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This book covers advancements of power electronic converters and their control techniques for grid integration of large-scale renewable energy sources and electrical vehicles. Major emphasis are on transformer-less direct grid integration, bidirectional power transfer, compensation of grid power quality issues, DC system protection and grounding, interaction in mixed AC/DC system, AC and DC system stability, magnetic design for high-frequency high power density systems with advanced soft magnetic materials, modelling and simulation of mixed AC/DC system, switching strategies

for enhanced efficiency, and protection and reliability for sustainable grid integration. This book is an invaluable resource for professionals active in the field of renewable energy and power conversion.

With the increasing demands for safer freight trains operating with higher speed and higher loads, it is necessary to implement methods for controlling longer, heavier trains. This requires a full understanding of the factors that affect their dynamic performance. Simulation techniques allow proposed innovations to be optimised before introducing them into the operational railway environment. Coverage is given to the various

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types of locomotives used with heavy haul freight trains, along with the various possible configurations of those trains. This book serves as an introductory text for college students, and as a reference for engineers practicing in heavy haul rail network design,

An up to date account of renewable sources of electricity generation and their integration into power systems With the growth in installed capacity of renewable energy (RE) generation, many countries such as the UK are relying on higher levels of RE generation to meet targets for reduced greenhouse gas emissions. In the face of this, the integration issue is now of increasing concern, in particular to

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system operators. This updated text describes the individual renewable technologies and their power generation characteristics alongside an expanded introduction to power systems and the challenges posed by high levels of penetrations from such technologies, together with an account of technologies and changes to system operation that can ease RE integration. Features of this edition: Covers power conditioning, the characteristics of RE generators, with emphasis on their time varying nature, and the use of power electronics in interfacing RE sources to grids
Outlines up to date RE integration issues such as power flow in

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networks supplied from a combination of conventional and renewable energy sources Updated coverage of the economics of power generation and the role of markets in delivering investment in sustainable solutions Considers the challenge of maintaining power balance in a system with increasing RE input, including recent moves toward power system frequency support from RE sources Offers an insightful perspective on the shape of future power systems including offshore networks and demand side management Includes worked examples that enhance this edition's suitability as a textbook for introductory courses in RE systems technology Firmly established as an

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essential reference, the Second Edition of Renewable Energy in Power Systems will prove a real asset to engineers and others involved in both the traditional power and fast growing renewables sector. This text should also be of particular benefit to students of electrical power engineering and will additionally appeal to non-specialists through the inclusion of background material covering the basics of electricity generation. High Oleic Oils: Development, Properties and Uses is the first complete reference to address practical applications for this new and dynamic category of fats and oils that are essentially replacing partially hydrogenated oils in

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various food and nonfood uses. As a category, high oleic oils are highly stable, but like other fats and oils, there are differences in the composition and applications of the various types of high oleic oils. Their compositions allow for the production of a range of frying oils, increased shelf-life foods, functional shortenings and hard fats, and even industrial products not easily produced with nonhigh oleic oils. Information and know-how on these applications and advantages has been in high demand and short supply until now. Based on extensive commercial experience, seminars and presentations, Editor Frank Flider has identified common customer questions, needs and

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concerns about high oleic oils, and addresses them in this single comprehensive volume outlining development, composition, and utilization of high oleic oils. Through the individual expertise of a highly qualified team of contributing authors, this book outlines the development, composition, and utilization of these oils, making it of value to a wide range of readers, including the research and development industry and academic researchers. Details the development and technology behind today's high oleic crops and oils as well as the history and background of many naturally occurring oleic oils Describes high oleic oils' nutritional and

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compositional advantages over PHOs and lower oleic oils Presents unbiased, noncommercial, science-based, and objective insights, deliberately balanced to represent high oleic oil varieties equally

Addresses transgenic insights as well as new state-of-the-art and future development technologies

Software Engineering for Robotics Algorithms, Technologies, and Applications

Sustainable Production: Novel Trends in Energy, Environment and Material Systems

Modeling, Design, and Control High Oleic Oils

Instrument and Automation

Engineers' Handbook

The Instrument and

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Automation Engineers' Handbook (IAEH) is the #1 process automation handbook in the world. Volume one of the Fifth Edition, Measurement and Safety, covers safety sensors and the detectors of physical properties. Measurement and Safety is an invaluable resource that: Describes the detectors used in the measurement of process variables Offers application- and method-specific guidance for choosing the best measurement device Provides tables of detector capabilities and other practical information at a glance Contains detailed

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descriptions of domestic and overseas products, their features, capabilities, and suppliers, including suppliers' web addresses Complete with 163 alphabetized chapters and a thorough index for quick access to specific information, Measurement and Safety is a must-have reference for instrument and automation engineers working in the chemical, oil/gas, pharmaceutical, pollution, energy, plastics, paper, wastewater, food, etc. industries. About the eBook The most important new feature of the IAEH, Fifth Edition is its availability as an eBook. The eBook

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provides the same content as the print edition, with the addition of thousands of web addresses so that readers can reach suppliers or reference books and articles on the hundreds of topics covered in the handbook.

