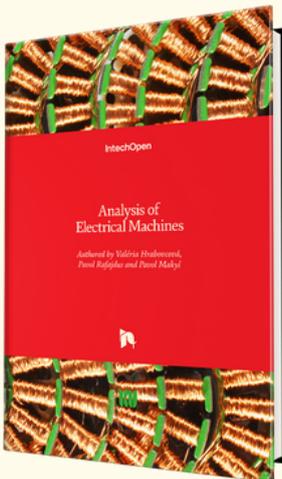
ARTIFICIAL INTELLIGENCE

Deterministic Artificial Intelligence

Edited by Timothy Sands, Stanford University; Columbia University; Naval Postgraduate School, United States

Kirchhoff's laws give a mathematical description of electromechanics. Similarly, translational motion mechanics obey Newton's laws, while rotational motion mechanics comply with Euler's moment equations, a set of three nonlinear, coupled differential equations. Nonlinearities complicate the mathematical treatment of the seemingly simple action of rotating, and these complications lead to a robust lineage of research culminating here with a text on the ability to make rigid bodies in rotation become self-aware, and even learn. This book is meant for basic scientifically inclined readers...

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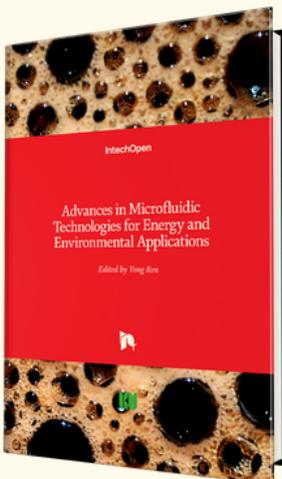
ELECTROMECHANICS

Analysis of Electrical Machines

*Edited by Valeria Hrabovcova, University of Zilina, Slovakia
Co-editors: Pavol Rafajdus, University of Zilina, Slovakia
Pavol Makyš, University of Zilina, Slovakia*

This book is devoted to students, PhD students, postgraduates of electrical engineering, researchers, and scientists dealing with the analysis, design, and optimization of electrical machine properties. The purpose is to present methods used for the analysis of transients and steady-state conditions. In three chapters the following methods are presented: (1) a method in which the parameters (resistances and inductances) are calculated on the basis of geometrical dimensions and material properties made in the...

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TECHNOLOGY

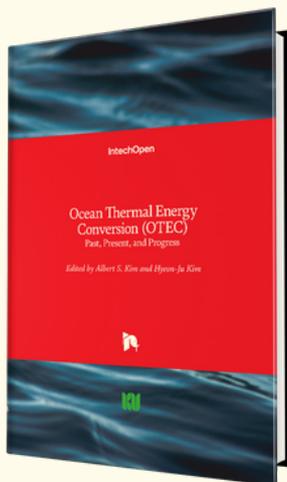
Advances in Microfluidic Technologies for Energy and Environmental Applications

Edited by Yong Ren, University of Nottingham Ningbo, China

Microfluidics have aroused a new surge of interest in recent years in environmental and energy areas, and inspired novel applications to tackle the worldwide challenges for sustainable development. This book aims to present readers with a valuable compendium of significant advances in applying the multidisciplinary microfluidic technologies to address energy and environmental problems in a plethora of areas such as environmental monitoring and detection, new nanofluid application in traditional mechanical manufacturing processes, development of novel biosensors, and thermal...

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RENEWABLE ENERGY

Ocean Thermal Energy Conversion (OTEC) - Past, Present, and Progress

*Edited by Albert S. Kim, University of Hawaii at Manoa, United States
Co-editor: Hyeon-Ju Kim, Korea Research Institute of Ships and Ocean Engineering, Korea*

The 21st century is characterized as an era of natural resource depletion, and humanity is faced with several threats due to the lack of food, energy, and water. Climate change and sea-level rise are at unprecedented levels, being phenomena that make predicting the future of ocean resources more complicated. Oceans contain a limitless amount of water with small (but finite) temperature differences from their surfaces to their floors...

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URBAN ENGINEERING

Smart Cities and Construction Technologies

*Edited by Sara Shirowzhan, UNSW Sydney, Australia
Co-editor: Kefeng Zhang, University of New South Wales, Australia*

This book includes nine chapters presenting the outcome of research projects relevant to building, cities, and construction. A description of a smart city and the journey from conventional to smart cities is discussed at the beginning of the book. Innovative case studies of underground cities and floating city bridges are presented in this book. BIM and GIS applications on different projects, and the concept of intelligent contract and virtual reality are discussed. Two concepts relevant to conventional buildings including private open spaces and place attachments are also included, and these topics can...

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RENEWABLE ENERGY

Sustainable Mobility

*Edited by Bernardo Llamas, Universidad Politécnica de Madrid, Spain
Co-editors: Marcelo F. Ortega Romero, Universidad Politécnica de Madrid, Spain
Eugenia Sillero, Asociación Ibérica de Gas Natural para la Movilidad, GASNAM, Spain*

The concept of sustainability is already applied in all industrial sectors. The fight against climate change therefore forces us to look for alternatives in the way we move. Different alternative fuels are discussed in this book: from liquid and gaseous biofuels to electricity. Moreover, waste to fuel processes are another option to produce a significant amount of fuels. In the spirit of this book, there is not only collecting different alternatives, but creativity is also promoted in the readers of this book, so that they...

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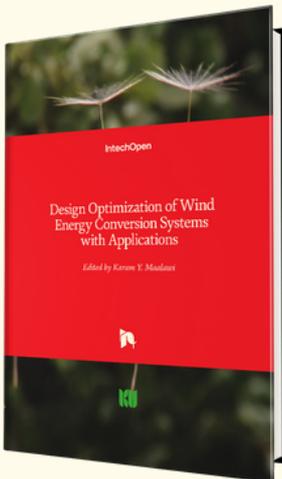
MULTIAGENT SYSTEMS

Multi Agent Systems - Strategies and Applications

Edited by Ricardo López-Ruiz, University of Zaragoza, Spain

Research on multi-agent systems is enlarging our future technical capabilities as humans and as an intelligent society. During recent years many effective applications have been implemented and are part of our daily life. These applications have agent-based models and methods as an important ingredient. Markets, finance world, robotics, medical technology, social negotiation, video games, big-data science, etc. are some of the branches where the knowledge gained through multi-agent simulations is necessary and where new software engineering tools are continuously created and tested in order to reach an effective technology transfer to impact our lives. This book brings together...

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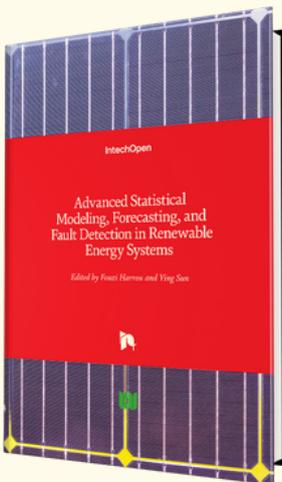
DESIGN ENGINEERING

Design Optimization of Wind Energy Conversion Systems with Applications

Edited by Karam Maalawi, National Research Centre, Egypt

Modern and larger horizontal-axis wind turbines with power capacity reaching 15 MW and rotors of more than 235-meter diameter are under continuous development for the merit of minimizing the unit cost of energy production (total annual cost/annual energy produced). Such valuable advances in this competitive source of clean energy have made numerous research contributions in developing wind industry technologies worldwide. This book provides important information on the optimum design of wind energy conversion systems (WECS) with a comprehensive and self-contained handling of...

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RENEWABLE ENERGY

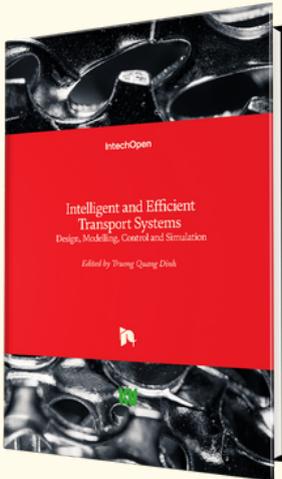
Advanced Statistical Modeling, Forecasting, and Fault Detection in Renewable Energy Systems

*Edited by Fouzi Harrou, King Abdullah University of Science and Technology, Saudi Arabia
Co-editor: Ying Sun, King Abdullah University of Science and Technology, Saudi Arabia*

Fault detection, control, and forecasting have a vital role in renewable energy systems (Photovoltaics (PV) and wind turbines (WTs)) to improve their productivity, efficiency, and safety, and to avoid expensive maintenance. For instance, the main crucial and challenging issue in solar and wind energy production is the volatility of intermittent power generation due mainly to weather conditions. This fact usually limits the integration of PV systems and WT's into the power grid. Hence, accurately forecasting...

