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Handbook of Electric Power Calculations - H. Wayne Beaty 2000-10-18

A bestselling calculations handbook that offers electric power engineers and technicians essential, step-by-step procedures for solving a wide array of electric power problems. This edition introduces a complete electronic book on CD-ROM with over 100 live calculations--90% of the book's calculations. Updated to reflect the new National Electric Code advances in transformer and motors; and the new system design and operating procedures in the electric utility industry prompted by deregulation.

Direct Methods for Sparse Linear Systems - Timothy A. Davis 2006-09-01

The sparse backslash book. Everything you wanted to know but never dared to ask about modern direct linear solvers. Chen Greif, Assistant Professor, Department of Computer Science, University of British Columbia. Overall, the book is magnificent. It fills a long-felt need for an accessible textbook on modern sparse direct methods. Its choice of scope is excellent John Gilbert, Professor, Department of Computer Science, University of California, Santa Barbara. Computational scientists often encounter problems requiring the solution of sparse systems of linear equations. Attacking these problems efficiently requires an in-depth knowledge of the underlying theory, algorithms, and data structures found in sparse matrix software libraries. Here, Davis presents the fundamentals of sparse matrix algorithms to provide the requisite background. The book includes CSparse, a concise downloadable sparse matrix package that illustrates the algorithms and theorems presented in the book and equips readers with the tools necessary to understand larger and more complex software packages. With a strong emphasis on MATLAB and the C programming language, Direct Methods for Sparse Linear Systems equips readers with the working knowledge required to use sparse solver packages and write code to interface applications to those packages. The book also explains how MATLAB performs its sparse matrix computations. Audience This invaluable book is essential to computational scientists and software developers who want to understand the theory and algorithms behind modern techniques used to solve large sparse linear systems. The book also serves as an excellent practical resource for students with an interest in combinatorial scientific computing. Preface; Chapter 1: Introduction; Chapter 2: Basic algorithms; Chapter 3: Solving triangular systems; Chapter 4: Cholesky factorization; Chapter 5: Orthogonal methods; Chapter 6: LU factorization; Chapter 7: Fill-reducing orderings; Chapter 8: Solving sparse linear systems; Chapter 9: CSparse; Chapter 10: Sparse matrices in MATLAB; Appendix: Basics of the C programming language; Bibliography; Index.

Engineering Satellite-Based Navigation and Timing - John W. Betz 2015-12-01

This book describes the design and performance analysis of satnav systems, signals, and receivers, with a general approach that applies to all satnav systems and signals in use or under development. It also provides succinct descriptions and comparisons of each satnav system. Clearly structured, and comprehensive depiction of engineering satellite-based navigation and timing systems, signals, and receivers GPS as well as all new and modernized systems (SBAS, GLONASS, Galileo, BeiDou, QZSS, IRNSS) and signals being developed and fielded Theoretical and applied review questions, which can be used for homework or to obtain deeper insights into the material Extensive equations describing techniques and their performance, illustrated by MATLAB plots New results, novel insights, and innovative descriptions for key approaches and results in systems engineering and receiver design If you are an instructor and adopted this book for your course, please email ieeeproposals@wiley.com to get access to the instructor files for this book.

VSC-FACTS-HVDC - Enrique Acha 2019-04-01

An authoritative reference on the new generation of VSC-FACTS and VSC-HVDC systems and their applicability within current and future power systems VSC-FACTS-HVDC and PMU: Analysis, Modelling and Simulation in Power Grids provides comprehensive coverage of VSC-FACTS and VSC-HVDC systems within the context of high-voltage Smart Grids modelling and simulation. Readers are presented with an examination of the advanced computer modelling of the VSC-FACTS and VSC-HVDC systems for steady-state, optimal solutions, state estimation and transient stability analyses, including numerous case studies for the reader to gain hands-on experience in the use of models and concepts. Key features: Wide-ranging treatment of the VSC achieved by assessing basic operating principles, topology structures, control algorithms and utility-level applications. Detailed advanced models of VSC-FACTS and VSC-HVDC equipment, suitable for a wide range of power network-wide studies, such as power flows, optimal power flows, state estimation and dynamic simulations. Contains numerous case studies and practical examples, including cases of multi-terminal VSC-HVDC systems. Includes a companion website featuring MATLAB software and Power System Computer Aided Design (PSCAD) scripts which are provided to enable the reader to gain hands-on experience. Detailed coverage of electromagnetic transient studies of VSC-FACTS and VSC-HVDC systems using the de-facto industry standard PSCAD /EMTDC simulation package. An essential guide for utility engineers, academics, and research students as well as industry managers, engineers in equipment design and manufacturing, and consultants.

