Calculus In Electrical Engineering

About the Book: This book Engineering Mathematics-II is designed as a self-contained, comprehensive classroom text for the second semester B.E. Classes of Visveswaraiah Technological University as per the Revised new Syllabus. The topics included are Differential Calculus, Integral Calculus and Vector Integration, Differential Equations and Laplace Transforms. The book is written in a simple way and is accompanied with explanatory figures. All this make the students enjoy the subject while they learn. Inclusion of selected exercises and problems make the book educational in nature. It shou.

Programming for Electrical Engineers: MATLAB and Spice introduces beginning engineering students to programming in Matlab and Spice through engaged, problem-based learning and dedicated electrical and computer engineering content. The book draws its problems and examples specifically from electrical and computer engineering, covering such topics as circuit analysis, signal processing, and filter design. It teaches relevant computational techniques in the context of solving common problems in electrical and computer engineering, including mesh and nodal analysis, Fourier transforms, and phasor analysis. Programming for Electrical Engineers: MATLAB and Spice is unique among MATLAB textbooks for its dual focus on introductory-level learning and discipline-specific content in electrical and computer engineering. No other textbook on the market currently targets this audience with the same attention to discipline-specific content and engaged learning practices. