

Electric Power Distribution Handbook Second Edition

Combining select chapters from Grigsby's standard-setting *The Electric Power Engineering Handbook* with several chapters not found in the original work, *Electric Power Transformer Engineering* became widely popular for its comprehensive, tutorial-style treatment of the theory, design, analysis, operation, and protection of power transformers. For its second edition, this popular progeny rejoins the handbook as one in a set of five carefully focused volumes. In addition to updates in nearly every chapter, this highly regarded reference brings to the Handbook its original contributions, discussing phase-shifting, rectifier, and constant-voltage transformers as well as power transformer protection and transient-voltage response. It also includes two new sections in the chapter on reactors, covering installation considerations for dry-type air-core reactors as well as line traps and power line carrier communication-, data-, and protective-relaying systems. Major updates appear in the highly active areas of dry-type transformers, instrument transformers, reactors, and load-tap changers. This book offers convenient access to everything from basic theory and concepts to detailed analysis of the individual components of a transformer. Reflecting standards, technologies, and new developments around the world, *Electric Power Transformer Engineering, Second Edition* provides a thorough and up-to-date guide for power engineers at all levels of expertise. Other volumes in the set include: *Electric Power Generation, Transmission, and Distribution Electric Power Substations Engineering, Second Edition Power Systems Power System Stability and Control*

Providing more than twice the content of the original edition, this new edition is the premier source on the selection, development, and provision of safe, high-quality, and cost-effective electric utility distribution systems, and it promises vast improvements in system reliability and layout by spanning every aspect of system planning including load forecasting, scheduling, performance, and economics. Responding to the evolving needs of electric utilities, *Power Distribution Planning Reference Book* presents an abundance of real-world examples, procedural and managerial issues, and engineering and analytical methodologies that are crucial to efficient and enhanced system performance.

Part of the second edition of *The Electric Power Engineering Handbook*, *Electric Power Generation, Transmission, and Distribution* offers focused and detailed coverage of all aspects concerning the conventional and nonconventional methods of power generation, transmission and distribution systems, electric power utilization, and power quality. Contributed by worldwide leaders under the guidance of one of the world's most respected and accomplished authorities in power engineering, this carefully crafted reference provides convenient access to both overviews and detailed information on a diverse array of topics. Updates to nearly every existing chapter keep this book at the forefront of developments in modern power systems, reflecting international standards, practices, and technologies. Additionally, three new chapters examine the environmental impact of transmission lines, real-time control of distributed generation, and distribution system characteristics and protection. New material ensures up-to-date information on highly active areas including advanced energy technologies, distributed utilities, load characterization and modeling, and power quality issues such as power system harmonics, voltage sags, and power quality monitoring. Remaining relevant in a rapidly evolving field, *Electric Power Generation, Transmission, and Distribution* helps you develop and maintain safe, efficient, and economical power generation and delivery in today's dynamic and high-demand environment. Other volumes in the set include: *Electric Power Substations Engineering, Second Edition Electric Power Transformer Engineering, Second Edition Power Systems Power System Stability and Control*

Of the "big three" components of electrical infrastructure, distribution typically gets the least attention. In fact, a thorough, up-to-date treatment of the subject hasn't been published in years, yet deregulation and technical changes have increased the need for better information. Filling this void, the *Electric Power Distribution Handbook* delivers comprehensive, cutting-edge coverage of the electrical aspects of power distribution systems. The first few chapters of this pragmatic guidebook focus on equipment-oriented information and applications such as choosing transformer connections, sizing and placing capacitors, and setting regulators. The middle portion discusses reliability and power quality, while the end tackles lightning protection, grounding, and safety. The second edition of this Choice award winner features:

- * 1 new chapter on overhead line performance and 14 fully revised chapters incorporating updates from several EPRI projects
- * New sections on voltage optimization, arc flash, and contact voltage
- * Full-color illustrations throughout, plus fresh bibliographic references, tables, graphs, methods, and statistics
- * Updates on conductor burndown, fault location, reliability programs, tree contacts, automation, and grounding and personnel protection
- * Access to an author-maintained support website, distributionhandbook.com, with problem sets, resources, and online apps.