Advances in Computer, Information, and Systems Sciences, and Engineering - Khaled Elleithy 2007-06-06

The conference proceedings of: International Conference on Industrial Electronics, Technology & Automation (IETA 05) International Conference on Telecommunications and Networking (TeNe 05) International Conference on Engineering Education, Instructional Technology, Assessment, and E-learning (EIAE 05) include a set of rigorously reviewed world-class manuscripts addressing and detailing state-of-the-art research projects in the areas of: Industrial Electronics, Technology and Automation, Telecommunications, Networking, Engineering Education, Instructional Technology and e-Learning. The three conferences, (IETA 05, TENE 05 and EIAE 05) were part of the International Joint Conference on Computer, Information, and System Sciences, and Engineering (CISSE 2005). CISSE 2005, the World's first Engineering/Computing and Systems Research E-Conference was the first high-caliber Research Conference in the world to be completely conducted online in real-time via the internet. CISSE received 255 research paper submissions and the final program included 140 accepted papers, from more than 45 countries. The whole concept and format of CISSE 2005 was very exciting and ground-breaking. The powerpoint presentations, final paper manuscripts and time schedule for live presentations over the web had been available for 3 weeks prior to the start of the conference for all registrants, so they could pick and choose the presentations they want to attend and think about questions that they might want to ask. The live audio presentations were also recorded and are part of the permanent CISSE archive, which includes all power point presentations, papers and recorded presentations. All aspects of the conference were managed on-line; not only the reviewing, submissions and registration processes; but also the actual conference. Conference participants - authors, presenters and attendees - only needed an internet connection and sound available on their computers in order to be able to contribute and participate in this international ground-breaking conference. The on-line structure of this high-quality event allowed academic

professionals and industry participants to contribute work and attend world-class technical presentations based on rigorously refereed submissions, live, without the need for investing significant travel funds or time out of the office. Suffice to say that CISSE received submissions from more than 50 countries, for whose researchers, this opportunity presented a much more affordable, dynamic and well-planned event to attend and submit their work to, versus a classic, on-the-ground conference. The CISSE conference audio room provided superb audio even over low speed internet connections, the ability to display PowerPoint presentations, and cross-platform compatibility (the conferencing software runs on Windows, Mac, and any other operating system that supports Java). In addition, the conferencing system allowed for an unlimited number of participants, which in turn granted CISSE the opportunity to allow all participants to attend all presentations, as opposed to limiting the number of available seats for each session. The implemented conferencing technology, starting with the submission & review system and ending with the online conferencing capability, allowed CISSE to conduct a very high quality, fulfilling event for all participants. See: www.cissee2005.org, sections: IETA, TENE, EIAE

Intelligent Automatic Generation Control - Hassan Bevrani 2017-12-19

Automatic generation control (AGC) is one of the most important control problems in the design and operation of interconnected power systems. Its significance continues to grow as a result of several factors: the changing structure and increasing size, complexity, and functionality of power systems, the rapid emergence (and uncertainty) of renewable energy sources, developments in power generation/consumption technologies, and environmental constraints. Delving into the fundamentals of power system AGC, Intelligent Automatic Generation Control explores ways to make the infrastructures of tomorrow smarter and more flexible. These frameworks must be able to handle complex multi-objective regulation optimization problems, and they must be highly diversified in terms of policies, control strategies, and wide distribution in demand and supply sources—all via an intelligent scheme. The core of such intelligent systems should be based on efficient, adaptable algorithms, advanced information technology, and fast communication devices to ensure that the AGC systems can maintain generation-load balance following serious disturbances. This book addresses several new schemes using intelligent control techniques for simultaneous minimization of system frequency deviation and tie-line power changes, which is required for successful operation of interconnected power systems. It also concentrates on physical and engineering aspects and examines several developed control strategies using real-time simulations. This reference will prove useful for engineers and operators in power system planning and operation, as well as academic researchers and students in field of electrical engineering.

