

Transmission And Distribution By Bakshi

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Electrical Power Transmission And Distribution - Uday A. Bakshi 2007

Typical Transmission and Distribution System Scheme Standard voltages for transmission. Advantages of high voltage transmission. Feeders, Distributors and Service mains. Overhead Transmission Lines Sag calculation in conductors -(a) Suspended on level supports (b) Supports at different levels. Effect of wind and ice tension and sag at erection. Stringing chart. Line Parameters Calculation of inductance of single phase, three phase lines with equilateral and unsymmetric spacing. Inductance of composite conductor lines. Capacitance - Calculation for two wires and three phase lines, capacitance calculation for two wires 3 phase lines with equilateral and unsymmetrical spacing. Characteristics and Performance of Power Transmission Lines Short transmission lines, medium transmission lines, Nominal T and representation of long lines, equivalent T and network representation of long transmission lines. ABCD constants. Power flow through a transmission line, P-V and Q-V coupling. Insulators Types, potential distribution over a string of suspension insulators. String efficiency and methods of increasing string efficiency and methods of increasing string efficiency, testing of insulators. Underground Cables Types, material used. Insulation resistance, thermal rating of cables, charging current. Grading of cables, capacitance grading and inter sheath grading, testing of cables. Corona Phenomena, expression for disruptive and visual critical voltages and corona power loss. Distribution Radial and ring main systems, AC to DC distribution : calculation for concentrated loads.

Transmission And Distribution Of Electrical Power - Uday A. Bakshi 2009

ELECTRIC POWER GENERATION - S. N. SINGH 2008-06-23

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.

Modelling Flexible AC Transmission Systems (FACTS) Devices on Weak Transmission Lines in the Nigerian Power Network - Olalekan Olagunju 2020-02-26

Research Paper (postgraduate) from the year 2019 in the subject Electrotechnology, , language: English, abstract: The aim of the study is to model FACTS devices on weak transmission line in the Nigeria power network and consider their effect on the bus voltages, reactive and active power using genetic algorithm(GA) approach for loss minimization. The Nigeria 330KV existing network to be considered consist of nine (9) generating stations, thirty(30)Buses and forty one (41) transmission lines which will be modelled

and simulated using Matlab Version 7.10. The study is limited to Nigeria 330kV existing power network with the focus on the comparison of the Bus voltages and power flow on the transmission lines when FACTS devices are incorporated and when the FACTS devices are not incorporated. Research Questions: For the realization of the objectives mentioned above and the aim, the following research questions were set as a guide: 1. What is the significant effect of FACTS devices on weak transmission lines? 2. Can FACTS device be used with genetic algorithm for optimization of power loss and improvement of the bus voltages? 3. What is the limitation of using just genetic algorithm without FACTS device for the optimization of power loss and the improvement of the bus voltages? This research work is divided into five chapters with each chapter buttressing more on minimization of power loss. The scope of the work , the objective and aim of the research work to be achieved is addressed in chapter one (1). Chapter two(2) focus on the literature review of other researchers on FACTS device in the improvement of the power network, the concept of FACTS device and the choice of FACTS device to be used was also addressed in chapter two (2) of this research work. Chapter three focus on the methodology used for this study. The simulation of the 330kV Nigeria power network was done on MATLAB /SIMULINK 7.5. Also the chapter three focused on the use of power flow analysis toolbox which is a collection of a written codes of m files that has a compatible interface with MATLAB to generate the load flow of the power network instead of using ETAP. The genetic algorithm was also discussed as an optimization tool deployed to optimize the losses on the transmission line. Chapter four focus on the research findings with possible explanation as to some of the result obtained. Finally chapter five talks about the conclusion of this research work and highlight some areas to explore in the future.

Transmission Lines & Waveguides - Uday A. Bakshi 2020-11-01

The book is written for an undergraduate course on the transmission lines and waveguides. It provides comprehensive coverage of four terminal networks, filters, transmission lines and various types of waveguides. The book starts with explaining the symmetrical and asymmetrical four terminal networks which form the basis of filters. Then book provides the detailed discussion of various types of filters. The discussion of composite filters and crystal filter is also included in the book. The book covers the transmission line parameters in detail along with reflection on a line, reflection loss and reflection factor. The chapter on transmission line at radio frequency includes parameters of line at high frequency, standing waves, standing wave ratio, single stub matching, double stub matching and Smith chart. The book covers the various aspects of guided waves between parallel planes. It also provides the discussion of rectangular and circular waveguides. At the end book incorporates the discussion of resonators. Each chapter provides the detailed explanation of the topic, practical examples and variety of solved problems. The explanations are given using very simple and lucid language. All the chapters are arranged in a specific sequence which helps to build the understanding of the subject in a logical fashion. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Electric Power Transmission and Distribution - S. Sivanagaraju 2008-09

Electric Power Transmission and Distribution is a comprehensive text, designed for undergraduate courses in power systems and transmission and distribution. A part of the electrical engineering curriculum, this book is designed to meet the requirements of students taking elementary courses in electric power transmission and distribution. Written in a simple, easy-to-understand manner, this book introduces the

reader to electrical, mechanical and economic aspects of the design and construction of electric power transmission and distribution systems.

Control System Engineering - Uday A. Bakshi 2020-11-01

The book is written for an undergraduate course on the Feedback Control Systems. It provides comprehensive explanation of theory and practice of control system engineering. It elaborates various aspects of time domain and frequency domain analysis and design of control systems. Each chapter starts with the background of the topic. Then it gives the conceptual knowledge about the topic dividing it in various sections and subsections. Each chapter provides the detailed explanation of the topic, practical examples and variety of solved problems. The explanations are given using very simple and lucid language. All the chapters are arranged in a specific sequence which helps to build the understanding of the subject in a logical fashion. The book starts with explaining the various types of control systems. Then it explains how to obtain the mathematical models of various types of systems such as electrical, mechanical, thermal and liquid level systems. Then the book includes good coverage of the block diagram and signal flow graph methods of representing the various systems and the reduction methods to obtain simple system from the analysis point of view. The book further illustrates the steady state and transient analysis of control systems. The book covers the fundamental knowledge of controllers used in practice to optimize the performance of the systems. The book emphasizes the detailed analysis of second order systems as these systems are common in practice and higher order systems can be approximated as second order systems. The book teaches the concept of stability and time domain stability analysis using Routh-Hurwitz method and root locus method. It further explains the fundamentals of frequency domain analysis of the systems including co-relation between time domain and frequency domain. The book gives very simple techniques for stability analysis of the systems in the frequency domain, using Bode plot, Polar plot and Nyquist plot methods. It also explores the concepts of compensation and design of the control systems in time domain and frequency domain. The classical approach loses the importance of initial conditions in the systems. Thus, the book provides the detailed explanation of modern approach of analysis which is the state variable analysis of the systems including methods of finding the state transition matrix, solution of state equation and the concepts of controllability and observability. The variety of solved examples is the feature of this book which helps to inculcate the knowledge of the design and analysis of the control systems in the students. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Novel Advancements in Electrical Power Planning and Performance - Shandilya, Smita 2019-08-02

As the demand for efficient energy sources continues to grow, electrical systems are becoming more essential to meet these increased needs. Electrical generation and transmission plans must remain cost-effective, reliable, and flexible for further future expansion. As these systems are being utilized more frequently, it becomes imperative to find ways of optimizing their overall function. Novel Advancements in Electrical Power Planning and Performance is an essential reference source that provides vital research on the specific challenges, issues, strategies, and solutions that are associated with electrical transmission and distribution systems and features emergent methods and research in the systemic and strategic planning of energy usage. Featuring research on topics such as probabilistic modeling, voltage stability, and radial distribution, this book is ideally designed for electrical engineers, practitioners, power plant managers, investors, industry professionals, researchers, academicians, and students seeking coverage on the methods and profitability of electrical expansion planning.

Transformers and Generators - Uday A. Bakshi 2020-11-01

The importance of transformers and generators is well known in the various engineering fields. The book provides comprehensive coverage of the various types of transformers, d.c. generators and synchronous generators (alternators). The book starts with the brief review of single phase transformer. It continues to discuss no load and on load performance of transformers, phasor diagrams, equivalent circuit, voltage regulation and all day efficiency of transformer. The detailed discussion of open and short circuit tests and predetermination of regulation and efficiency is also included in the book. The chapter on three phase transformer provides the detailed discussion of construction, three phase transformer connections and phasor groups. The book also explains parallel operation of transformers, tap changing transformer,

autotransformers, cooling of transformers and three winding transformer. The various testing methods of transformers are also incorporated in the book. The book covers all the details of d.c. generators including construction, armature reaction, commutation, characteristics and applications. The chapters on synchronous generators starts with the explanation of basics of synchronous generators including construction, winding details, e.m.f. equation and effect of harmonics on induced e.m.f. The book then explains the concept of armature reaction, phasor diagrams, regulation and various methods of finding the regulation of alternator. Stepwise explanation and simple techniques used to elaborate these methods is the feature of this book. The book further explains the concept of synchronization of alternators, two reaction theory and parallel operation of alternators. The book uses plain, lucid language to explain each topic. The book provides the logical method of explaining the various complicated topics and stepwise methods to make the understanding easy. Each chapter is well supported with necessary illustrations, self explanatory diagrams and variety of solved problems. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Electromagnetic Engineering - Uday A. Bakshi 2009

Vector Analysis Co-ordinate systems such as rectangular, cylindrical and spherical. Transformation of co-ordinates, physical significance of gradient, divergence and Del operator. Electrostatics Coulombs Law. Definition of electric field and electric field intensity. Field due to continuous charge distribution (line, surface and Volume). Electric Flux Gauss Law and its applications. Divergence theorem and Maxwell's first equation. Potential Energy of a Charge Configuration. Equipotentials, Potential gradients, Relation between E and V. Capacitance - Parallel plate, spherical and for co-axial cables. Poisson's and Laplace's equation. Magnetostatics Continuity equation and definition of steady state current. Ampere's Force Law. Biot - Savart Law. Magnetic Induction. Magnetic Field Intensity and Potential (Magnetic flux and flux density) Ampere's circuital law and its application. Vector Magnetic potential. The Lorentz Force equation. Time Varying Fields and Maxwell's Equations Faraday's Law of Induced EMF. Lenz's Law Displacement Current Point and Integral Forms of Maxwell's Equations. The Poynting Vector, Poynting theorem, energy stored and Radiated Power. Properties of conductors and dielectrics. Derivation of Wave Equations and Diffusion Equations. Special solution and in conductors. Definition of skin depth and internal impedance. Uniform Plane Wave EM waves in charge free, current free dielectric. Properties of EM wave. Normal incidence at ideal conductor, reflection and transmission with normal incidence at another dielectric, Fields in reflected and transmitted waves. Plane wave in lossy media, wave impedance and propagation constant. Application to low loss dielectric and good conductor. Depth of the penetration, surface impedance and surface resistance. Calculation of surface resistance for a rectangular conductor with infinite depth. Radiation and Antennas General solution of Maxwell's equations. Potentials for time periodic fields, retarded vector potential Radiation fields due to Hertzian dipole. Field radiation pattern directive gain, maximum directive gain, radiation resistance, effective length, relation between radiation resistance directive gain and effective length. Short dipole, short monopole, half wave dipole, quarter wave monopole and their radiation characteristics, Definition of EMI/RFI and their sources.