An unparalleled source of tips and solutions for improving performance, the *Electric Power Distribution Handbook, Second Edition* provides power and utility engineers with the technical information and practical tools they need to understand the applied science of distribution. A quick scan of any bookstore, library, or online bookseller will produce a multitude of books covering power systems. However, few, if any, are totally devoted to power distribution engineering, and none of them are true textbooks. Filling this vacuum in the power system engineering literature, *Electric Power Distribution System Engineering* broke new ground. Written in the classic, self-learning style of the original, *Electric Power Distribution Engineering, Third Edition* is updated and expanded with:

- Over 180 detailed numerical examples
- More than 170 end-of-chapter problems
- New MATLAB® applications

The Third Edition also features new chapters on:

- Distributed generation
- Renewable energy (e.g., wind and solar energies)
- Modern energy storage systems
- Smart grids and their applications

Designed specifically for junior- or senior-level electrical engineering courses, the book covers all aspects of distribution engineering from basic system planning and concepts through distribution system protection and reliability. Drawing on decades of experience to provide a text that is as attractive to students as it is useful to professors and practicing engineers, the author demonstrates how to design, analyze, and perform modern distribution system engineering. He takes special care to cover industry terms and symbols, providing a glossary and clearly defining each term when it is introduced. The discussion of distribution planning and design considerations goes beyond the usual analytical and qualitative analysis to emphasize the economical explication and overall impact of the distribution design considerations discussed.

The use of electric power substations in generation, transmission, and distribution remains one of the most challenging and exciting areas of electric power engineering. Recent technological developments have had a tremendous impact on all aspects of substation design and operation. With 80% of its chapters completely revised and two brand-new chapters on energy storage and Smart Grids, *Electric Power Substations Engineering, Third Edition* provides an extensive updated overview of substations, serving as a reference and guide for both industry and academia. Contributors have written each chapter with detailed design information for electric power engineering professionals and other engineering professionals (e.g., mechanical, civil) who want an

overview or specific information on this challenging and important area. This book: Emphasizes the practical application of the technology Includes extensive use of graphics and photographs to visually convey the book's concepts Provides applicable IEEE industry standards in each chapter Is written by industry experts who have an average of 25 to 30 years of industry experience Presents a new chapter addressing the key role of the substation in Smart Grids Editor John McDonald and this very impressive group of contributors cover all aspects of substations, from the initial concept through design, automation, and operation. The book's chapters—which delve into physical and cyber-security, commissioning, and energy storage—are written as tutorials and provide references for further reading and study. As with the other volumes in the Electric Power Engineering Handbook series, this book supplies a high level of detail and, more importantly, a tutorial style of writing and use of photographs and graphics to help the reader understand the material. Several chapter authors are members of the IEEE Power & Energy Society (PES) Substations Committee and are the actual experts who are developing the standards that govern all aspects of substations. As a result, this book contains the most recent technological developments in industry practice and standards. Watch John D. McDonald talk about his book A volume in the Electric Power Engineering Handbook, Third Edition. Other volumes in the set: K12642 Electric Power Generation, Transmission, and Distribution, Third Edition (ISBN: 9781439856284) K12648 Power Systems, Third Edition (ISBN: 9781439856338) K13917 Power System Stability and Control, Third Edition (ISBN: 9781439883204) K12643 Electric Power Transformer Engineering, Third Edition (ISBN: 9781439856291)

This accessible text, now in its Second Edition, continues to provide a comprehensive coverage of electric power generation, transmission and distribution, including the operation and management of different systems in these areas. It gives an overview of the basic principles of electrical engineering and load characteristics and provides exhaustive system-level description of several power plants, such as thermal, electric, nuclear and gas power plants. The book fully explores the basic theory and also covers emerging concepts and technologies. The conventional topics of transmission subsystem including HVDC transmission are also discussed, along with an introduction to new technologies in power transmission and control such as Flexible AC Transmission Systems (FACTS). Numerous solved examples, inter-spersed throughout, illustrate the concepts discussed. What is New to This Edition : Provides two new chapters on Diesel Engine Power Plants and Power System Restructuring to make the students aware of the changes taking place in the power system industry. Includes more solved and unsolved problems in each chapter to enhance the problem solving skills of the students. Primarily designed as a text for the undergraduate students of electrical engineering, the book should also be of great value to power system engineers.