Robust Control in Power Systems - Bikash Pal 2006-07-02

Robust Control in Power Systems deals with the applications of new techniques in linear system theory to control low frequency oscillations in power systems. The book specifically focuses on the analysis and damping of inter-area oscillations in the systems which are in the range of 0.2-1 Hz. The damping control action is injected through high power electronic devices known as flexible AC transmission system (FACTS) controllers. Three commonly used FACTS controllers: controllable series capacitors (CSCs) controllable phase shifters (CPSs) and static var compensators (SVCs) have been used in this book to control the inter-area oscillations. The overview of linear system theory from the perspective of power system control is explained through examples. The damping control design is formulated as norm optimization problem. The H_∞ , H_2 norm of properly defined transfer functions are minimized in linear matrix inequalities (LMI) framework to obtain desired performance and stability robustness. Both centralized and decentralized control structures are used. Usually the transmission of feedback signal from a remote location encounters delays making it difficult to control the system. Smith predictor based approach has been successfully explored in this book as a solution to such a problem. Robust Control in Power Systems will be valuable to academicians in the areas of power, control and system theory, as well as professionals in the power industry.

Technology and Engineering Applications of Simulink - S. Chakravarty 2012-05-23

Building on MATLAB (the language of technical computing), Simulink provides a platform for engineers to plan, model, design, simulate, test and implement complex electromechanical, dynamic control, signal processing and communication systems. Simulink-Matlab combination is very useful for developing

algorithms, GUI assisted creation of block diagrams and realisation of interactive simulation based designs. The eleven chapters of the book demonstrate the power and capabilities of Simulink to solve engineering problems with varied degree of complexity in the virtual environment.

Optimization of Power System Problems - Mahmoud Pesaran Hajiabbas 2020-01-06

This book presents integrated optimization methods and algorithms for power system problems along with their codes in MATLAB. Providing a reliable and secure power and energy system is one of the main challenges of the new era. Due to the nonlinear multi-objective nature of these problems, the traditional methods are not suitable approaches for solving large-scale power system operation dilemmas. The integration of optimization algorithms into power systems has been discussed in several textbooks, but this is the first to include the integration methods and the developed codes. As such, it is a useful resource for undergraduate and graduate students, researchers and engineers trying to solve power and energy optimization problems using modern technical and intelligent systems based on theory and application case studies. It is expected that readers have a basic mathematical background.

System Simulation Techniques with MATLAB and Simulink - Dingyü Xue 2013-09-16

System Simulation Techniques with MATLAB and Simulink comprehensively explains how to use MATLAB and Simulink to perform dynamic systems simulation tasks for engineering and non-engineering applications. This book begins with covering the fundamentals of MATLAB programming and applications, and the solutions to different mathematical problems in simulation. The fundamentals of Simulink modelling and simulation are then presented, followed by coverage of intermediate level modelling skills and more advanced techniques in Simulink modelling and applications. Finally the modelling and simulation of engineering and non-engineering systems are presented. The areas covered include electrical, electronic systems, mechanical systems, pharmacokinetics systems, video and image processing systems and discrete events systems. Hardware-in-the-loop simulation and real-time application are also discussed. Key features: Progressive building of simulation skills using Simulink, from basics through to advanced levels, with illustrations and examples Wide coverage of simulation topics of applications from engineering to non-engineering systems Dedicated chapter on hardware-in-the-loop simulation and real-time control End of chapter exercises A companion website hosting a solution manual and powerpoint slides System Simulation Techniques with MATLAB and Simulink is a suitable textbook for senior undergraduate/postgraduate courses covering modelling and simulation, and is also an ideal reference for researchers and practitioners in industry.

Understanding FACTS - Narain G. Hingorani 2000

The Flexible AC Transmission System (FACTS)—a new technology based on power electronics—offers an opportunity to enhance controllability, stability, and power transfer capability of ac transmission systems. Two pioneers in the field provide in-depth discussions on power semiconductor devices, voltage-sourced and current-sourced converters, specific FACTS controllers, and major FACTS applications in the U.S.

IMDC-IST 2021 - Abd-Alhameed Raed 2022-01-26

This book contains the proceedings of the Second International Conference on Integrated Sciences and Technologies (IMDC-IST-2021). Where held on 7th-9th Sep 2021 in Sakarya, Turkey. This conference was organized by University of Bradford, UK and Southern Technical University, Iraq. The papers in this conference were collected in a proceedings book entitled: Proceedings of the second edition of the International Multi-Disciplinary Conference Theme: “Integrated Sciences and Technologies” (IMDC-IST-2021). The presentation of such a multi-discipline conference provides a lot of exciting insights and new understanding on recent issues in terms of Green Energy, Digital Health, Blended Learning, Big Data, Meta-material, Artificial-Intelligence powered applications, Cognitive Communications, Image Processing, Health Technologies, 5G Communications. Referring to the argument, this conference would serve as a valuable reference for future relevant research activities. The committee acknowledges that the success of this conference are closely intertwined by the contributions from various stakeholders. As being such, we would like to express our heartfelt appreciation to the keynote speakers, invited speakers, paper presenters, and participants for their enthusiastic support in joining the second edition of the International Multi-Disciplinary Conference Theme: “Integrated Sciences and Technologies” (IMDC-IST-2021). We are convinced that the contents of the study from various papers are not only encouraged productive discussion

among presenters and participants but also motivate further research in the relevant subject. We appreciate for your enthusiasm to attend our conference and share your knowledge and experience. Your input was important in ensuring the success of our conference. Finally, we hope that this conference serves as a forum for learning in building togetherness and academic networks. Therefore, we expect to see you all at the next IMDC-IST.