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TRANSPORTATION ENGINEERING

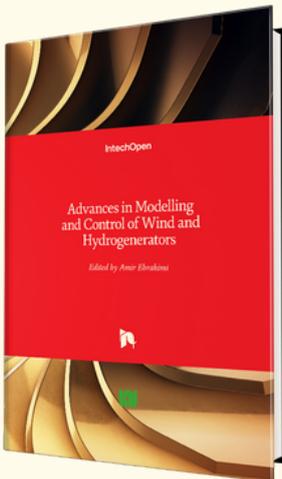
Intelligent and Efficient Transport Systems - Design, Modelling, Control and Simulation

Edited by Truong Quang Dinh, University of Warwick, United Kingdom

The aim of this book is to present a number of digital and technology solutions to real-world problems across transportation sectors and infrastructures. Nine chapters have been well prepared and organized with the core topics as follows:

- A guideline to evaluate the energy efficiency of a vehicle
- A guideline to design and evaluate an electric propulsion system
- Potential opportunities for intelligent transportation systems and smart cities
- The importance of system control and energy-power management in transportation...

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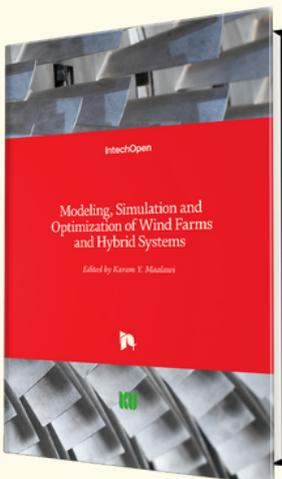
ENERGY ENGINEERING

Advances in Modelling and Control of Wind and Hydrogenerators

Edited by Amir Ebrahimi, Hannover University, Germany

Rapid deployment of wind and solar energy generation is going to result in a series of new problems with regards to the reliability of our electrical grid in terms of outages, cost, and life-time, forcing us to promptly deal with the challenging restructuring of our energy systems. Increased penetration of fluctuating renewable energy resources is a challenge for the electrical grid. Proposing solutions to deal with this problem also impacts the functionality of large generators. The power electronic generator interactions, multi-domain modelling, and reliable monitoring systems are examples...

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RENEWABLE ENERGY

Modeling, Simulation and Optimization of Wind Farms and Hybrid Systems

Edited by Karam Maalawi, National Research Centre, Egypt

The reduction of greenhouse gas emissions is a major governmental goal worldwide. The main target, hopefully by 2050, is to move away from fossil fuels in the electricity sector and then switch to clean power to fuel transportation, buildings and industry. This book discusses important issues in the expanding field of wind farm modeling and simulation as well as the optimization of hybrid and micro-grid systems. Section I deals with modeling and simulation of wind farms for efficient, reliable and cost-effective optimal solutions. Section II tackles the optimization of hybrid wind/PV and renewable...

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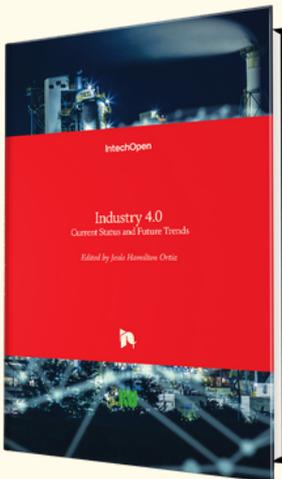
INDUSTRIAL ENGINEERING

New Trends in the Use of Artificial Intelligence for the Industry 4.0

*Edited by Luis Romeral Martínez, Technical University of Catalonia, Spain
Co-editors: Roque A. Osornio-Rios, Autonomous University of Queretaro, Mexico
Miguel Delgado Prieto, Universitat Politècnica de Catalunya, Spain*

Industry 4.0 is based on the cyber-physical transformation of processes, systems and methods applied in the manufacturing sector, and on its autonomous and decentralized operation. Industry 4.0 reflects that the industrial world is at the beginning of the so-called Fourth Industrial Revolution, characterized by a massive interconnection of assets and the integration of human operators with the manufacturing environment. In this...