A reference at once so elemental and so comprehensive, The Electric Power Engineering Handbook not only describes the field's body of knowledge, but defines it. Written by expert contributors under the leadership of one of the world's most respected and accomplished authorities in power engineering, the second edition remains the undisputed guide to power generation, transmission, and distribution, as well as for modeling, analyzing, planning, designing, monitoring, and controlling power systems. This fully updated edition is now available as a set of five books, each focused on a particular area of expertise. Electric Power Generation, Transmission, and Distribution Electric Power Substations Engineering, Second Edition Electric Power Transformer Engineering, Second Edition Power Systems Power System Stability and Control The handbook's first edition spawned two bestselling specialist works, Electric Power Transformer Engineering and Electric Power Substations Engineering, each of which included new material not found in the handbook. For this edition, these highly popular progeny rejoin the handbook, supplying ten additional chapters. Along with updates to nearly every chapter, several rewritten articles, and new material added to existing sections, this edition features nine entirely new chapters on such areas as environmental effects of transmission systems, substation asset management, substation commissioning, distribution system characteristics and protection, real-time control of distributed generation, and flexible AC transmission system (FACTS) controllers. Retaining its unique tutorial style, The Electric Power Engineering Handbook, Second Edition prevails as a monument to the decades of ingenuity and tireless efforts of power engineers around the world.

Part of the second edition of The Electric Power Engineering Handbook, Power System Stability and Control offers conveniently focused and detailed information covering all aspects concerning power system protection, dynamics, stability, operation, and control. Contributed by worldwide leaders under the guidance of one of the world's most respected and accomplished authorities in power engineering, this carefully crafted reference provides convenient access to both overviews and detailed information on a diverse array of topics. Updates to nearly every existing chapter keep this book at the forefront of developments in modern power systems, reflecting international standards, practices, and technologies. New sections were added to keep pace with new developments and rapid growth in the areas of small signal stability and power system oscillations, power system stability controls, and dynamic modeling of power systems. This edition also features a review of a wide area dynamics analysis carried out in 2005 for the western interconnection of the North American power system. Other highly active areas contributing updated information include transformer and transmission line protection, optimal power flow, and security analysis. Remaining relevant in a rapidly evolving field, Power System Stability and Control helps you ensure safe, economical, and high-quality power delivery in today's high-demand and highly dynamic environment. Other volumes in the set include: Electric Power Generation, Transmission, and Distribution Electric Power Substations Engineering, Second Edition Electric Power Transformer Engineering, Second Edition Power Systems

Part of the second edition of The Electric Power Engineering Handbook, Power Systems offers focused and detailed coverage of all aspects concerning power system analysis and simulation, transients, planning, reliability, and power electronics. Contributed by worldwide leaders under the guidance of one of the world's most respected and accomplished authorities in power engineering, this carefully crafted reference provides convenient access to both overviews and detailed information on a diverse array of topics. Updates to nearly every existing chapter keep this book at the forefront of developments in modern power systems, reflecting international standards, practices, and technologies. Four entirely new chapters discuss computational methods for electric power systems, flexible AC transmission system (FACTS) controllers, surge arresters, and probabilistic methods for planning and operational analysis. New material ensures up-to-date information on highly active areas such as switching surges, transient voltage response of coils and windings, short-term load and price forecasting using artificial neural networks, planning and reliability, power semiconductor devices, inverters, and active filters for power conditioning. Remaining relevant in a rapidly evolving field, Power Systems guides you in the analysis, design, protection, operation, and reliability of modern power systems to ensure efficient and economical power delivery. Other volumes in the set include: Electric Power Generation, Transmission, and Distribution Electric Power Substations Engineering, Second Edition Electric Power Transformer Engineering, Second Edition Power System Stability and Control

The electricity sector is currently experiencing many changes, such as the impact of high-end technologies, environmental issues, privatization of the power utilities, rising tariffs and power shortages. The sector is reinventing itself to overcome these challenges and is anticipating growth with the institution of electricity reforms and the entry of private companies. Written by a highly acknowledged practitioner, Electrical Power Distribution dwells on all these aspects and covers the subject in its entirety. With the sixth edition, the book celebrates its 30th anniversary--a testimony to the vast readership as well as the changes being experienced in this sector. Highlights of This Edition

Inclusion of two new chapters-Meter, Billing and Collection and Natural Distribution System Revision of all the existing chapters in view of the Electricity Act, 2003 Addition of examples and problems in the existing chapters With this coverage, this book would be useful to engineers in the various electricity boards and companies engaged in electrical power distribution, as well as students of electrical engineering. The Instructors' Manual of the book has been revised thoroughly to supplement the updated contents. This can be accessed from the website <http://highered.mcgraw-hill.com/sites/0070144559>