Emerging Technologies for Sustainability - P.C Thomas 2020-08-15

The theme of conference is Emerging Technologies for Sustainability. Sustainability tends to be problem driven and oriented towards guiding decision making. The goal is to raise the global standard of living without increasing the use of resources beyond global sustainable levels. The conference is intended to act as a platform for researchers to share and gain knowledge, showcase their research findings and propose new solutions in policy formulation, design, processing and application of green materials, material selection, analysis, green manufacturing, testing and synthesis, thereby contributing to the creation of a more sustainable world.

Electronic Systems and Intelligent Computing - Pradeep Kumar Mallick 2020-09-22

This book presents selected, high-quality research papers from the International Conference on Electronic Systems and Intelligent Computing (ESIC 2020), held at NIT Yupia, Arunachal Pradesh, India, on 2 - 4 March 2020. Discussing the latest challenges and solutions in the field of smart computing, cyber-physical systems and intelligent technologies, it includes papers based on original theoretical, practical and experimental simulations, developments, applications, measurements, and testing. The applications and solutions featured provide valuable reference material for future product development.

Advances in Communication, Signal Processing, VLSI, and Embedded Systems - Shubhakar Kalya 2019-11-30

This book comprises selected peer-reviewed papers from the International Conference on VLSI, Signal Processing, Power Systems, Illumination and Lighting Control, Communication and Embedded Systems (VSPICE-2019). The contents are divided into five broad topics - VLSI and embedded systems, signal processing, power systems, illumination and control, and communication and networking. The book focuses on the latest innovations, trends, and challenges encountered in the different areas of electronics and communication, and electrical engineering. It also offers potential solutions and provides an insight into various emerging areas such as image fusion, bio-sensors, and underwater sensor networks. This book can prove to be useful for academics and professionals interested in the various sub-fields of electronics and communication engineering.

VSC-FACTS-HVDC - Enrique Acha 2019-04-04

An authoritative reference on the new generation of VSC-FACTS and VSC-HVDC systems and their applicability within current and future power systems VSC-FACTS-HVDC and PMU: Analysis, Modelling and Simulation in Power Grids provides comprehensive coverage of VSC-FACTS and VSC-HVDC systems within the context of high-voltage Smart Grids modelling and simulation. Readers are presented with an examination of the advanced computer modelling of the VSC-FACTS and VSC-HVDC systems for steady-state, optimal solutions, state estimation and transient stability analyses, including numerous case studies for the reader to gain hands-on experience in the use of models and concepts. Key features: Wide-ranging treatment of the VSC achieved by assessing basic operating principles, topology structures, control algorithms and utility-level applications. Detailed advanced models of VSC-FACTS and VSC-HVDC equipment, suitable for a wide range of power network-wide studies, such as power flows, optimal power flows, state estimation and dynamic simulations. Contains numerous case studies and practical examples, including cases of multi-terminal VSC-HVDC systems. Includes a companion website featuring MATLAB software and Power System Computer Aided Design (PSCAD) scripts which are provided to enable the reader to gain hands-on experience. Detailed coverage of electromagnetic transient studies of VSC-FACTS and VSC-HVDC systems using the de-facto industry standard PSCAD /EMTDC simulation package. An essential guide for utility engineers, academics, and research students as well as industry managers, engineers in equipment design and manufacturing, and consultants.

Electrical Generation and Distribution Systems and Power Quality Disturbances - Gregorio Romero 2011-11-21

The utilization of renewable energy sources such as wind energy, or solar energy, among others, is currently of greater interest. Nevertheless, since their availability is arbitrary and unstable this can lead to frequency variation, to grid instability and to a total or partial loss of load power supply, being not appropriate sources to be directly connected to the main utility grid. Additionally, the presence of a static converter as output interface of the generating plants introduces voltage and current harmonics into the electrical system that negatively affect system power quality. By integrating distributed power generation systems closed to the loads in the electric grid, we can eliminate the need to transfer energy over long distances through the electric grid. In this book the reader will be introduced to different power generation and distribution systems with an analysis of some types of existing disturbances and a study of different industrial applications such as battery charges.