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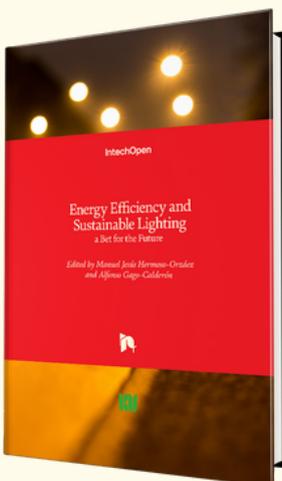
INDUSTRIAL ENGINEERING

Industry 4.0 - Current Status and Future Trends

Edited by Jesús Hamilton Ortiz, Close mobile R&D, Spain

This book shows a vision of the present and future of Industry 4.0 and identifies and examines the most pressing research issue in Industry 4.0. Containing the contributions of leading researchers and academics, this book includes recent publications in key areas of interest, for example: a review on the Industry 4.0: What is the Industry 4.0, the pillars of Industry 4.0, current and future trends, technologies, taxonomy, and some case studies (A.U.T.O 4.0, stabilization of digitized process). This book also provides an essential tool in the process of migration to Industry 4.0. The book is suitable as a text for graduate students and professionals in the industrial sector and general engineering...

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SUSTAINABLE ENERGY

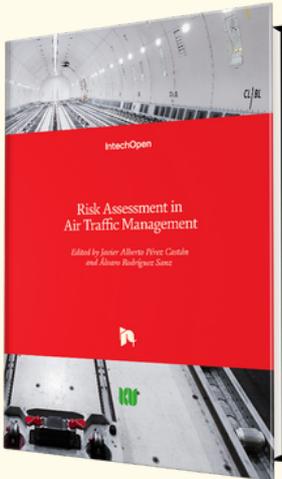
Energy Efficiency and Sustainable Lighting - a Bet for the Future

*Edited by Manuel J. Hermoso-Orzáez, University of Jaén, Spain
Co-editor: Alfonso Gago-Calderón, University of Málaga, Spain*

The lighting of both exteriors and interiors is a field within electrical and lighting engineering, where important technological changes have been taking place oriented towards environmental sustainability and energy efficiency. LED technology has been gradually gaining ground in the world of lighting over other technologies due to its high lighting and energy efficiency and savings. However, some problems related to overheating or associated regulation are emerging. This has prompted the search for...

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AVIONICS

Risk Assessment in Air Traffic Management

*Edited by Javier Alberto Pérez Castán, Technical University of Madrid, Spain
Co-editor: Álvaro Rodríguez Sanz, Technical University of Madrid, Spain*

One of the most complex challenges for the future of aviation is to ensure a safe integration of the expected air traffic demand. Air traffic is expected to almost double its current value in 20 years, which cannot be managed without the development and implementation of a safe air traffic management (ATM) system. In ATM, risk assessment is a crucial cornerstone to validate the operation of air traffic flows, airport processes, or navigation accuracy. This book tries to be a focal point and motivate further research by encompassing crosswise and widespread knowledge about this critical and exciting...

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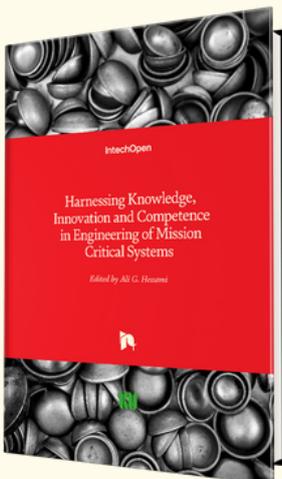
WASTEWATER ENGINEERING

Advances in Membrane Technologies

Edited by Amira Abdelrasoul, University of Saskatchewan, Canada

Membrane technologies are currently the most effective and sustainable methods utilized in diversified water filtration, wastewater treatment, as well as industrial and sustainable energy applications. This book covers essential subsections of membrane separation and bioseparation processes from the perspectives of technical innovation, novelty, and sustainability. The book offers a comprehensive overview of the latest improvements and concerns with respect to membrane fouling remediation techniques, issues of bioincompatibility for biomedical applications, and various subareas of membrane separation processes, which will be an efficient resource for engineers.

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KNOWLEDGE MANAGEMENT

Harnessing Knowledge, Innovation and Competence in Engineering of Mission Critical Systems

Edited by Ali G. Hessami, Vega Systems, United Kingdom

This book explores the critical role of acquisition, application, enhancement, and management of knowledge and human competence in the context of the largely digital and data/information dominated modern world. Whilst humanity owes much of its achievements to the distinct capability to learn from observation, analyse data, gain insights, and perceive beyond original realities, the systematic treatment of knowledge as a core capability and driver of success has largely remained the forte of pedagogy. In an increasingly intertwined global community faced with existential challenges and risks...

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AUTOMOBILE ENGINEERING

Diesel and Gasoline Engines

Edited by Richard Viskup, Johannes Kepler University, Austria

The internal combustion engine was invented around 1790 by various scientists and engineers worldwide. Since then the engines have gone through many modifications and improvements. Today, different applications of engines form a significant technological importance in our everyday lives, leading to the evolution of our modern civilization. The invention of diesel and gasoline engines has definitely changed our lifestyles as well as shaped our priorities. The current engines serve innumerable applications in various types of transportation, in harsh environments, in construction, in diverse industries, and also as back-up power supply systems for hospitals, security departments...

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DATA MANAGEMENT SYSTEM

Open Scientific Data - Why Choosing and Reusing the RIGHT DATA Matters

Edited by Vera Lipton, Interdisciplinary Center, IDC, Herzliya, Israel

This book shows how the vision for open access to scientific data can be more readily achieved through a staged model that research funders, policy makers, scientists, and research organizations can adopt in their practice. Drawing on her own experiences with data processing, on early findings with open scientific data at CERN (the European Organization for Nuclear Research), and from case studies of shared clinical trial data, the author updates our understanding of research data - what it is; how it dynamically evolves across different scientific disciplines and across various stages of research...

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MECHATRONICS

Emerging Trends in Mechatronics

Edited by Aydin Azizi, German University of Technology in Oman

Mechatronics is a multidisciplinary branch of engineering combining mechanical, electrical and electronics, control and automation, and computer engineering fields. The main research task of mechatronics is design, control, and optimization of advanced devices, products, and hybrid systems utilizing the concepts found in all these fields. The purpose of this special issue is to help better understand how mechatronics will impact on the practice and research of developing advanced techniques to model, control, and optimize complex systems. The special issue presents recent advances in mechatronics and related technologies. The selected topics give an overview of the state of the art...

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AERODYNAMICS

Advances in Spacecraft Attitude Control

Edited by Timothy Sands, Stanford University; Columbia University; Naval Postgraduate School, United States

Spacecraft attitude maneuvers comply with Euler's moment equations, a set of three nonlinear, coupled differential equations. Nonlinearities complicate the mathematical treatment of the seemingly simple action of rotating, and these complications lead to a robust lineage of research. This book is meant for basic scientifically inclined readers, and commences with a chapter on the basics of spaceflight and leverages this remediation to reveal very advanced topics to new spaceflight enthusiasts. The topics learned from reading this text will prepare students and faculties to investigate interesting spaceflight problems in an era where cube satellites have made such...

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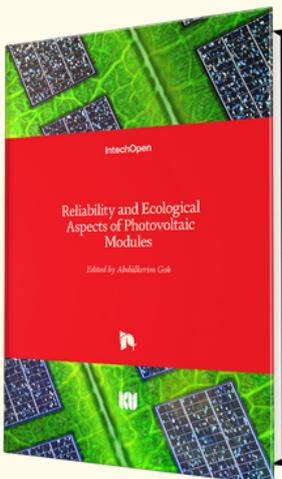
MATERIAL SCIENCE

Multilayer Thin Films - Versatile Applications for Materials Engineering

Edited by Sukumar Basu, Jaypee University of Information Technology, India

This book, "Multilayer Thin Films-Versatile Applications for Materials Engineering", includes thirteen chapters related to the preparations, characterizations, and applications in the modern research of materials engineering. The evaluation of nanomaterials in the form of different shapes, sizes, and volumes needed for utilization in different kinds of gadgets and devices. Since the recently developed two-dimensional carbon materials are proving to be immensely important for new configurations in the miniature scale in the modern technology, it is imperative to innovate various atomic...

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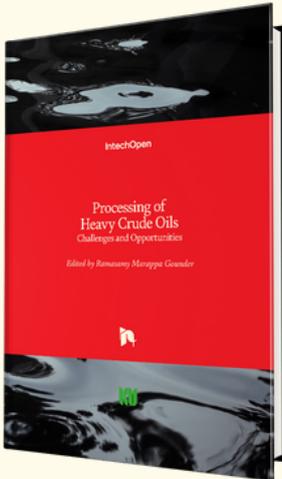
Reliability and Ecological Aspects of Photovoltaic Modules

Edited by Abdulkemim Gok, Gebze Technical University, Turkey

Photovoltaic (PV) solar energy is expected to be the world's largest source of electricity in the future. To enhance the long-term reliability of PV modules, a thorough understanding of failure mechanisms is of vital importance. In addition, it is important to address the potential downsides to this technology. These include the hazardous chemicals needed for manufacturing solar cells, especially for thin-film technologies, and the large number of PV modules disposed of at the end of their lifecycles. This book discusses the reliability and environmental aspects of PV modules.