This feature includes a complete bidders' list that allows readers to issue their specifications for competitive bids from any or all potential product suppliers.

Das grundlegende Werk von Darwin On the Origin of Species liegt hier in der originalen Übersetzung durch Julius Victor Carus vor, erweitert durch zahlreiche Erläuterungen,

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aussagekräftige Abbildungen sowie wichtige historische Bezüge. Die Entstehung der Arten von Darwin ist für die heutige Leserschaft häufig schwierig zu verstehen. Eine hilfreiche Unterstützung erfolgt durch die farbliche Hervorhebung entscheidender Textstellen und viele fachliche Erklärungen. Darwins Analysen und Bewertungen aus den Gebieten der Botanik, Zoologie, Verhaltenslehre, Paläontologie und Entwicklungsbiologie werden in acht Beiträgen namhafter Fachwissenschaftler im Licht der gegenwärtigen Forschung beleuchtet und so wird erst die ungeheure Bedeutung und

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Weitsicht seines Werkes offensichtlich. Endlich liegen jetzt die Übersetzungen der beiden ebenso bahnbrechenden Aufsätze von Alfred Russel Wallace vor: der Sarawak- und Ternate-Essay. Wallace war neben Darwin der bedeutendste Evolutionsforscher seiner Zeit. Seine Arbeiten zur Evolutionsbiologie, die im Angelsächsischen hoch geschätzt sind, können als durchaus gleichrangig zu Darwins berühmtester Schrift angesehen werden. Ulrich Kutschera eröffnet das Buch mit einem Geleitwort und Reinhold Leinfelder schließt es mit einem Ausblick zur

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Bedeutung der Evolutionstheorie für die Zukunft des Menschen ab. Das Buch ist daher nicht nur eine unverzichtbare Lernhilfe für Schüler und Studenten, die sich mit der Evolutionsbiologie beschäftigen, sondern zusätzlich auch eine spannende weiterführende Lektüre für alle Leser mit Interesse an Wissenschaftsgeschichte. Explore the real future of work in this expert tech implementation guide that goes beyond automation In Augmented Lean: A Human-Centric Framework for Managing Frontline Operations, serial startup

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founder Dr. Natan Linder and futurist podcaster Dr. Trond Arne Undheim deliver an urgent and incisive exploration of how to facilitate agile processes amongst a millennial workforce that already lives by many of its tenets. The book demonstrates how to abandon legacy industrial technology that is failing modern operations and hindering operational excellence and digital progress. As an executive and leader, you cannot fall prey to hyped-up notions of industry 4.0's factory of the future automation, artificial intelligence, internet of things, sensors,

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digital twins, and augmented reality fixing every problem. Instead, to truly reduce cognitive load, complexity, and frustrations in the workplace, we must build cyber-physical technologies so that humans remain at the center.

Leaders must ensure that the technology they deploy at an industrial scale has fluid interfaces that demonstrably simplifies work and makes operations more flexible without introducing fear, uncertainty, or doubt. The authors provide: A step-by-step walkthrough of the Augmented Lean framework that shows readers when, how, and why to augment your

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workforce through cyber-physical principles that go beyond both Lean and Agile management practices

Concrete strategies on how to scale these operational augmentation methods throughout your organization based on real-world case studies of operators in the trenches of manufacturing whose impact far outweighs their seniority in the corporate hierarchy

Insightful advice for how to use the augmentation framework in small- and medium-sized enterprises where license and training costs are prohibitive when only using off-the-shelf industry 4.0 approaches A

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thoroughly practical
playbook for augmenting your
workforce with the latest
cyber-physical adaptations
to digital technologies,
Augmented Lean provides you
with the organizational-,
process-, and management-
level techniques you need to
get the most out of your
employees. In turn, as an
operator, engineer, or
industrial worker reading
this book, you will become
empowered to be a change
agent through no-code
interfaces instead of
remaining a recipient of
endless training demands and
ever-increasing
technological complexity.
Augmented Lean will orient

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you towards the future with the most effective tools to cut through hype so you can instantly apply your learnings and be productive wherever you currently operate.

This book examines the organizational change of the wind sector in the course of product and value chain modularization. The methodology developed here analyzes modularization using standardized variables, and allows a classification of value chains at company and component levels. Necessary adaptation and learning processes change externalities and location

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requirements, which leads to a reorganization of relationships between components-as well as companies-and creates an organizational discontinuity. This leads ultimately to a new spatial configuration of the industry and its value chains. The author works as Export Advisor for Wind Energy at the Consulate General of Denmark in Hamburg. Dissertation. (Series: Geography / Geographie, Vol. 26) [Subject: Energy Studies, Organizational Change, Business & Management, Economics]
Process Measurement and

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Analysis, Fifth Edition -

Two Volume Set

Emergency Planning at

Seabrook Nuclear Powerplant

Biography of an American

Technology

A Human-Centric Framework

for Managing Frontline

Operations

Electricity Supply Systems

of the Future

Augmented Lean

The history of the grid, the world's largest interconnected power machine that is North America's electricity infrastructure. The North American power grid has been called the world's largest machine. The grid connects