Measurements and Instrumentation - Uday A. Bakshi 2020-11-01

The importance of measuring instruments is well known in the various engineering fields. The book provides comprehensive coverage of various analog, electronic and digital instruments, d.c. and a.c. bridges, signal generators and analyzers, virtual instrumentation and data acquisition system. The book starts with explaining the theory of measurement including characteristics of instruments, classification, standards, statistical analysis and limiting errors. Then the book explains the various analog and electronic instruments such as PMMC, moving iron, electro-dynamometer type, true RMS, Q-meter and sampling voltmeter. The book also includes the discussion of various d.c. and a.c. bridges along with necessary derivations and phasor diagrams. The book incorporates the detailed discussion of various types of oscilloscopes including simple, dual beam, dual trace, analog storage, sampling and digital oscilloscope. It also explains the various oscilloscope measurements and Lissajous figures. The book further explains the various signal generators and analyzers. It also covers the discussion of DAC, ADC, various digital instruments and data acquisition system. Finally the book provides the details of computer controlled systems, virtual instrumentation and fiber optic measurements. Each chapter starts with the background of

the topic. Then it gives the conceptual knowledge about the topic dividing it in various sections and subsections. Each chapter provides the detailed explanation of the topic, practical examples and variety of solved problems. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Indian Engineering - 1926

High Voltage Direct Current Transmission - J. Arrillaga 1998-06-30

This book describes a variety of reasons justifying the use of DC transmission as well as the basic concepts and techniques involved in the AC-DC and DC-AC conversion processes.

Switchgear & Protection - Uday A. Bakshi 2020-11-01

The knowledge of switchgear and apparatus protection plays an important role in the power system. The book is structured to cover the key aspects of the course Switchgear & Protection for undergraduate students. The book starts with the discussion of basics of protective relaying. The book includes comprehensive coverage of faults and analysis of symmetrical and unsymmetrical faults. The book explains the protection against overvoltage, lightning arresters and power system earthing. The book covers the characteristics of various types of relays such as electromagnetic relays, induction type relays, directional relays, differential relays, thermal relays, frequency relays and negative sequence relays. The detailed discussion of distance relays and static relays is also included in the book. The book also covers the various possible faults and methods of protection of transformers, generators, motors, busbars and transmission lines. The book further explains the theory of circuit interruption and various arc interruption methods. Finally, the book incorporates various types of circuit breakers, circuit breaker ratings and testing of circuit breakers. The book uses plain and lucid language to explain each topic. The book provides the logical method of explaining the various complicated topics and stepwise methods to make the understanding easy. Each chapter is well supported with necessary illustrations and self-explanatory diagrams. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Emerging Trends in Engineering, Science and Technology for Society, Energy and Environment - Rajesh Vanchipura 2018-08-06

The International Conference on Emerging Trends in Engineering, Science and Technology (ICETEST) was held at the Government Engineering College, Thrissur, Kerala, India, from 18th to 20th January 2018, with the theme, "Society, Energy and Environment", covering related topics in the areas of Civil Engineering, Mechanical Engineering, Electrical Engineering, Chemical Engineering, Electronics & Communication Engineering, Computer Science and Architecture. Conflict between energy and environment has been of global significance in recent years. Academic research needs to support the industry and society through socially and environmentally sustainable outcomes. ICETEST 2018 was organized with this specific objective. The conference provided a platform for researchers from different domains, to discuss and disseminate their findings. Outstanding speakers, faculties, and scholars from different parts of the world presented their research outcomes in modern technologies using sustainable technologies.

Electrical Technology - Uday A. Bakshi 2020-11-01

The book covers all the aspects of Electrical Technology for undergraduate course. Various concepts of electrical engineering like power and energy measurement, tariff and power factor improvement, illumination, single phase and three phase transformers, single phase and three phase induction motors, alternators, d.c. machines, special purpose motors and solid state speed control of d.c. and a.c. drives are explained in the book with the help of comprehensive approach. The book starts with review of basic concepts of electrical engineering. Then it explains electrical power measurement methods and electrical energy measurement methods. The book also explains types of tariffs and power factor improvement methods. It includes all the details of illumination schemes. The book further explains single phase and three phase transformers. Then book provides the detailed discussion of three phase and single phase induction motors, d.c. generators and motors and synchronous generators. The discussion of special purpose motors such as servomotors, stepper motors and universal motor is also provided in support. Finally, the book incorporates the discussion of various power devices such as power diodes, SCR, DIAC,

Triac, IGBT, Power MOSFETs and then continues to discuss the solid state speed control methods for d.c. and a.c. electrical drives. The book uses plain, simple and lucid language to explain each topic. The book provides the logical method of explaining the various complicated topics and stepwise methods to make the understanding easy. The variety of solved examples is the feature of this book. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Wideband RF Technologies and Antennas in Microwave Frequencies - Dr. Albert Sabban 2016-06-14

Presents wideband RF technologies and antennas in the microwave band and millimeter-wave band This book provides an up-to-date introduction to the technologies, design, and test procedures of RF components and systems at microwave frequencies. The book begins with a review of the elementary electromagnetics and antenna topics needed for students and engineers with no basic background in electromagnetic and antenna theory. These introductory chapters will allow readers to study and understand the basic design principles and features of RF and communication systems for communications and medical applications. After this introduction, the author examines MIC, MMIC, MEMS, and LTCC technologies. The text will also present information on meta-materials, design of microwave and mm wave systems, along with a look at microwave and mm wave receivers, transmitters and antennas. Discusses printed antennas for wireless communication systems and wearable antennas for communications and medical applications Presents design considerations with both computed and measured results of RF communication modules and CAD tools Includes end-of-chapter problems and exercises Wideband RF Technologies and Antennas in Microwave Frequencies is designed to help electrical engineers and undergraduate students to understand basic communication and RF systems definition, electromagnetic and antennas theory and fundamentals with minimum integral and differential equations. Albert Sabban, PhD, is a Senior Researcher and Lecturer at Ort Braude College Karmiel Israel. Dr. Sabban was RF and antenna specialist at communication and Biomedical Hi-tech Companies. He designed wearable compact antennas to medical systems. From 1976 to 2007, Dr. Albert Sabban worked as a senior R&D scientist and project leader in RAFAEL.

Optimal Coordination of Power Protective Devices with Illustrative Examples - Ali R. Al-Roomi 2021-11-30

Optimal Coordination of Power Protective Devices with Illustrative Examples Provides practical guidance on the coordination issue of power protective relays and fuses Protecting electrical power systems requires devices that isolate the components that are under fault while keeping the rest of the system stable. Optimal Coordination of Power Protective Devices with Illustrative Examples provides a thorough introduction to the optimal coordination of power systems protection using fuses and protective relays. Integrating fundamental theory and real-world practice, the text begins with an overview of power system protection and optimization, followed by a systematic description of the essential steps in designing optimal coordinators using only directional overcurrent relays. Subsequent chapters present mathematical formulations for solving many standard test systems, and cover a variety of popular hybrid optimization schemes and their mechanisms. The author also discusses a selection of advanced topics and extended applications including adaptive optimal coordination, optimal coordination with multiple time-current curves, and optimally coordinating multiple types of protective devices. Optimal Coordination of Power Protective Devices: Covers fuses and overcurrent, directional overcurrent, and distance relays Explains the relation between fault current and operating time of protective relays Discusses performance and design criteria such as sensitivity, speed, and simplicity Includes an up-to-date literature review and a detailed overview of the fundamentals of power system protection Features numerous illustrative examples, practical case studies, and programs coded in MATLAB® programming language Optimal Coordination of Power Protective Devices with Illustrative Examples is the perfect textbook for instructors in electric power system protection courses, and a must-have reference for protection engineers in power electric companies, and for researchers and industry professionals specializing in power system protection.

High Voltage Engineering - Farouk A.M. Rizk 2018-09-03

Inspired by a new revival of worldwide interest in extra-high-voltage (EHV) and ultra-high-voltage (UHV) transmission, High Voltage Engineering merges the latest research with the extensive experience of the best in the field to deliver a comprehensive treatment of electrical insulation systems for the next generation of utility engineers and electric power professionals. The book offers extensive coverage of the

physical basis of high-voltage engineering, from insulation stress and strength to lightning attachment and protection and beyond. Presenting information critical to the design, selection, testing, maintenance, and operation of a myriad of high-voltage power equipment, this must-have text: Discusses power system overvoltages, electric field calculation, and statistical analysis of ionization and breakdown phenomena essential for proper planning and interpretation of high-voltage tests Considers the breakdown of gases (SF₆), liquids (insulating oil), solids, and composite materials, as well as the breakdown characteristics of long air gaps Describes insulation systems currently used in high-voltage engineering, including air insulation and insulators in overhead power transmission lines, gas-insulated substation (GIS) and cables, oil-paper insulation in power transformers, paper-oil insulation in high-voltage cables, and polymer insulation in cables Examines contemporary practices in insulation coordination in association with the International Electrotechnical Commission (IEC) definition and the latest standards Explores high-voltage testing and measuring techniques, from generation of test voltages to digital measuring methods With an emphasis on handling practical situations encountered in the operation of high-voltage power equipment, High Voltage Engineering provides readers with a detailed, real-world understanding of electrical insulation systems, including the various factors affecting—and the actual means of evaluating—insulation performance and their application in the establishment of technical specifications.