« This book gives nonelectrical professionals a fundamental understanding of large interconnected electrical power systems, better known as the «power grid,» with regard of terminology, electrical concepts, design considerations, construction practices, industry standards, control room operations for both normal and emergency conditions, maintenance, consumption, telecommunications and safety. The text begins with an overview of the terminology and basic electrical concepts commonly used in the industry then it examines the generation, transmission and distribution of power. Other topics discussed include energy management, conservation of electrical energy, consumption characteristics and regulatory aspects to help readers understand modern electric power systems. This second edition features : new sections on renewable energy, regulatory changes, new measures to improve system reliability, and smart technologies used in the power grid system; updated practical examples, photographs, drawing, and illustrations to help the reader gain a better understanding of the material; optional supplementary reading sections within most chapters to elaborate on certain concepts by providing additional detail or background. »--

A quick scan of any bookstore, library, or online bookseller will produce a multitude of books covering power systems. However, few, if any, are totally devoted to power distribution engineering, and none of them are true textbooks. Filling this vacuum in the power system engineering literature, the first edition of Electric Power Distribution System Engineering broke new ground. Written in the classic, self-learning style of the first edition, this second edition contains updated coverage, new examples, and numerous examples of MATLAB applications. Designed specifically for junior- or senior-level electrical engineering courses, the author draws on his more than 31 years of experience to provide a text that is as attractive to students as it is useful to professors and practicing engineers. The book covers all aspects of distribution engineering from basic system planning and concepts through distribution system protection and reliability. The author brings to the table years of experience and, using this as a foundation, demonstrates how to design, analyze, and perform modern distribution system engineering. He takes special care to cover industry terms and symbols, providing a glossary and clearly defining each term when it is introduced. The discussion of distribution planning and design considerations goes beyond the usual analytical and qualitative analysis and emphasizes the economical explication and overall impact of the distribution design considerations discussed. See what's new in the Second Edition: Topics such as automation of distribution systems, advanced SCADA systems, computer applications, substation grounding, lightning protection, and insulators Chapter on electric power quality New examples and MATLAB applications Substation grounding Lightning protection Insulators Expanded topics include: Load forecasting techniques High-impedance faults A detailed review of distribution reliability indices Watch Turan Gonen talk about his book at: <http://youtu.be/OZBd2diBzgk>

The Standard Handbook for Electrical Engineers has served the EE field for nearly a century. Originally published in 1907, through 14 previous editions it has been a required resource for students and professionals. This new 15th edition features new material focusing on power generation and power systems operation – two longstanding strengths of the handbook that have recently become front-burner technology issues. At the same time, the entire format of the handbook will be streamlined, removing archaic sections and providing a quick, easy look-up experience.

Smart Power Distribution Systems: Control, Communication, and Optimization explains how diverse technologies work to build and maintain smart grids around the globe. Yang, Yang and Li present the most recent advances in the control, communication and optimization of smart grids and provide unique insight into power system control, sensing and communication, and optimization technologies. The book covers control challenges for renewable energy and smart grids, communication in smart power systems, and optimization challenges in smart power system operations. Each area discussed focuses on the scientific innovations relating to the approaches, methods and algorithmic solutions presented. Readers will develop sound knowledge and gain insights into the integration of renewable energy generation in smart power distribution systems. Presents the latest technological advances in electric power distribution networks, with a particular focus on methodologies, approaches and algorithms Provides insights into the most recent research and developments from expert contributors from across the world Presents a clear and methodical structure that guides the reader through discussion and analysis, providing unique insights and sound knowledge along the way

This book includes my lecture notes for electrical power transmission course. The power transmission process, from generation to distribution is described and expressions for resistance, inductance and capacitance of high-voltage power transmission lines are developed used to determine the equivalent circuit of a three-phase transmission line. The book is divided to different learning outcomes Part 1- Describe the power transmission process, from generation to distribution. Part 2- Develop expressions for resistance, inductance and capacitance of high-voltage power transmission lines and determine the equivalent circuit of a three-phase transmission line. Part 1: Describe the power transmission process, from generation to distribution. - Describe the components of an electrical power system. - Identify types of power lines, standard voltages, and components of high-voltage transmission lines (HVTL). - Describe the construction of a transmission line, galloping lines, corona effect, insulator pollution, and lightning strikes. - Explain transmission system stability in regards to power transfer, power flow division, and transfer impedance. Part 2: Develop expressions for resistance, inductance and capacitance of high-voltage power transmission lines and determine the equivalent circuit of a three-phase transmission line. - List the types of conductors used in power transmission line. - Develop the expression for the inductance and capacitance of a simple, single-phase, two wire transmission line composed of solid round conductors. - Deduce the expression for the inductance and capacitance of a simple, single-phase composite (stranded) conductor line. - Derive the expression for the inductance and capacitance of three-phase lines having symmetrically and asymmetrically spacing and for bundled conductors. - Discuss the effect of earth on the capacitance of three-phase transmission lines. - Derive the short transmission lines models and medium transmission lines models.