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nearly every living soul on the continent; Americans rely utterly on the miracle of electrification. In this book, Julie Cohn tells the history of the grid, from early linkages in the 1890s through the grid's maturity as a networked infrastructure in the 1980s. She focuses on the strategies and technologies used to control power on the grid—in fact made up of four major networks of interconnected power systems—paying particular attention to the work of engineers and system operators who handled the everyday operations. To do so,

she consulted sources that range from the pages of historical trade journals to corporate archives to the papers of her father, Nathan Cohn, who worked in the industry from 1927 to 1989—roughly the period of key power control innovations across North America. Cohn investigates major challenges and major breakthroughs but also the hidden aspects of our electricity infrastructure, both technical and human. She describes the origins of the grid and the growth of interconnection; emerging control issues, including

difficulties in matching generation and demand on linked systems; collaboration and competition against the backdrop of economic depression and government infrastructure investment; the effects of World War II on electrification; postwar plans for a coast-to-coast grid; the northeast blackout of 1965 and the East-West closure of 1967; and renewed efforts at achieving stability and reliability after those two events.

Power Plant Synthesis provides an integrated approach to the operation,

analysis, simulation, and dimensioning of power plants for electricity and thermal energy production.

Fundamental concepts of energy and power, energy conversion, and power plant design are first presented, and integrated approaches for the operation and simulation of conventional electricity production systems are then examined. Hybrid power plants and cogeneration systems are covered, with operating algorithms, optimization, and dimensioning methods explained. The environmental

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impacts of energy sources are described and compared, with real-life case studies included to show the synthesis of the specific topics covered.

Textbook on the science and methods behind a global transition to 100% clean, renewable energy for science, engineering, and social science students.

This book presents the proceedings from the International Symposium for Production Research 2020. The cross-disciplinary papers presented draw on research from academics and practitioners from industrial

engineering, management engineering, operational research, and production/operational management. It explores topics including: · computer-aided manufacturing; Industry 4.0 applications; simulation and modeling big data and analytics; flexible manufacturing systems; decision analysis quality management industrial robotics in production systems information technologies in production management; and optimization techniques. Presenting real-life applications, case studies,

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and mathematical models, this book is of interest to researchers, academics, and practitioners in the field of production and operation engineering.

Protection Challenges in Meeting Increasing Electric Power Demand
Power Plant Synthesis
Fundamentals and Technologies in the 5G Era

Symmetry in Renewable Energy and Power Systems
Towards Energy Smart Homes
This book offers a vision of the future of electricity supply systems and CIGRE's views on the know-how that

will be needed to manage the transition toward them. A variety of factors are driving a transition of electricity supply systems to new supply models, in particular the increasing use of renewable sources, environmental factors and developments in ICT technologies. These factors suggest that there are two possible models for power network development, and that those models are not necessarily exclusive:

1. An increasing importance of large networks for bulk transmission capable of interconnecting load regions and large centralized renewable generation resources, including offshore and of providing more interconnections between the various countries and energy markets.
2. An emergence of clusters of small, largely self-contained

distribution networks, which include decentralized local generation, energy storage and active customer participation, intelligently managed so that they operate as active networks providing local active and reactive support. The electricity supply systems of the future will likely include a combination of the above two models, since additional bulk connections and active distribution networks are needed in order to reach ambitious environmental, economic and security-reliability targets. This concise yet comprehensive reference resource on technological developments for future electrical systems has been written and reviewed by experts and the Chairs of the sixteen Study Committees that form the Technical Council of CIGRE.

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The Instrument and Automation Engineers' Handbook (IAEH) is the Number 1 process automation handbook in the world. The two volumes in this greatly expanded Fifth Edition deal with measurement devices and analyzers. Volume one, Measurement and Safety, covers safety sensors and the detectors of physical properties, while volume two, Analysis and Analysis, describes the measurement of such analytical properties as composition. Complete with 245 alphabetized chapters and a thorough index for quick access to specific information, the IAEH, Fifth Edition is a must-have reference for instrument and automation engineers working in the chemical, oil/gas, pharmaceutical, pollution, energy, plastics, paper, wastewater, food, etc. industries.

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Control of Power Electronic Converters with Microgrid Applications Discover a systematic approach to design controllers for power electronic converters and circuits In Control of Power Electronic Converters with Microgrid Applications, distinguished academics and authors Drs. Arindam Ghosh and Firuz Zare deliver a systematic exploration of design controllers for power electronic converters and circuits. The book offers readers the knowledge necessary to effectively design intelligent control mechanisms. It covers the theoretical requirements, like advanced control theories and the analysis and conditioning of AC signals as well as controller development and control. The authors provide readers with discussions of custom power devices,

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as well as both DC and AC microgrids. They also discuss the harmonic issues that are crucial in this area, as well as harmonic standardization. The book addresses a widespread lack of understanding in the control philosophy that can lead to a stable operation of converters, with a focus on the application of power electronics to power distribution systems. Readers will also benefit from the inclusion of: A thorough introduction to controller design for different power electronic converter configurations in microgrid systems (both AC and DC) A presentation of emerging technology in power distribution systems to integrate different renewable energy sources Chapters on DC-DC converters and DC microgrids, as well as DC-AC converter modulation techniques and

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custom power devices, predictive control, and AC microgrids Perfect for manufacturers of power converters, microgrid developers and installers, as well as consultants who work in this area, *Control of Power Electronic Converters with Microgrid Applications* is also an indispensable reference for graduate students, senior undergraduate students, and researchers seeking a one-stop resource for the design of controllers for power electronic converters and circuits.