Power Generation, Operation, and Control - Allen J. Wood 2012-11-07

A comprehensive text on the operation and control of power generation and transmission systems In the ten years since Allen J. Wood and Bruce F. Wollenberg presented their comprehensive introduction to the engineering and economic factors involved in operating and controlling power generation systems in electric utilities, the electric power industry has undergone unprecedented change. Deregulation, open access to transmission systems, and the birth of independent power producers have altered the structure of the industry, while technological advances have created a host of new opportunities and challenges. In Power Generation, Operation, and Control, Second Edition, Wood and Wollenberg bring professionals and students alike up to date on the nuts and bolts of the field. Continuing in the tradition of the first edition, they offer a practical, hands-on guide to theoretical developments and to the application of advanced operations research methods to realistic electric power engineering problems. This one-of-a-kind text also addresses the interaction between human and economic factors to prepare readers to make real-world decisions that go beyond the limits of mere technical calculations. The Second Edition features vital new material, including: * A computer disk developed by the authors to help readers solve complicated problems * Examination of Optimal Power Flow (OPF) * Treatment of unit commitment expanded to incorporate the Lagrange relaxation technique * Introduction to the use of bounding techniques and other contingency selection methods * Applications suited to the new, deregulated systems as well as to the traditional, vertically organized utilities company Wood and Wollenberg draw upon nearly 30 years of classroom testing to provide valuable data on operations research, state estimation methods, fuel scheduling techniques, and more. Designed for clarity and ease of use, this invaluable reference prepares industry professionals and students to meet the future challenges of power generation, operation, and control.

IEEE Recommended Practice for Excitation System Models for Power System Stability Studies - Institute of Electrical and Electronics Engineers 1992

The Holomorphic Embedding Load-Flow Method - Antonio Trias 2018-12-19

This monograph provides the first in-depth and comprehensive overview of the Holomorphic Embedding Load-Flow Method, a technique to constructively solve the power flow equations in power networks.

Solving Applied Mathematical Problems with MATLAB - 2008-11-03

This textbook presents a variety of applied mathematics topics in science and engineering with an emphasis on problem solving techniques using MATLAB. The authors provide a general overview of the MATLAB language and its graphics abilities before delving into problem solving, making the book useful for readers without prior MATLAB experi

Power System Dynamics and Stability - Peter W. Sauer 2017-07-14

Classic power system dynamics text now with phasor measurement and simulation toolbox This new edition addresses the needs of dynamic modeling and simulation relevant to power system planning, design, and operation, including a systematic derivation of synchronous machine dynamic models together with speed and voltage control subsystems. Reduced-order modeling based on integral manifolds is used as a firm basis for understanding the derivations and limitations of lower-order dynamic models. Following these developments, multi-machine model interconnected through the transmission network is formulated and simulated using numerical simulation methods. Energy function methods are discussed for direct evaluation of stability. Small-signal analysis is used for determining the electromechanical modes and mode-shapes,

and for power system stabilizer design. Time-synchronized high-sampling-rate phasor measurement units (PMUs) to monitor power system disturbances have been implemented throughout North America and many other countries. In this second edition, new chapters on synchrophasor measurement and using the Power System Toolbox for dynamic simulation have been added. These new materials will reinforce power system dynamic aspects treated more analytically in the earlier chapters. Key features: Systematic derivation of synchronous machine dynamic models and simplification. Energy function methods with an emphasis on the potential energy boundary surface and the controlling unstable equilibrium point approaches. Phasor computation and synchrophasor data applications. Book companion website for instructors featuring solutions and PowerPoint files. Website for students featuring MATLAB files. Power System Dynamics and Stability, 2nd Edition, with Synchrophasor Measurement and Power System Toolbox combines theoretical as well as practical information for use as a text for formal instruction or for reference by working engineers.