Part of the second edition of The Electric Power Engineering Handbook, Electric Power Generation, Transmission, and Distribution offers focused and detailed coverage of all aspects concerning the conventional and nonconventional methods of power generation, transmission and distribution systems, electric power utilization, and power quality. Contrary to the second edition of a bestseller, this definitive text covers all aspects of testing and maintenance of the equipment found in electrical power systems serving industrial, commercial, utility substations, and generating plants. It addresses practical aspects of routing testing and maintenance and presents both the methodologies and engineering basics

needed to carry out these tasks. It is an essential reference for engineers and technicians responsible for the operation, maintenance, and testing of power system equipment. Comprehensive coverage includes dielectric theory, dissolved gas analysis, cable fault locating, ground resistance measurements, and power factor, dissipation factor, DC, breaker, and relay testing methods.

The electrical power supply is about to change; future generation will increasingly take place in and near local neighborhoods with diminishing reliance on distant power plants. The existing grid is not adapted for this purpose as it is largely a remnant from the 20th century. Can the grid be transformed into an intelligent and flexible grid that is future proof? This revised edition of *Electrical Power System Essentials* contains not only an accessible, broad and up-to-date overview of alternating current (AC) power systems, but also end-of-chapter exercises in every chapter, aiding readers in their understanding of the material introduced. With an original approach the book covers the generation of electric energy from thermal power plants as from renewable energy sources and treats the incorporation of power electronic devices and FACTS. Throughout there are examples and case studies that back up the theory or techniques presented. The authors set out information on mathematical modelling and equations in appendices rather than integrated in the main text. This unique approach distinguishes it from other text books on Electrical Power Systems and makes the resource highly accessible for undergraduate students and readers without a technical background directly related to power engineering. After laying out the basics for a steady-state analysis of the three-phase power system, the book examines: generation, transmission, distribution, and utilization of electric energy wind energy, solar energy and hydro power power system protection and circuit breakers power system control and operation the organization of electricity markets and the changes currently taking place system blackouts future developments in power systems, HVDC connections and smart grids The book is supplemented by a companion website from which teaching materials can be downloaded.

Electrical Power Transmission System Engineering: Analysis and Design is devoted to the exploration and explanation of modern power transmission engineering theory and practice. Designed for senior-level undergraduate and beginning-level graduate students, the book serves as a text for a two-semester course or, by judicious selection, the material may be condensed into one semester. Written to promote hands-on self-study, it also makes an ideal reference for practicing engineers in the electric power utility industry. Basic material is explained carefully, clearly, and in detail, with multiple examples. Each new term is defined as it is introduced. Ample equations and homework problems reinforce the information presented in each chapter. A special effort is made to familiarize the reader with the vocabulary and symbols used by the industry. Plus, the addition of numerous impedance tables for overhead lines, transformers, and underground cables makes the text self-contained. The Third Edition is not only up to date with the latest advancements in electrical power transmission system engineering, but also: Provides a detailed discussion of flexible alternating current (AC) transmission systems Offers expanded coverage of the structures, equipment, and environmental impacts of transmission lines Features additional examples of shunt fault analysis using MATLAB® Also included is a review of the methods for allocating transmission line fixed charges among joint users, new trends and regulations in transmission line construction, a guide to the Federal Energy Regulatory Commission (FERC) electric transmission facilities permit process and Order No. 1000, and an extensive glossary of transmission system engineering terminology. Covering the electrical and mechanical aspects of the field with equal detail, *Electrical Power Transmission System Engineering: Analysis and Design, Third Edition* supplies a solid understanding of transmission system engineering today.

Covering the fundamental theory of electric power transformers, this book provides the background required to understand the basic operation of electromagnetic induction as applied to transformers.