This book includes original research papers related to renewable energy and power systems in which theoretical or practical issues of symmetry are considered. The book includes contributions on voltage stability analysis in DC networks, optimal dispatch of islanded

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microgrid systems, reactive power compensation, direct power compensation, optimal location and sizing of photovoltaic sources in DC networks, layout of parabolic trough solar collectors, topologic analysis of high-voltage transmission grids, geometric algebra and power systems, filter design for harmonic current compensation. The contributions included in this book describe the state of the art in this field and shed light on the possibilities that the study of symmetry has in power grids and renewable energy systems.

Emerging Research in Electronics,
Computer Science and Technology

The Power Grid

Resilient Operation, Control and
Protection

Medium-Voltage Direct Current Grid

Analytical Techniques in the Oil and Gas Industry for Environmental Monitoring

Development, Properties, and Uses

The assembly of this study started in 2013 during the preparation of the foundation of the Flexible Electrical Networks (FEN) Research Campus, an institution supported by the German Federal Ministry of Education and Science, concentrating on DC technology in power grids as an enabler for the energy transition. It reflects the state-of-the-art and research needs of DC technology against the background of application in public grids up until the year 2015. Topics as components, control, management and automation, high-, medium, and low-voltage grid concepts as well as social dimensions, economics, and impact on living

beings are considered. After substantial editorial effort, its first public edition has become ready now. The aim of FEN is to investigate and to develop flexible power grids. Such grid will safeguard the future energy supply with a high share of fluctuating and decentralized renewable energy sources. At the same time, these grids will enable a reliable and affordable energy supply in the future. The objective is to provide new technologies and concepts for the security and quality of the energy supply in the transmission and distribution grids. To pursue this goal, the use of direct-current (DC) technology, based on power electronics, automation and communication technologies, plays an important role. Although DC technology is not yet established as a

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standard technology in the public electrical power supply system, its high potential has been widely recognized. The use of DC is an enabler to make the future energy supply system more economical than a system based on alternating-current (AC), because of its superior properties in handling distributed and fluctuation power generation. Indeed, DC connections are already the most cost-efficient solution in cases of very high-power long-distance point-to-point transmission of electricity or via submarine cables. The objective of the FEN Research Campus is now to achieve and demonstrate feasibility of DC as a standard solution for future electrical grids, as described in this study.

This book focuses on the role and application of tap changers to power

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transformers and the power transmission industry in general. Starting with an elementary introduction to the fundamentals of tap changers, the book discusses the evolution of resistance tap changers and their current applications. It also includes the most recent technologies in the field like the vacuum and reactor tap changers, and discusses the driving mechanisms, operations and maintenance. This book can be a very useful reference for power systems professionals, engineering consultants, transformer manufacturers, and R&D organizations in the specification, installation, operation and maintenance of tap changers.

Plant Flow Measurement and Control Handbook
Fluid, Solid, Slurry and Multiphase Flow
Academic Press

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This book presents the proceedings of the International Conference on Emerging Research in Electronics, Computer Science and Technology (ICERECT) organized by PES College of Engineering in Mandya. Featuring cutting-edge, peer-reviewed articles from the field of electronics, computer science and technology, it is a valuable resource for members of the scientific research community.

Fault Current Limiters

Renewable Energy in Power Systems

Selected Papers from ISPR2020,

September 24-26, 2020 Online -

Turkey

Smart Grid Telecommunications

Design and Simulation of Heavy Haul

Locomotives and Trains

The Grid

The topics covered in this book range from modeling and

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programming languages and environments, via approaches for design and verification, to issues of ethics and regulation. In terms of techniques, there are results on model-based engineering, product lines, mission specification, component-based development, simulation, testing, and proof. Applications range from manufacturing to service robots, to autonomous vehicles, and even robots that evolve in the real world. A final chapter summarizes issues on ethics and regulation based on discussions from a panel of experts. The origin of this book is a two-day event, entitled

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RoboSoft, that took place in November 2019, in London. Organized with the generous support of the Royal Academy of Engineering and the University of York, UK, RoboSoft brought together more than 100 scientists, engineers and practitioners from all over the world, representing 70 international institutions. The intended readership includes researchers and practitioners with all levels of experience interested in working in the area of robotics, and software engineering more generally. The chapters are all self-contained, include

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explanations of the core concepts, and finish with a discussion of directions for further work. Chapters 'Towards Autonomous Robot Evolution', 'Composition, Separation of Roles and Model-Driven Approaches as Enabler of a Robotics Software Ecosystem' and 'Verifiable Autonomy and Responsible Robotics' are available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

Aimed at students and professionals, this book covers every major aspect of petroleum: the origin of fossil

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hydrocarbons and their chemical/physical properties; discovering hydrocarbon reserves; recovering oil, gas, and bitumen; purifying gas; the chemical and physical characterization of crude oil; refining crudes into fuels and lubricants; and converting simple chemicals into solvents, polymers, fibers, rubbers, coatings, and myriad other products, including pharmaceuticals. Readers will learn how the industry operates, from "upstream" exploration and production, "midstream" transportation to "downstream" refining, and manufacturing of finished

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products. The book also contains unique chapters on midstream operations, learnings from major accidents, and safety/environmental laws and regulations. It builds on the authors' previous books and teaching material from a highly rated course that is taught at the Florida A&M University/Florida State University (USA).