Solar PV and Wind Energy Conversion Systems - S. Sumathi 2015

This textbook starts with a review of the principles of operation, modeling and control of common solar energy and wind-power generation systems before moving on to discuss grid compatibility, power quality issues and hybrid models of Solar PV and Wind Energy Conversion Systems (WECS). MATLAB/SIMULINK models of fuel cell technology and associated converters are discussed in detail. The impact of soft computing techniques such as neural networks, fuzzy logic, and genetic algorithms in the context of solar and wind energy is explained with practical implementation using MATLAB/SIMULINK models. This book is intended for final year undergraduate, post-graduate and research students interested in understanding the modeling and control of Solar PV and Wind Energy Conversion Systems based on MATLAB/SIMULINK. - Each chapter includes "Learning Objectives" at the start, a "Summary" at the end, and helpful Review Questions - Includes MATLAB/SIMULINK models of different control strategies for power conditioning units in the context of Solar PV - Presents soft computing techniques for Solar PV and WECS, as well as MATLAB/SIMULINK models, e.g. for wind turbine topologies and grid integration - Covers hybrid solar PV and Wind Energy Conversion Systems with converters and MATLAB/SIMULINK models - Reviews harmonic reduction in Solar PV and Wind Energy Conversion Systems in connection with power quality issues - Covers fuel cells and converters with implementation using MATLAB/SIMULINK.

Flexible AC Transmission Systems: Modelling and Control - Xiao-Ping Zhang 2012-02-24

The extended and revised second edition of this successful monograph presents advanced modeling, analysis and control techniques of Flexible AC Transmission Systems (FACTS). The book covers comprehensively a range of power-system control problems: from steady-state voltage and power flow control, to voltage and reactive power control, to voltage stability control, to small signal stability control using FACTS controllers. In the six years since the first edition of the book has been published research on the FACTS has continued to flourish while renewable energy has developed into a mature and booming global green business. The second edition reflects the new developments in converter configuration, smart grid technologies, super power grid developments worldwide, new approaches for FACTS control design, new controllers for distribution system control, and power electronic controllers in wind generation operation and control. The latest trends of VSC-HVDC with multilevel architecture have been included and four completely new chapters have been added devoted to Multi-Agent Systems for Coordinated Control of FACTS-devices, Power System Stability Control using FACTS with Multiple Operating Points, Control of a Looping Device in a Distribution System, and Power Electronic Control for Wind Generation.

Applications of MATLAB in Science and Engineering - Tadeusz Michalowski 2011-09-09

The book consists of 24 chapters illustrating a wide range of areas where MATLAB tools are applied. These areas include mathematics, physics, chemistry and chemical engineering, mechanical engineering, biological (molecular biology) and medical sciences, communication and control systems, digital signal, image and video processing, system modeling and simulation. Many interesting problems have been included throughout the book, and its contents will be beneficial for students and professionals in wide areas of interest.

Biometric Recognition - Jie Zhou 2018-08-08

The LNCS volume 10996 constitutes the proceedings of the 13th Chinese Conference on Biometric

Recognition, held in Urumchi, China, in August 2018. The 79 regular papers presented in this book were carefully reviewed and selected from 112 submissions. The papers cover a wide range of topics such as Biometrics, Speech recognition, Activity recognition and understanding, Online handwriting recognition, System forensics, Multi-factor authentication, Graphical and visual passwords.

Power Conversion and Control of Wind Energy Systems - Bin Wu 2011-08-09

The book presents the latest power conversion and control technology in modern wind energy systems. It has nine chapters, covering technology overview and market survey, electric generators and modeling, power converters and modulation techniques, wind turbine characteristics and configurations, and control schemes for fixed- and variable-speed wind energy systems. The book also provides in-depth steady-state and dynamic analysis of squirrel cage induction generator, doubly fed induction generator, and synchronous generator based wind energy systems. To illustrate the key concepts and help the reader tackle real-world issues, the book contains more than 30 case studies and 100 solved problems in addition to simulations and experiments. The book serves as a comprehensive reference for academic researchers and practicing engineers. It can also be used as a textbook for graduate students and final year undergraduate students.

Robust and Optimal Control - Kemin Zhou 1996

For graduate—level courses and for professional reference dealing with robust linear control, multivariable design and H...à Control. Assumes prior knowledge of feedback and control systems and linear systems theory. Also appropriate for practicing engineers familiar with modern control techniques. Class-tested at major institutions around the world and regarded as an "instant classic" by reviewers, this work offers the most complete coverage of robust and H...à control available. The clarity of the overall methodology: how one sets a problem up, introduces uncertainty models, weights, performance norms, etc. set this book apart from others in the field. Offers detailed treatment of topics not found elsewhere including — Riccati equations, ...m theory, H...à loopshaping, controller reduction, how to formulate problems in a LFT form. Key results are given immediately for quick access in the beginning of the book. Overall the book serves as a tremendous self-contained reference by having collected and developed all the important proofs and key results available. Problems sets are available on Internet.