Electromagnetic Field Theory - Uday A. Bakshi 2020-11-01

The comprehensive study of electric, magnetic and combined fields is nothing but electromagnetic engineering. Along with electronics, electromagnetics plays an important role in other branches. The book is structured to cover the key aspects of the course Electromagnetic Field Theory for undergraduate students. The knowledge of vector analysis is the base of electromagnetic engineering. Hence book starts with the discussion of vector analysis. Then it introduces the basic concepts of electrostatics such as Coulomb's law, electric field intensity due to various charge distributions, electric flux, electric flux density, Gauss's law, divergence and divergence theorem. The book continues to explain the concept of elementary work done, conservative property, electric potential and potential difference and the energy in the electrostatic fields. The detailed discussion of current density, continuity equation, boundary conditions and various types of capacitors is also included in the book. The book provides the discussion of Poisson's and Laplace's equations and their use in variety of practical applications. The chapter on magnetostatics incorporates the explanation of Biot-Savart's law, Ampere's circuital law and its applications, concept of curl, Stoke's theorem, scalar and vector magnetic potentials. The book also includes the concept of force on a moving charge, force on differential current element and magnetic boundary conditions. The book covers all the details of Faraday's laws, time varying fields, Maxwell's equations and Poynting theorem. Finally, the book provides the detailed study of uniform plane waves including their propagation in free space, perfect dielectrics, lossy dielectrics and good conductors. The book uses plain, lucid language to explain each topic. The book provides the logical method of explaining the various complicated topics and stepwise methods to make the understanding easy. The variety of solved examples is the feature of this book which helps to inculcate the knowledge of the electromagnetics in the students. Each chapter is well supported with necessary illustrations and self-explanatory diagrams. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Basic Electrical Engineering - Uday A. Bakshi 2020-11-01

The book is written for an undergraduate course on the Basic Electrical Engineering. It provides comprehensive explanation of theory and practice of electrical engineering. It elaborates various aspects of d.c. and a.c. circuit analysis, magnetic circuits, measuring instruments, single phase transformers and various electrical machines. The book starts with the concepts of electric charge, current and potential difference. It explains Kirchhoff's laws, star-delta transformation, mesh analysis and node analysis. It also covers the application of various network theorems in analyzing d.c. circuits. The book incorporates detailed discussion of steady state analysis of single-phase series and parallel a.c. circuits along with the resonance. The book also explains the three phase balanced circuits, three phase power measurement and power factor improvement. The simple techniques and stepwise methods used to explain the phasor diagrams is the feature of the book. The book teaches the theory of various electrical measuring instruments. The book also covers the concept of earthing and electrical safety, which is most important

while dealing with the electrical equipment's. The book also includes the discussion of magnetic circuits, self and mutual inductances and magnetic hysteresis. The book further explains the details of single-phase transformers and various electrical machines such as d.c. machines, three phase and single-phase induction motors and synchronous machines. The brief introduction of power system is also incorporated in the book. The book uses plain, lucid language to explain each topic. The book provides the logical method of explaining the various complicated topics and stepwise methods to make the understanding easy. All the chapters are arranged in a proper sequence that permits each topic to build upon earlier studies. The variety of solved examples is the feature of this book which helps to inculcate the knowledge of the basic electrical engineering in the students. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Extra High Voltage AC Transmission Engineering - Rakosh Das Begamudre 2011

Presented in a lucid style with easy-to-understand methodology Review Questions, Problems with Answers are given The material has been tried out for advanced undergraduate and postgraduate courses at reputed institutions.

Power Electronics - Dr. J. S. Chitode 2020-12-01

Power semiconductor devices are discussed in first chapter. SCR, GTO, LASCR, RCT, MCT, characteristics, rating turn-off and turn-on is presented. Power BJT, MOSFET, IGBT, driving circuits, protection and snubber circuits are also discussed. Commutation circuits and series and parallel operation are presented. Single and three phase controlled converters are given in second chapter. Half wave, full wave, midpoint, semiconverters, full converters, dual converters and effect of source inductance is also given. Operation with resistive and inductive load is discussed. Third chapter presents AC voltage controllers and cycloconverters. On-off control, phase control, triac based controllers are given. Cycloconverters and operations with inductive as well as resistive load are discussed. Choppers are given in fourth chapter. Step down, step up, voltage, current and load commutated choppers are given. Classification is also discussed. Last chapter presents inverters. Half bridge, full bridge, quasi square wave, push-pull, thyristorized inverters with resistive and inductive loads are given. Switching techniques for PWM inverters are also given.

Renewable Energy Policy and Politics - Karl Mallon 2012-06-25

Understanding why renewable energy policies succeed and fail is essential for a range of stakeholders in the energy and environmental sectors. Clear information on why and how to secure successful renewable energy markets is much needed. Renewable Energy Policy and Politics meets that need, bringing together the experience of world leaders in this field. The book addresses the politics of renewable energy, the key players required to drive energy reform and those likely to resist change. The interplay between government, industry and society is discussed and explained with a balanced hand, offering a rare insight into political campaigning on energy. International case studies are included, complemented by a step-by-step breakdown of the elements required to achieve legislation. This book sets out the rules of the game, the stakes and the strategies for success. It will be an invaluable tool for policy makers, energy consultants, non-governmental organizations and other professionals working in the fields of energy policy, climate change and environmental policy. Students and researchers keen to enhance their knowledge of renewable energy markets and policy development will also find this essential reading.

Communication, Networks and Computing - Shekhar Verma 2018-10-10

This book (CCIS 839) constitutes the refereed proceedings of the First International Conference on Communication, Networks and Computings, CNC 2018, held in Gwalior, India, in March 2018. The 70 full papers were carefully reviewed and selected from 182 submissions. The papers are organized in topical sections on wired and wireless communication systems, high dimensional data representation and processing, networks and information security, computing techniques for efficient networks design, electronic circuits for communication system.

FACTS Controllers - K. R PADIYAR 2020-10

Key Features: Concepts are explained with illustrative examples and case studies. Applications of SVC, TCSC, GCSC, SPST, STATCOM, SSSC, UPFC, IPFC and IPC for voltage/power control in transmission systems. Application of DSTATCOM, DVR and UPQC for improving power quality in distribution systems.