Interest in autonomous ships has grown exponentially over the past few years. Whereas a few years ago, the prospect of unmanned and autonomous vessels sailing on the seas was considered unrealistic, the debate now centers on when

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and in what format and pace the development will take place. Law has a key role to play in this development and legal obstacles are often singled out as principal barriers to the rapid introduction of new technologies in shipping.

Within a few years, autonomous ships have turned from a non-issue to one of the main regulatory topics being addressed by the International Maritime Organization.

However, the regulatory discussion is still in its infancy, and while many new questions have been raised, few answers have been provided to them to date. Increased automation of

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tasks that have traditionally been undertaken by ships' crews raises interesting legal questions across the whole spectrum of maritime law. The first of its kind, this book explores the issue of autonomous ships from a wide range of legal perspectives, including both private law and public law at international and national level, making available cutting-edge research which will be of significant interest to researchers in maritime law. Plant Flow Measurement and Control Handbook is a comprehensive reference source for practicing engineers in the field of instrumentation

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and controls. It covers many practical topics, such as installation, maintenance and potential issues, giving an overview of available techniques, along with recommendations for application. In addition, it covers available flow sensors, such as automation and control. The author brings his 35 years of experience in working in instrumentation and control within the industry to this title with a focus on fluid flow measurement, its importance in plant design and the appropriate control of processes. The book provides a good balance between

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practical issues and theory and is fully supported with industry case studies and a high level of illustrations to assist learning. It is unique in its coverage of multiphase flow, solid flow, process connection to the plant, flow computation and control. Readers will not only further understand design, but they will also further comprehend integration tactics that can be applied to the plant through a step-by-step design process that goes from installation to operation. Provides specification sheets, engineering drawings, calibration procedures and installation practices for each

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type of measurement Presents the correct flow meter that is suitable for a particular application Includes a selection table and step-by-step guide to help users make the best decision Cover examples and applications from engineering practice that will aid in understanding and application

Polymer Composites for Electrical Engineering

Control of Power Electronic Converters with Microgrid Applications

Optimal Coordination of Power Protective Devices with Illustrative Examples

Plant Hazard Analysis and Safety Instrumentation

Systems

Concepts and Applications

Autonomous Ships and the Law

Broad coverage of digital product creation, from design to manufacture and process optimization This book addresses the need to provide up-to-date coverage of current CAD/CAM usage and implementation. It covers, in one source, the entire design-to-manufacture process, reflecting the industry trend to further integrate CAD and CAM into a single, unified process. It also updates the computer aided design

theory and methods in modern manufacturing systems and examines the most advanced computer-aided tools used in digital manufacturing. Computer Aided Design and Manufacturing consists of three parts. The first part on Computer Aided Design (CAD) offers the chapters on Geometric Modelling; Knowledge Based Engineering; Platforming Technology; Reverse Engineering; and Motion Simulation. The second part on Computer Aided Manufacturing (CAM) covers

Group Technology and Cellular Manufacturing; Computer Aided Fixture Design; Computer Aided Manufacturing; Simulation of Manufacturing Processes; and Computer Aided Design of Tools, Dies and Molds (TDM). The final part includes the chapters on Digital Manufacturing; Additive Manufacturing; and Design for Sustainability. The book is also featured for being uniquely structured to classify and align engineering disciplines and computer aided technologies from the

perspective of the design needs in whole product life cycles, utilizing a comprehensive Solidworks package (add-ins, toolbox, and library) to showcase the most critical functionalities of modern computer aided tools, and presenting real-world design projects and case studies so that readers can gain CAD and CAM problem-solving skills upon the CAD/CAM theory. Computer Aided Design and Manufacturing is an ideal textbook for undergraduate and graduate students in mechanical engineering,

manufacturing engineering, and industrial engineering. It can also be used as a technical reference for researchers and engineers in mechanical and manufacturing engineering or computer-aided technologies.

Medium Voltage Direct Current Grid is the first comprehensive reference to provide advanced methods and best practices with case studies to Medium Voltage Direct Current Grid (MVDC) for Resilience Operation, Protection and Control. It also provides technical

details to tackle emerging challenges, and discuss knowledge and best practices about Modeling and Operation, Energy management of MVDC grid, MVDC Grid Protection, Power quality management of MVDC grid, Power quality analysis and control methods, AC/DC, DC/DC modular power converter, Renewable energy applications and Energy storage technologies. In addition, includes support to end users to integrate their systems to smart grid. Covers advanced methods

and global case studies for reference Provides technical details and best practices for the individual modeling and operation of MVDC systems Includes guidance to tackle emerging challenges and support users in integrating their systems to smart grids This book brings together successful stories of deployment of synchrophasor technology in managing the power grid. The authors discuss experiences with large scale deployment of Phasor Measurement Units (PMUs)

in power systems across the world, enabling readers to take this technology into control center operations and develop good operational procedures to manage the grid better, with wide area visualization tools using PMU data.