Due to its high impact on the cost of electricity and its direct correlation with customer satisfaction, distribution reliability continues to be one of the most important topics in the electric power industry. Continuing in the unique tradition of the bestselling first edition, *Electric Power Distribution Reliability, Second Edition* consolidates all pertinent topics on electric power distribution into one comprehensive volume balancing theory, practical knowledge, and real world applications. Updated and expanded with new information on benchmarking, system hardening, underground conversion, and aging infrastructure, this timely reference enables you to—

- Manage aging infrastructure
- Harden electric power distribution systems
- Avoid common benchmarking pitfalls
- Apply effective risk management

The electric power industry will continue to make distribution system reliability and customer-level reliability a top priority. Presenting a wealth of useful knowledge, *Electric Power Distribution Reliability, Second Edition* remains the only book that is completely dedicated to this important topic.

Electric Power Distribution Handbook CRC Press

A revised and updated text that explores the fundamentals of the physics of electric power handling systems The revised and updated second edition of *Electric Power Principles: Sources, Conversion, Distribution and Use* offers an innovative and comprehensive approach to the fundamentals of electric power. The author – a noted expert on the topic – provides a thorough grounding in electric power systems, with an informative discussion on per-unit normalisations, symmetrical components and iterative load flow calculations. The text covers the most important topics within the power system, such as protection and DC transmission, and examines both traditional power plants and those used for extracting sustainable energy from wind and sunlight. The text explores the principles of electromechanical energy conversion and magnetic circuits and synchronous machines – the most important generators of electric power. The book also contains information on power electronics, induction and direct current motors. This new second edition includes: A new chapter on energy storage, including battery modeling and how energy storage and associated power electronics can be used to modify system dynamics Information on voltage stability and bifurcation The addition of Newton's Method for load flow calculations Material on the grounding transformer connections added to the section on three phase transformer An example of the unified power flow controller for voltage support Written for students studying electric power systems and electrical engineering, the updated second edition of *Electric Power Principles: Sources, Conversion, Distribution and Use* is the classroom-tested text that offers an understanding of the basics of the physics of electric power

handling systems.

Of the "big three" components of electrical infrastructure, distribution typically gets the least attention. In fact, a thorough, up-to-date treatment of the subject hasn't been published in years, yet deregulation and technical changes have increased the need for better information. Filling this void, the Electric Power Distribution Handbook delivers comprehensive, cutting-edge coverage of the electrical aspects of power distribution systems. The first few chapters of this pragmatic guidebook focus on equipment-oriented information and applications such as choosing transformer connections, sizing and placing capacitors, and setting regulators. The middle portion discusses reliability and power quality, while the end tackles lightning protection, grounding, and safety. The Second Edition of this CHOICE Award winner features: 1 new chapter on overhead line performance and 14 fully revised chapters incorporating updates from several EPRI projects New sections on voltage optimization, arc flash, and contact voltage Full-color illustrations throughout, plus fresh bibliographic references, tables, graphs, methods, and statistics Updates on conductor burndown, fault location, reliability programs, tree contacts, automation, and grounding and personnel protection Access to an author-maintained support website, distributionhandbook.com, with problems sets, resources, and online apps An unparalleled source of tips and solutions for improving performance, the Electric Power Distribution Handbook, Second Edition provides power and utility engineers with the technical information and practical tools they need to understand the applied science of distribution. This new edition of Industrial Power Distribution addresses key areas of electric power distribution from an end-user perspective, which will serve industry professionals and students develop the necessary skills for the power engineering field. Expanded treatment of one-line diagrams, the per-unit system, complex power, transformer connections, and motor applications New topics in this edition include lighting systems and arc flash hazard Concept of AC Power is developed step by step from the basic definition of power Fourier analysis is described in a graphical sense End-of-chapter exercises 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.

Implementing the automation of electric distribution networks, from simple remote control to the application of software-based decision tools, requires many considerations, such as assessing costs, selecting the control infrastructure type and automation level, deciding on the ambition level, and justifying the solution through a business case. Control and Automation of Electric Power Distribution Systems addresses all of these issues to aid you in resolving automation problems and improving the management of your distribution network. Bringing together automation concepts as they apply to utility distribution systems, this volume presents the theoretical and practical details of a control and automation solution for the entire distribution system of substations and feeders. The fundamentals of this solution include depth of control, boundaries of control responsibility, stages of automation, automation intensity levels, and automated device preparedness. To meet specific performance goals, the authors discuss distribution planning, performance calculations, and protection to facilitate the selection of the primary device, associated secondary control, and fault indicators. The book also provides two case studies that illustrate the business case for distribution automation (DA) and methods for calculating benefits, including the assessment of crew time savings. As utilities strive for better economies, DA, along with other tools described in this volume, help to achieve improved management of the distribution network. Using Control and Automation of Electric Power Distribution Systems, you can embark on the automation solution best suited for your needs.