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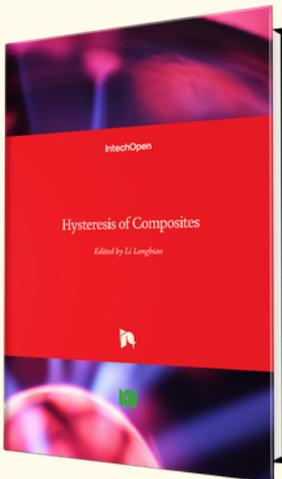
PETROCHEMICAL ENGINEERING

Processing of Heavy Crude Oils - Challenges and Opportunities

Edited by Ramasamy Marappa Gounder, Universiti Teknologi Petronas, Malaysia

Unconventional heavy crude oils are replacing the conventional light crude oils slowly but steadily as a major energy source. Heavy crude oils are cheaper and present an opportunity to the refiners to process them with higher profit margins. However, the unfavourable characteristics of heavy crude oils such as high viscosity, low API gravity, low H/C ratio, chemical complexity with high asphaltenes content, high acidity, high sulfur and increased level of metal and heteroatom impurities impede extraction, pumping, transportation and processing. Very poor mobility of the heavy oils, due to...

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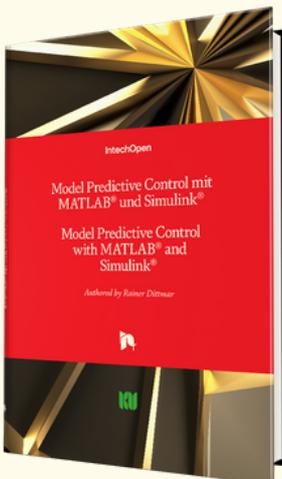
COMPOSITE MATERIALS

Hysteresis of Composites

Edited by Longbiao Li, Nanjing University of Aeronautics and Astronautics, China

This book introduces the hysteresis and damping of, and damage to, composites. It analyzes the following areas: damage mechanisms affecting the hysteresis of composites, mechanical hysteresis of ceramic-matrix composites, hysteresis behavior of fiber-reinforced ceramic-matrix composites (CMCs), relationship between the internal damage and hysteresis loops of CMCs, and mechanical hysteresis loops and the fiber/matrix interface frictional coefficient of SiC/CAS and C/SiC composites. A damping study on aluminum-multiwalled carbon nanotube-based nanocomposite materials is discussed to increase the damping property for applications like engine heads, pistons, cylinder...

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MATHEMATICAL MODELING

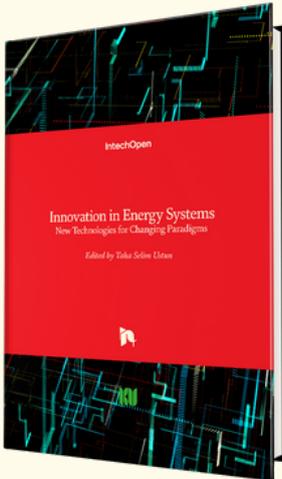
Model Predictive Control mit MATLAB und Simulink - Model Predictive Control with MATLAB and Simulink

Edited by Rainer Dittmar, West Coast University of Applied Sciences, Germany

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™ des Programmsystems MATLAB®/Simulink® 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...

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RENEWABLE ENERGY

Innovation in Energy Systems - New Technologies for Changing Paradigms

Edited by Taha Selim Ustun, Fukushima Renewable Energy Institute, Japan

It has been a little over a century since the inception of interconnected networks and little has changed in the way that they are operated. Demand-supply balance methods, protection schemes, business models for electric power companies, and future development considerations have remained the same until very recently. Distributed generators, storage devices, and electric vehicles have become widespread and disrupted century-old bulk generation - bulk transmission operation. Distribution networks are no longer passive networks and now contribute to power generation. Old billing and...

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POWER ELECTRONICS

Advanced Communication and Control Methods for Future Smartgrids

Edited by Taha Selim Ustun, Fukushima Renewable Energy Institute, Japan

Proliferation of distributed generation and the increased ability to monitor different parts of the electrical grid offer unprecedented opportunities for consumers and grid operators. Energy can be generated near the consumption points, which decreases transmission burdens and novel control schemes can be utilized to operate the grid closer to its limits. In other words, the same infrastructure can be used at higher capacities thanks to increased efficiency. Also, new players are integrated into this grid such as smart meters with local control capabilities, electric vehicles that can act as...

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