A thorough introduction to environmental monitoring in the oil and gas industry
Analytical Techniques in the Oil and Gas Industry for Environmental Monitoring
examines the analytical side of the oil and gas industry as it also provides an overall introduction to the industry.

You'll discover how oil and natural gas are sourced, refined, and processed. You can learn about what's produced from oil and natural gas, and why evaluating these sourced resources is important. The book discusses the conventional analyses for oil and natural gas feeds, along with their limitations. It offers detailed descriptions of advanced analytical techniques that are commercially available, plus explanations of gas and oil industry equipment and instrumentation. You'll find

technique descriptions supplemented with a list of references as well as with real-life application examples. With this book as a reference, you can prepare to apply specific analytical methods in your organization's lab environment. Analytical Techniques can also serve as your comprehensive resource on key techniques in the characterization of oil and gas samples, within both refinery and environmental contexts. Understand of the scope of oil and gas industry

**techniques available
Consider the benefits and
limitations of each available
process Prepare for applying
analytical techniques in your
lab See real examples and a
list of references for each
technique Read descriptions
of off-line analytics, as well
as on-line and process
applications As a chemist,
engineer, instructor, or
student, this book will also
expand your awareness of
the role these techniques
have in environmental
monitoring and
environmental impact
assessments.**

**Emerging Power Converters
for Renewable Energy and
Electric Vehicles**

**DC Technology in Utility
Grids**

Charles Darwin

**Smart, Secure, Green and
Reliable**

**Plant Flow Measurement
and Control Handbook**

Measurement and Safety

This reference book provides a detailed discussion on the protection challenges that arise due to technological improvements in transmission and distribution systems to supply increasing power demand. The primary focus of

this book is transmission line protection with FACTS devices connected to the line and islanding detection in an active distribution system i.e., microgrids. First, a literature review on the protection of transmission lines in the presence of switching devices is presented. The following chapters then present commonly proposed modifications required in the power system to meet increasing power demands, commonly used existing protection schemes and their limitations in the presence of switching devices, and solutions to these limitations

in protection schemes. Results from fault simulations using PSCAD/EMTDC and MATLAB are also included. This book will be valuable to graduate students and practicing engineers alike for dealing with protection issues in transmission and distribution systems incorporating FACTS devices. Provides thorough knowledge of trends in transmission networks for the enhancement of power flow, control and protection Presents an analysis of requirements of microgrids in the future Highlights challenges in the protection of active distribution systems or

microgrids against islanding in the presence of distributed generation

This book exemplifies how smart buildings have a crucial role to play for the future of energy. The book investigates what already exists in regards to technologies, approaches and solutions both with a scientific and technological point of view. The authors cover solutions for mirroring and tracing human activities, optimal strategies to configure home settings, and generating explanations and persuasive dashboards to get occupants better committed in their home energy managements.

Solutions are adapted from the fields of Internet of Things, physical modeling, optimization, machine learning and applied artificial intelligence. Practical applications are given throughout.

Explore the diverse electrical engineering application of polymer composite materials with this in-depth collection edited by leaders in the field
Polymer Composites for Electrical Engineering delivers a comprehensive exploration of the fundamental principles, state-of-the-art research, and future challenges of polymer composites. Written from the

perspective of electrical engineering applications, like electrical and thermal energy storage, high temperature applications, fire retardance, power cables, electric stress control, and others, the book covers all major application branches of these widely used materials. Rather than focus on polymer composite materials themselves, the distinguished editors have chosen to collect contributions from industry leaders in the area of real and practical electrical engineering applications of polymer composites. The books relevance will only increase as

advanced polymer composites receive more attention and interest in the area of advanced electronic devices and electric power equipment. Unique amongst its peers, Polymer Composites for Electrical Engineering offers readers a collection of practical and insightful materials that will be of great interest to both academic and industrial audiences. Those resources include: A comprehensive discussion of glass fiber reinforced polymer composites for power equipment, including GIS, bushing, transformers, and more) Explorations of polymer

composites for capacitors, outdoor insulation, electric stress control, power cable insulation, electrical and thermal energy storage, and high temperature applications
A treatment of semi-conductive polymer composites for power cables
In-depth analysis of fire-retardant polymer composites for electrical engineering
An examination of polymer composite conductors
Perfect for postgraduate students and researchers working in the fields of electrical, electronic, and polymer engineering,
Polymer Composites for Electrical Engineering will also earn a place in the libraries of

those working in the areas of composite materials, energy science and technology, and nanotechnology.