THE DEFINITIVE GUIDE TO POWER QUALITY--UPDATED AND EXPANDED Electrical Power Systems Quality, Third Edition, is a complete, accessible, and up-to-date guide to identifying and preventing the causes of power quality problems. The information is presented without heavy-duty equations, making it practical and easily readable for utility engineers, industrial engineers, technicians, and equipment designers. This in-depth resource addresses the essentials of power quality and tested methods to improve compatibility among the power system, customer equipment, and processes. Coverage includes: Standard terms and definitions for power quality phenomena Protecting against voltage sags and interruptions Harmonic phenomena and dealing with harmonic distortion Transient overvoltages Long-duration voltage variations Benchmarking power quality International Electrotechnical Commission (IEC) and Institute of Electrical and Electronics Engineers (IEEE) standards Maintaining power quality in distributed generation systems Common wiring and grounding problems, along with solutions Site surveys and power quality monitoring

Considered to be the first book devoted to the subject, Linear Synchronous Motors: Transportation and Automation Systems, Second Edition evaluates the state of the art, demonstrating the technological innovations that are improving the design, construction, and performance of modern control systems. This new edition not only illustrates the development of linear synchronous motor drives, but it also discusses useful techniques for selecting a motor that will meet the specific requirements of linear electrical drives. New Features for the Second Edition: Several updated and expanded sections, as well as two new chapters on FEM Even more numerical examples, calculations, and mathematical models Broadened target audience that includes researchers, scientists, students, and more Evaluating trends and practical techniques for achieving optimal system performance, the authors showcase ready-to-implement solutions for common roadblocks in this process. The book presents fundamental equations and calculations used to determine and evaluate system operation, efficiency, and reliability, with an exploration of modern computer-aided design of linear synchronous motors, including the finite element approach. It covers topics such as linear sensors and stepping motors, magnetic levitation systems, elevators, and factory automation systems. It also features case studies on flat PM, tubular PM, air-cored, and hybrid linear synchronous motors, as well as 3D finite element method analysis of tubular linear reluctance motors, and linear oscillatory actuators. With such an exceptional presentation of practical tools and conceptual illustrations, this volume is an especially powerful resource. It will benefit readers from all walks by providing numerical examples, models, guidelines, and diagrams to help develop a clear understanding of linear synchronous motor operations, characteristics, and much more.

Combining select chapters from Grigsby's standard-setting The Electric Power Engineering Handbook with several chapters not found in the original work, Electric Power Substations Engineering became widely popular for its comprehensive, tutorial-style treatment of the theory, design, analysis, operation, and protection of power substations. For its second edition, this popular progeny rejoins the handbook as one in a set of five carefully focused volumes. In addition to substantial updates in most areas, this bestselling reference brings to the Handbook its five original

contributions, covering such diverse topics as communications, physical and cyber security, and gas-insulated transmission lines (GIL). This edition also includes two entirely new chapters on substation asset management and substation commissioning. Major updates appear in the highly active areas of integration, automation, substation grounding, high-voltage switching equipment, and air- and gas-insulated substations. With contributions by active leaders from around the world, the coverage reflects international standards, practices, and technologies, not limited to those found in North America. In fact, many of the contributors are involved in developing the standards in their area of expertise. Updated to include the latest developments, trends, and technologies, *Electric Power Substations Engineering, Second Edition* provides a thorough and up-to-date guide for power engineers at all levels of expertise. Other volumes in the set include: *Electric Power Generation, Transmission, and Distribution* *Electric Power Transformer Engineering, Second Edition* *Power Systems Power System Stability and Control*

Electric Power Transmission and Distribution is meant to serve as a textbook for students of B.Tech and B.E. Electrical Engineering. This is, in fact, the first course book for the electrical engineering student in which almost all concepts of transmission and distribution are covered in a single book. This book is mainly divided into two sections. The first section deals with power supply schemes, overhead transmission of electrical power, conductor materials, electrical and mechanical design aspects of transmission lines, performance of transmission lines, different phenomena that occur in the transmission system and overhead. It also covers the transmission of electric power by underground cables. The second section deals with electrical distribution system, where D.C. and A.C. distribution system concepts, different types of D.C. distribution schemes and different solutions to solve the A.C. distribution problems are covered. The book covers the syllabi of many universities in India for a course in power transmission and distribution.