Proceeding of the Second International Conference on Microelectronics, Computing & Communication Systems (MCCs 2017) - Vijay Nath 2019-08-14

The volume presents high quality papers presented at the Second International Conference on Microelectronics, Computing & Communication Systems (MCCS 2017). The book discusses recent trends in technology and advancement in MEMS and nanoelectronics, wireless communications, optical communication, instrumentation, signal processing, image processing, bioengineering, green energy, hybrid vehicles, environmental science, weather forecasting, cloud computing, renewable energy, RFID, CMOS sensors, actuators, transducers, telemetry systems, embedded systems, and sensor network applications. It includes original papers based on original theoretical, practical, experimental, simulations, development, application, measurement, and testing. The applications and solutions discussed in the book will serve as a good reference material for future works.

Optimal Power Flow Using FACTS Devices - L. Ashok Kumar 2020-12-04

Optimal Power Flow Using FACTS Devices: Soft Computing Techniques develops intelligent algorithms to analyze optimal power flow (OPF) and to enhance the power transfer capability of the transmission line with reduced congestion. By providing elaborate studies on FACTS devices and by using soft computing metaheuristics algorithms such as Firefly, Cuckoo, Flower Pollination, and others., this book enables readers to know about algorithms in real-time power system applications and damping of subsynchronous resonance (SSR) oscillations. Key features of this book include: Offers comprehensive review of FACTS devices and the importance of soft computing techniques for solving OPF. Describes the various problems associated with power system operation and control. Addresses issues of SSR in power systems and proposes soft techniques for SSR analysis in power systems. Demonstrates of the importance of SSR and congestion management using intelligent FACTS devices as part of OPF. Covers power systems' reliability, quality, cost-effectiveness, effects on customer goodwill, and pollution limits, including the deregulation of markets and different intelligent controllers. Optimal Power Flow Using FACTS Devices: Soft Computing

Techniques is aimed at researchers and professionals in the field of power systems.

General Intelligence and Test of Reasoning - Vikas Experts

Test Prep for General Intelligence and Test of Reasoning

Thyristor-Based FACTS Controllers for Electrical Transmission Systems - R. Mohan Mathur 2002-02-27

An important new resource for the international utility market Over the past two decades, static reactive power compensators have evolved into a mature technology and become an integral part of modern electrical power systems. They are one of the key devices in flexible AC transmission systems (FACTS). Coordination of static compensators with other controllable FACTS devices promises not only tremendously enhanced power system controllability, but also the extension of power transfer capability of existing transmission corridors to near their thermal capacities, thus delaying or even curtailing the need to invest in new transmission facilities. Offering both an in-depth presentation of theoretical concepts and practical applications pertaining to these power compensators, Thyristor-Based FACTS Controllers for Electrical Transmission Systems fills the need for an appropriate text on this emerging technology. Replete with examples and case studies on control design and performance, the book provides an important resource for both students and engineers working in the field.

FACTS - Enrique Acha 2004-10-22

The first book to provide comprehensive coverage of FACTS power systems modeling and simulation. * Detailed coverage of the development of FACTS controllers and guidance on the selection of appropriate equipment * Computer modelling examples of the FACTS controllers for steady-state and transient stability systems * Numerous case studies and practical examples

Applications of Robotics in Industry Using Advanced Mechanisms - Janmenjoy Nayak 2020-09-05

This book shares important findings on the application of robotics in industry using advanced mechanisms, including software and hardware. It presents a collection of recent trends and research on various advanced computing paradigms such as soft computing, robotics, smart automation, power control, and uncertainty analysis. The book constitutes the proceedings of the 1st International Conference on Application of Robotics in Industry using Advanced Mechanisms (ARIAM2019), which offered a platform for sharing original research findings, presenting innovative ideas and applications, and comparing notes on various aspects of robotics. The contributions highlight the latest research and industrial applications of robotics, and discuss approaches to improving the smooth functioning of industries. Moreover, they focus on designing solutions for complex engineering problems and designing system components or processes to meet specific needs, with due considerations for public health and safety, including cultural, societal, and environmental considerations. Taken together, they offer a valuable resource for researchers, scientists, engineers, professionals and students alike.