Plant Hazard Analysis and Safety Instrumentation Systems is the first book to combine coverage of these two integral aspects of running a chemical processing plant. It helps engineers from various disciplines learn how various analysis techniques, international standards, and instrumentation and controls provide layers of protection for basic process control systems, and how, as a result, overall system reliability, availability, dependability, and

maintainability can be increased. This step-by-step guide takes readers through the development of safety instrumented systems, also including discussions on cost impact, basics of statistics, and reliability. Swapan Basu brings more than 35 years of industrial experience to this book, using practical examples to demonstrate concepts. Basu links between the SIS requirements and process hazard analysis in order to complete SIS lifecycle implementation and covers safety analysis and realization in control systems, with up-to-date descriptions of modern

concepts, such as SIL, SIS, and Fault Tolerance to name a few. In addition, the book addresses security issues that are particularly important for the programmable systems in modern plants, and discusses, at length, hazardous atmospheres and their impact on electrical enclosures and the use of IS circuits. Helps the reader identify which hazard analysis method is the most appropriate (covers ALARP, HAZOP, FMEA, LOPA) Provides tactics on how to implement standards, such as IEC 61508/61511 and ANSI/ISA 84 Presents information on how to conduct safety analysis

and realization in control systems and safety instrumentation
Computer Aided Design and Manufacturing
Fault Analysis and Protection
System Design for DC Grids
Fluid, Solid, Slurry and Multiphase Flow
Oil and Gas Production Handbook: An Introduction to Oil and Gas Production
100% Clean, Renewable Energy and Storage for Everything
Die Entstehung der Arten
This book highlights recent research on sustainable production. In today's manufacturing industry, cleaner

production has become a central goal. "Sustainable production" describes activities that pose no threat to future generations and are not pursued at their expense. In addition, sustainable production is a concept that can improve environmental performance and focuses on technical aspects that can be used to improve efficiency and productivity. Sustainable production is not limited to the manufacturing sector, but affects all production sectors including energy,

environment, and material systems – all of which face significant challenges in connection with sustainability, e.g. efforts to reduce production's impact on the environment and to manage health and safety impacts. Key means of reducing environmental pollution from manufacturing involve reducing the main resources used in production (metals used in the machining processes, fluids/oils in production, water, and energy).

SMART GRID

TELECOMMUNICATIONS

Discover the foundations and main applications of telecommunications to smart grids In Smart Grid Telecommunications, renowned researchers and authors Drs. Alberto Sendin, Javier Matanza, and Ramon Ferrús deliver a focused treatment of the fundamentals and main applications of telecommunication technologies in smart grids. Aimed at engineers and professionals who work with power systems, the book explains what smart grids are and where telecommunications are

needed to solve their various challenges. Power engineers will benefit from explanations of the main concepts of telecommunications and how they are applied to the different domains of a smart grid.

Telecommunication engineers will gain an understanding of smart grid applications and services and will learn from the explanations of how telecommunications need to be adapted to work with them. The authors offer a simplified vision of smart grids with

rigorous coverage of the latest advances in the field, while avoiding some of the technical complexities that can hinder understanding in this area. The book offers: Discussions of why telecommunications are necessary in smart grids and the various telecommunication services and systems relevant for them An exploration of foundational telecommunication concepts ranging from system-level aspects, such as network topologies, multi-layer architectures and protocol

stacks, to communications channel transmission- and reception-level aspects Examinations of telecommunication-related smart grid services and systems, including SCADA, protection and teleprotection, smart metering, substation and distribution automation, synchrophasors, distributed energy resources, electric vehicles, and microgrids A treatment of wireline and wireless telecommunication technologies, like DWDM, Ethernet, IP, MPLS, PONs, PLC, BPL, 3GPP cellular 4G

and 5G technologies, Zigbee, Wi-SUN, LoRaWAN, and Sigfox, addressing their architectures, characteristics, and limitations Ideal for engineers working in power systems or telecommunications as network architects, operations managers, planners, or in regulation-related activities, Smart Grid Telecommunications is also an invaluable resource for telecommunication network and smart grid architects. This book offers a comprehensive reference

guide to the important topics of fault analysis and protection system design for DC grids, at various voltage levels and for a range of applications. It bridges a much-needed research gap to enable wide-scale implementation of energy-efficient DC grids. Following an introduction, DC grid architecture is presented, covering the devices, operation and control methods. In turn, analytical methods for DC fault analysis are presented for different types of faults, followed

by separate chapters on various DC fault identification methods, using time, frequency and time-frequency domain analyses of the DC current and voltage signals. The unit and non-unit protection strategies are discussed in detail, while a dedicated chapter addresses DC fault isolation devices. Step-by-step guidelines are provided for building hardware-based experimental test setups, as well as methods for validating the various algorithms. The book also

features several application-driven case studies.

This book presents a comprehensive survey of fault current limiters (FCLs) and their applications in power system to cope with the fault current. The book reviews characteristics, technologies, topologies, working principles, applications, and the interaction of FCLs with the power system. In the attempts to develop FCL with close to ideal attributes, academic researchers and companies

offer the different configurations that are mostly classified into non-superconducting fault current limiters and superconducting fault current limiters (SFCLs). Both categories are included in this book, and therefore, it can serve as an excellent stepping-stone for senior and/or graduate students who are interested in knowing the reason of the increase in short circuit level in the power system, fault current limitation measures, benefits and drawbacks of the

application of FCLs in power systems, the state-of-the-art of fault current limitation techniques, as well as recent advances in this area.