Design of Power Oscillation Damping (POD) controllers. Mitigation of SSR using series FACTS Controllers. About the Book: The emerging technology of Flexible AC Transmission System (FACTS) enables planning and operation of power systems at minimum cost, without compromising security. This is based on modern high power electronic systems that provide fast controllability to ensure 'flexible' operation under changing system conditions. This book presents a comprehensive treatment of the subject by discussing the operating principles, mathematical models, control design and issues that affect the applications.

Fundamentals of Power System Protection - Paithankar Y. G. 2010

Transmission Lines and Lumped Circuits - Giovanni Miano 2001-02-23

The theory of transmission lines is a classical topic of electrical engineering. Recently this topic has received renewed attention and has been a focus of considerable research. This is because the transmission line theory has found new and important applications in the area of high-speed VLSI interconnects, while it has retained its significance in the area of power transmission. In many applications, transmission lines are connected to nonlinear circuits. For instance, interconnects of high-speed VLSI chips can be modelled as transmission lines loaded with nonlinear elements. These nonlinearities may lead to many new effects such as instability, chaos, generation of higher order harmonics, etc. The mathematical models of transmission lines with nonlinear loads consist of the linear partial differential equations describing the current and voltage dynamics along the lines together with the nonlinear boundary conditions imposed by the nonlinear loads connected to the lines. These nonlinear boundary conditions make the mathematical treatment very difficult. For this reason, the analysis of transmission lines with nonlinear loads has not been addressed adequately in the existing literature. The unique and distinct feature of the proposed book is that it will present systematic, comprehensive, and in-depth analysis of transmission lines with nonlinear loads. A unified approach for the analysis of networks composed of distributed and lumped circuits A simple, concise and completely general way to present the wave propagation on transmission lines, including a thorough study of the line equations in characteristic form Frequency and time domain multiport representations of any linear transmission line A detailed analysis of the influence on the line characterization of the frequency and space dependence of the line parameters A rigorous study of the properties of the analytical and numerical solutions of the network equations The associated discrete circuits and the associated resistive circuits of transmission lines Periodic solutions, bifurcations and chaos in transmission lines connected to nonlinear lumped circuits

Introduction to Embedded Systems, Second Edition - Edward Ashford Lee 2016-12-30

An introduction to the engineering principles of embedded systems, with a focus on modeling, design, and analysis of cyber-physical systems. The most visible use of computers and software is processing information for human consumption. The vast majority of computers in use, however, are much less visible. They run the engine, brakes, seatbelts, airbag, and audio system in your car. They digitally encode your voice and construct a radio signal to send it from your cell phone to a base station. They command robots on a factory floor, power generation in a power plant, processes in a chemical plant, and traffic lights in a city. These less visible computers are called embedded systems, and the software they run is called embedded software. The principal challenges in designing and analyzing embedded systems stem from their interaction with physical processes. This book takes a cyber-physical approach to embedded systems, introducing the engineering concepts underlying embedded systems as a technology and as a subject of study. The focus is on modeling, design, and analysis of cyber-physical systems, which integrate computation, networking, and physical processes. The second edition offers two new chapters, several new exercises, and other improvements. The book can be used as a textbook at the advanced undergraduate or introductory graduate level and as a professional reference for practicing engineers and computer scientists. Readers should have some familiarity with machine structures, computer programming, basic discrete mathematics and algorithms, and signals and systems.

Electric Motors - Uday A. Bakshi 2020-11-01

The importance of electric motors is well known in the various engineering fields. The book provides comprehensive coverage of the various types of electric motors including d.c. motors, three phase and single phase induction motors, synchronous motors, universal motor, a.c. servomotor, linear induction

motor and stepper motors. The book covers all the details of d.c. motors including torque equation, back e.m.f., characteristics, types of starters, speed control methods and applications. The book also covers the various testing methods of d.c. motors such as Swinburne's test, brake test, retardation test, field test and Hopkinson's test. The book further explains the three phase induction motors in detail. It includes the production of rotating magnetic field, construction, working, effect of slip, torque equation, torque ratios, torque-slip characteristics, losses, power flow, equivalent circuit, effect of harmonics on the performance, circle diagram and applications. This chapter also includes the discussion of induction generator. The book teaches the various starting methods and speed control methods of three phase induction motors. The book incorporates the explanation of various single phase induction motors. The chapter on synchronous motor provides the detailed discussion of construction, working principle, behavior on load, analysis of phasor diagram, Vee and Inverted Vee curves, hunting, synchronous condenser and applications. The book also teaches the various special machines such as single phase commutator motors, universal motor, a.c. servomotor, linear induction motor and stepper motors. The book uses plain, lucid language to explain each topic. The book provides the logical method of explaining the various complicated topics and stepwise methods to make the understanding easy. Each chapter is well supported with necessary illustrations, self explanatory diagrams and variety of solved problems. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Electromagnetics and Transmission Lines - Uday A. Bakshi 2020-12-01