Electric Power Transformer Engineering, Third Edition expounds the latest information and developments to engineers who are familiar with basic principles and applications, perhaps including a hands-on working knowledge of power transformers. Targeting all from the merely curious to seasoned professionals and acknowledged experts, its content is structured to enable readers to easily access essential material in order to appreciate the many facets of an electric power transformer. Topically structured in three parts, the book: Illustrates for electrical engineers the relevant theories and principles (concepts and mathematics) of power transformers Devotes complete chapters to each of 10 particular embodiments of power transformers, including power, distribution, phase-shifting, rectifier, dry-type, and instrument transformers, as well as step-voltage regulators, constant-voltage transformers, transformers for wind turbine generators and photovoltaic applications, and reactors Addresses 14 ancillary topics including insulation, bushings, load tap changers, thermal performance, testing, protection, audible sound, failure analysis, installation and maintenance and more As with the other books in the series, this one supplies a high level of detail and, more importantly, a tutorial style of writing and use of photographs and graphics to help the reader understand the material. Important chapters have been retained from the second edition; most have been significantly expanded and updated for this third installment. Each chapter is replete with photographs, equations, and tabular data, and this edition includes a new chapter on transformers for use with wind turbine generators and distributed photovoltaic arrays. Jim Harlow and his esteemed group of contributors offer a glimpse into the enthusiastic community of power transformer engineers responsible for this outstanding and best-selling work. A volume in the *Electric Power Engineering Handbook, Third Edition*. Other volumes in the set: K12642 *Electric Power Generation, Transmission, and Distribution, Third Edition* (ISBN: 9781439856284) K12648 *Power Systems, Third Edition* (ISBN: 9781439856338) K13917 *Power System Stability and Control, Third Edition* (9781439883204) K12650 *Electric Power Substations Engineering, Third Edition* (9781439856383) Watch James H. Harlow's talk about his book: Part One: <http://youtu.be/fZNe9L4cux0> Part Two: <http://youtu.be/y9ULZ9IM0jE> Part Three: http://youtu.be/nqWMjK7Z_dg

Most textbooks that deal with the power analysis of electrical engineering power systems focus on generation or distribution systems. Filling a gap in the literature, *Modern Power System Analysis, Second Edition* introduces readers to electric power systems, with an emphasis on key topics in modern power transmission engineering. Throughout, the book familiarizes readers with concepts and issues relevant to the power utility industry. A Classroom-Tested Power Engineering Text That Focuses on Power Transmission Drawing on the author's industry experience and more than 42 years teaching courses in electrical machines and electric power engineering, this book explains the material clearly and in sufficient detail, supported by extensive numerical examples and illustrations. New terms are defined when they are first introduced, and a wealth of end-of-chapter problems reinforce the information presented in each chapter. Topics covered include: Power system planning Transmission line parameters and the steady-state performance of transmission lines Disturbance of system components Symmetrical components and sequence impedances Analysis of balanced and unbalanced faults—including shunt, series, and simultaneous faults Transmission line protection Load-flow analysis Designed for senior undergraduate and graduate students as a two-semester or condensed one-semester text, this classroom-tested book can also be used for self-study. In addition, the detailed explanations and useful appendices make this updated second edition a handy reference for practicing power engineers in the electrical power utility industry. What's New in This Edition 35 percent new material Updated and expanded material throughout Topics on transmission line structure and equipment Coverage of overhead and underground power transmission Expanded discussion and examples on power flow and substation design Extended impedance tables and expanded coverage of per unit systems in the appendices New appendix containing additional solved problems using MATLAB® New glossary of modern power system analysis terminology

As well as dealing with the planning and design of modern distribution systems, as opposed to more general aspects of transmission and generation, this second edition of *Electricity Distribution Network Design* (1989) updates its treatment of computer-based planning and reliability. It also covers the implications of international standards, network information

systems and distribution automation.

Comprehensive in scope, this book, now in its fully updated second edition, takes an applications-oriented approach to electrical distribution systems. All critical aspects of power production, distribution, control, conversion and measurement are presented. The authors place emphasis on real-world applications, examining electrical distribution and associated system operation from a user's or technician's point of view. The use of an 'electrical power systems' model facilitates the reader's comprehensive understanding of electrical distribution, utilizing power distribution as a key starting point, and then applying that relationship to other important associated systems. The final chapter of this new edition is re-focused to emphasize the economics of distribution systems, computer power requirements and current environmental considerations. The book provides a valuable desk reference for the working engineer, contractor or technician who needs a thorough application-based guide for finding the best solutions to today's electrical distribution challenges.

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