Power System Grid Operation Using Synchrophasor Technology Digital Conversion on the Way to Industry 4.0 -Survey Report- Petroleum Science and Technology Hearing Before the Subcommittee on Energy Conservation and Power of the Committee on Energy and Commerce, House of

*Representatives, Ninety-ninth Congress, Second Session, November 18, 1986
Smart Solar PV Inverters
with Advanced Grid Support
Functionalities*

Provides practical guidance on the coordination issue of power protective relays and fuses Protecting electrical power systems requires devices that isolate the components that are under fault while keeping the rest of the system stable. Optimal Coordination of Power Protective Devices

provides a thorough introduction to the optimal coordination of power systems protection using fuses and protective relays. Integrating fundamental theory and real-world practice, the text begins with an overview of power system protection and optimization, followed by a systematic description of the essential steps in designing directional overcurrent relays and other optimal coordinators. Subsequent

chapters present mathematical formulations for solving many standard test systems, and cover a variety of popular hybrid optimization schemes and their mechanisms. The author also discusses a selection of advanced topics and extended applications including adaptive optimal coordination, optimal coordination with multiple time-current curves, and optimally coordinating multiple types of protective

**devices. Optimal
Coordination of Power
Protective Devices:
Covers fuses and
overcurrent, directional
overcurrent, and distance
relays Explains the
relation between fault
current and operating
time of protective relays
Discusses performance
and design criteria such
as sensitivity, speed, and
simplicity Includes an up-
to-date literature review
and a detailed overview
of the fundamentals of
power system protection
Features numerous**

***illustrative examples,
practical case studies,
and programs coded in
MATLAB and Python
programming languages
Optimal Coordination of
Power Protective Devices
is the perfect textbook
for instructors in electric
power system protection
courses, and a must-have
reference for protection
engineers in power
electric companies, and
for researchers and
industry professionals
specializing in power
system protection.
The Power Grid: Smart,***

Secure, Green and Reliable offers a diverse look at the traditional engineering and physics aspects of power systems, also examining the issues affecting clean power generation, power distribution, and the new security issues that could potentially affect the availability and reliability of the grid. The book looks at growth in new loads that are consuming over 1% of all the electrical power produced, and how combining those load

issues of getting power to the regions experiencing growth in energy demand can be addressed. In addition, it considers the policy issues surrounding transmission line approval by regulators. With truly multidisciplinary content, including failure analysis of various systems, photovoltaic, wind power, quality issues with clean power, high-voltage DC transmission, electromagnetic radiation,

electromagnetic interference, privacy concerns, and data security, this reference is relevant to anyone interested in the broad area of power grid stability. Discusses state-of-the-art trends and issues in power grid reliability Offers guidance on purchasing or investing in new technologies Includes a technical document relevant to public policy that can help all stakeholders understand the technical issues

facing a green, secure power grid
Learn the fundamentals of smart photovoltaic (PV) inverter technology with this insightful one-stop resource Smart Solar PV Inverters with Advanced Grid Support Functionalities presents a comprehensive coverage of smart PV inverter technologies in alleviating grid integration challenges of solar PV systems and for additionally enhancing grid reliability.
Accomplished author

Rajiv Varma systematically integrates information from the wealth of knowledge on smart inverters available from EPRI, NREL, NERC, SIWG, EU-PVSEC, CIGRE, IEEE publications; and utility experiences worldwide. The book further presents a novel, author-developed and patented smart inverter technology for utilizing solar PV plants both in the night and day as a Flexible AC Transmission System (FACTS) Controller STATCOM,

named PV-STATCOM. Replete with case studies, this book includes over 600 references and 280 illustrations. Smart Solar PV Inverters with Advanced Grid Support Functionalities' features include: Concepts of active and reactive power control; description of different smart inverter functions, and modeling of smart PV inverter systems Distribution system applications of PV-STATCOM for dynamic voltage control,

***enhancing connectivity of solar PV and wind farms, and stabilization of critical motors
Transmission system applications of PV-STATCOM for improving power transfer capacity, power oscillation damping (POD), suppression of subsynchronous oscillations, mitigation of fault induced delayed voltage recovery (FIDVR), and fast frequency response (FFR) with POD
Hosting capacity for solar PV systems, its***

enhancement through effective settings of different smart inverter functions; and control coordination of smart PV inverters Emerging smart inverter grid support functions and their pioneering field demonstrations worldwide, including Canada, USA, UK, Chile, and India. Perfect for system planners and system operators, utility engineers, inverter manufacturers and solar farm developers, this book will prove to be an

important resource for academics and graduate students involved in electrical power and renewable energy systems.

***Discontinuity in the Governance of Value Chains and Its Spatial Implications
Application of Tap changers to Transformers
Modularization in the Wind Turbine Industry
Proceedings of International Conference, ICERECT 2018***