The book covers all the aspects of Electromagnetics and Transmission Lines for undergraduate course. The book provides comprehensive coverage of vector analysis, Coulomb's law, electric field intensity, flux and Gauss's law, conductors, dielectrics, capacitance, Poisson's and Laplace's equations, magnetostatics, electrodynamic fields, Maxwell's equations, Poynting theorem, transmission lines and uniform plane waves. The knowledge of vector analysis is the base of electromagnetic engineering. Hence book starts with the discussion of vector analysis. Then it introduces the basic concepts of electrostatics such as Coulomb's law, electric field intensity due to various charge distributions, electric flux, electric flux density, Gauss's law and divergence. The book continues to explain the concept of elementary work done, conservative property, electric potential and potential difference and the energy in the electrostatic fields. The detailed discussion of current density, continuity equation, boundary conditions and various types of capacitors is also included in the book. The book provides the discussion of Poisson's and Laplace's equations and their use in variety of practical applications. The chapter on magnetostatics incorporates the explanation of Biot-Savart's law, Ampere's circuital law and its applications, concept of curl scalar and vector magnetic potentials. The book also includes the concept of force on a moving charge, force on differential current element and magnetic boundary conditions. The book covers all the details of Faraday's laws, time varying fields, Maxwell's equations and Poynting theorem. The book covers the transmission line parameters in detail along with reflection on a line, reflection loss and reflection factor. The chapter on transmission line at radio frequency includes parameters of line at high frequency, standing waves, standing wave ratio and Smith chart. Finally, the book provides the detailed study of uniform plane waves including their propagation in free space, perfect dielectrics, lossy dielectrics and good conductors. The book uses plain and lucid language to explain each topic. The book provides the logical method of explaining the various complicated topics and stepwise methods to make the understanding easy. Each chapter is well supported with necessary illustrations, self explanatory diagrams and large number of solved problems. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Electric Power Generation, Transmission, and Distribution - Leonard L. Grigsby 2018-09-03

Featuring contributions from worldwide leaders in the field, the carefully crafted Electric Power Generation, Transmission, and Distribution, Third Edition (part of the five-volume set, The Electric Power Engineering Handbook) provides convenient access to detailed information on a diverse array of power engineering topics. Updates to nearly every chapter keep this book at the forefront of developments in modern power systems, reflecting international standards, practices, and technologies. Topics covered include: Electric power generation: nonconventional methods Electric power generation: conventional methods Transmission system Distribution systems Electric power utilization Power quality L.L. Grigsby, a

respected and accomplished authority in power engineering, and section editors Saifur Rahman, Rama Ramakumar, George Karady, Bill Kersting, Andrew Hanson, and Mark Halpin present substantially new and revised material, giving readers up-to-date information on core areas. These include advanced energy technologies, distributed utilities, load characterization and modeling, and power quality issues such as power system harmonics, voltage sags, and power quality monitoring. With six new and 16 fully revised chapters, the 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. New chapters cover: Water Transmission Line Reliability Methods High Voltage Direct Current Transmission System Advanced Technology High-Temperature Conduction Distribution Short-Circuit Protection Linear Electric Motors A volume in the Electric Power Engineering Handbook, Third Edition. Other volumes in the set: K12648 Power Systems, Third Edition (ISBN: 9781439856338) K13917 Power System Stability and Control, Third Edition (ISBN: 9781439883204) K12650 Electric Power Substations Engineering, Third Edition (ISBN: 9781439856383) K12643 Electric Power Transformer Engineering, Third Edition (ISBN: 9781439856291)

Transmission and Distribution - Uday A. Bakshi

The book covers all the aspects of Transmission and Distribution for undergraduate course. The various aspects of transmission and distribution systems, FACTS, sag calculations, parameters and performance of transmission lines, insulators, cables, substations and grounding systems are explained in the book with the help of comprehensive approach. The book starts with the discussion of basics of power system. It includes comparison of material required for overhead and underground systems. Various types of d.c. and a.c. distribution systems, EHVAC, HVDC and FACTS devices is also included in the book. The book explains the sag calculation under different conditions and sag template. In depth analysis of transmission line parameters is also included in the book. The book also covers the performance analysis of short, medium and long transmission lines along with circle diagram and methods of voltage control. The details of corona effect are explained in support. The book incorporates the discussion of types of insulators, string efficiency, methods of improving string efficiency, single and three core cables, grading of cables, heating and testing of cables. The chapter on substations includes the explanation of various types of substations, substation equipment's and key diagrams. The book also covers the various types of grounding systems, grounding grids and resistance of grounding systems. The book uses plain and lucid language to explain each topic. The book provides the logical method of explaining the various complicated topics and stepwise methods to make the understanding easy. Each chapter is well supported with necessary illustrations, self-explanatory diagrams and large number of solved problems. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Electronic Measurements and Instrumentation - Uday A. Bakshi 2020-11-01

The importance of electronic measuring instruments and transducers is well known in the various engineering fields. The book provides comprehensive coverage of various electronic measuring instruments, transducers, data acquisition system, oscilloscopes and measurement of physical parameters. The book starts with explaining the theory of measurement including characteristics of instruments, classification, statistical analysis and limiting errors. Then the book explains the various analog and digital instruments such as average and true rms responding voltmeters, chopper and sampling voltmeter, types of digital voltmeters, multimeter and ohmmeter. It also includes the discussion of high frequency impedance measurement. The book further explains types of signal generators and various signal analyzers such as wave analyzer, logic analyzer, distortion analyzer and power analyzer. The book teaches various d.c. and a.c. bridges along with necessary derivations and phasor diagrams. The book incorporates the discussion of various types of conventional and special purpose oscilloscopes. The book includes the discussion of time and frequency measurement and types of recorders. The chapter on transducers is dedicated to the detailed discussion of various types of transducers. The book also includes the measurement of various physical parameters such as flow, displacement, velocity, force, pressure and torque. Finally, it incorporates the discussion of data acquisition system. Each chapter gives the conceptual knowledge about the topic dividing it in various sections and subsections. Each chapter provides the detailed explanation of the topic, practical examples and variety of solved problems. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Designing, Developing, and Facilitating Smart Cities - Vangelis Angelakis 2016-12-04