Grid Integration of Wind Energy - Siegfried Heier 2014-04-21

This popular reference describes the integration of wind-generated power into electrical power systems and, with the use of advanced control systems, illustrates how wind farms can be made to operate like conventional power plants. Fully revised, the third edition provides up-to-date coverage on new generator developments for wind turbines, recent technical developments in electrical power conversion systems, control design and essential operating conditions. With expanded coverage of offshore technologies, this edition looks at the characteristics and static and dynamic behaviour of offshore wind farms and their connection to the mainland grid. Brand new material includes: comprehensive treatment of onshore and offshore grid integration updated legislative guidelines for the design, construction and installation of wind power plants the fundamental characteristics and theoretical tools of electrical and mechanical components and their interactions new and future types of generators, converters, power electronics and controller designs improved use of grid capacities and grid support for fixed- and variable-speed controlled wind power plants options for grid control and power reserve provision in wind power plants and wind farms This resource is an excellent guide for researchers and practitioners involved in the planning, installation and grid integration of wind turbines and power plants. It is also highly beneficial to university students studying wind power technology, renewable energy and power systems, and to practitioners in wind engineering, turbine design and manufacture and electrical power engineering.

Power System Oscillations - Graham Rogers 2012-12-06

Power System Oscillations deals with the analysis and control of low frequency oscillations in the 0.2-3 Hz range, which are a characteristic of interconnected power systems. Small variations in system load excite the oscillations, which must be damped effectively to maintain secure and stable system operation. No warning is given for the occurrence of growing oscillations caused by oscillatory instability, since a change in the system's operating condition may cause the transition from stable to unstable. If not limited by nonlinearities, unstable oscillations may lead to rapid system collapse. Thus, it is difficult for operators to intervene manually to restore the system's stability. It follows that it is important to analyze a system's oscillatory behavior in order to understand the system's limits. If the limits imposed by oscillatory instability are too low, they may be increased by the installation of special stabilizing controls. Since the late 60s when this phenomena was first observed in North American systems, intensive research has resulted in design and installation of stabilizing controls known as power system stabilizers (PSS). The design, location and tuning of PSS require special analytical tools. This book addresses these questions in a modal analysis framework, with transient simulation as a measure of controlled system performance. After discussing the nature of the oscillations, the design of the PSS is discussed extensively using modal analysis and frequency response. In the scenario of the restructured power system, the performance of power system damping controls must be insensitive to parameter uncertainties. Power system stabilizers, when well tuned, are shown to be robust using the techniques of modern control theory. The design of damping controls, which operate through electronic power system devices (FACTS), is also discussed. There are many worked examples throughout the text. The Power System Toolbox[®] for use with MATLAB[®] is used to perform all of the analyses used in this book. The text is based on the author's experience of over 40 years as an engineer in the power industry and as an educator.

Power System Modelling and Scripting - Federico Milano 2010-09-08

Power system modelling and scripting is a quite general and ambitious title. Of course, to embrace all existing aspects of power system modelling would lead to an encyclopedia and would be likely an impossible task. Thus, the book focuses on a subset of power system models based on the following assumptions: (i) devices are modelled as a set of nonlinear differential algebraic equations, (ii) all alternate-current devices are operating in three-phase balanced fundamental frequency, and (iii) the time frame of the dynamics of interest ranges from tenths to tens of seconds. These assumptions basically restrict the analysis to transient stability phenomena and generator controls. The modelling step is not self-sufficient. Mathematical models have to be translated into computer programming code in order to be analyzed, understood and "experienced". It is an object of the book to provide a general framework for a power system analysis software tool and hints for filling up this framework with versatile programming code. This book is for all students and researchers that are looking for a quick reference on power system models or need some guidelines for starting the challenging adventure of writing their own code.

PowerFactory Applications for Power System Analysis - Francisco M. Gonzalez-Longatt 2014-12-27

This book presents a comprehensive set of guidelines and applications of DiGSILENT PowerFactory, an advanced power system simulation software package, for different types of power systems studies. Written by specialists in the field, it combines expertise and years of experience in the use of DiGSILENT PowerFactory with a deep understanding of power systems analysis. These complementary approaches therefore provide a fresh perspective on how to model, simulate and analyse power systems. It presents methodological approaches for modelling of system components, including both classical and non-conventional devices used in generation, transmission and distribution systems, discussing relevant assumptions and implications on performance assessment. This background is complemented with several guidelines for advanced use of DSL and DPL languages as well as for interfacing with other software packages, which is of great value for creating and performing different types of steady-state and dynamic performance simulation analysis. All employed test case studies are provided as supporting material to the reader to ease recreation of all examples presented in the book as well as to facilitate their use in other cases related to planning and operation studies. Providing an invaluable resource for the formal instruction of power system undergraduate/postgraduate students, this book is also a useful reference for engineers working in power system operation and planning.

Flexible AC Transmission Systems (FACTS) - Yong-Hua Song 1999

Provides a comprehensive guide to FACTS, covering all the major aspects in research and development of

FACTS technology.

Nise's Control Systems Engineering - Norman S. Nise 2018