This book discusses how smart cities strive to deploy and interconnect infrastructures and services to guarantee that authorities and citizens have access to reliable and global customized services. The book addresses the wide range of topics present in the design, development and running of smart cities, ranging from big data management, Internet of Things, and sustainable urban planning. The authors cover - from concept to practice - both the technical aspects of smart cities enabled primarily by the Internet of Things and the socio-economic motivations and impacts of smart city development. The reader will find smart city deployment motivations, technological enablers and solutions, as well as state of the art cases of smart city implementations and services. · Provides a single compendium of the technological, political, and social aspects of smart cities; · Discusses how the successful deployment of smart Cities requires a unified infrastructure to support the diverse set of applications that can be used towards urban development; · Addresses design, development and running of smart cities, including big data management and Internet of Things applications.

Electric Power Substations Engineering - John D. McDonald 2016-04-19

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

Transmission and Distribution Electrical Engineering - Colin Bayliss 2012-01-31

Chapter 1: System Studies -- Chapter 2: Drawings and Diagrams -- Chapter 3: Substation Layouts -- Chapter 4: Substation Auxiliary Power Supplies -- Chapter 5: Current and Voltage Transformers -- Chapter 6: Insulators -- Chapter 7: Substation Building Services -- Chapter 8: Earthing and Bonding -- Chapter 9: Insulation Co-ordination -- Chapter 10: Relay Protection -- Chapter 11: Fuses and Miniature Circuit Breakers -- Chapter 12: Cables -- Chapter 13: Switchgear -- Chapter 14: Power Transformers -- Chapter 15: Substation and Overhead Line Foundations -- Chapter 16: Overhead Line Routing -- Chapter 17: Structures, Towers and Poles -- Chapter 18: Overhead Line Conductor and Technical Specifications -- Chapter 19: Testing and Commissioning -- Chapter 20: Electromagnetic Compatibility -- Chapter 21: Supervisory Control and Data Acquisition -- Chapter 22: Project Management -- Chapter 23: Distribution Planning -- Chapter 24: Power Quality- Harmonics in Power Systems -- Chapter 25: Power Qual ...

Electromagnetic Field Theory - Rohit Khurana

The book Electromagnetic Field Theory caters to the students of BE/BTech Electronics and Communication Engineering, Electrical and Electronics Engineering, and Electronic Instrumentation Engineering, as electromagnetics is an integral part of their curricula. It covers a wide range of topics that deal with various physical and mathematical concepts, including vector functions, coordinate systems, integration and differentiation, complex numbers, and phasors. The book helps in understanding the electric and magnetic fields on different charge and current distributions, such as line, surface, and volume. It also explains the electromagnetic behaviour of waves, fields in transmission lines, and radiation in antennas. A number of electromagnetic applications are also included to develop the interest of students. SALIENT FEATURES • Simple and easy-to-follow text • Complete coverage of the subject as per the syllabi of most universities • Lucid, well-explained concepts with clear examples • Relevant illustrations for better understanding and retention • Some of the illustrations provide three-dimensional view for in-depth knowledge • Numerous mathematical examples for full clarity of concepts • Chapter objectives at the beginning of each chapter for its overview • Chapter-end summary and exercises for quick review and to test your knowledge

Basic Electrical & Instrumentation Engineering - Uday A. Bakshi 2020-12-01

The book covers all the aspects of Basic Electrical and Instrumentation Engineering for undergraduate course. Various concepts of three phase a.c. circuit analysis with balanced and unbalanced loads, tariff and power factor improvement, single phase and three phase transformers, d.c. machines, single phase and three phase induction motors, alternators, synchronous motors, basics of measuring instruments and transducers are explained in the book with the help of comprehensive approach. The book starts with explaining the three phase a.c. circuit analysis with balanced and unbalanced loads, concept of

transmission, distribution and power system protection. The discussion of tariff and power factor improvement is also added in support. The book further explains single phase and three phase transformers. Then book provides the detailed discussion of d.c. generators and motors. The book also includes the discussion of three phase and single phase induction motors, synchronous generators, synchronous motors and other motors such as stepper motor, brushless d.c. motor and universal motor. The book covers the classification and basic requirements of a measuring instrument. Then the book explains the static and dynamic characteristics and types of errors in measuring instruments. The book provides in depth discussion of electronic multimeter and oscilloscope. The book teaches the details of various types of transducers like resistive, inductive, capacitive, thermoelectric, piezoelectric, photoelectric and Hall effect transducers. The book uses plain, simple and lucid language to explain each topic. Each chapter gives the conceptual knowledge about the topic dividing it in the various sections and subsections. Each chapter

provides the detailed explanation of the topic, practical examples and variety of solved problems. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Transmission and Distribution Electrical Engineering - Colin Bayliss 1999-04-12

This comprehensive treatment of the theory and practice encountered in the installation and design of transmission and distribution systems for electrical power has been updated and revised to provide the project engineer with all the latest, relevant information to design and specify the correct system for a particular application. Thoroughly updated and revised to include latest developments Learn from and Author with extensive experience in managing international projects Find out the reasoning and implications behind the different specifications and methods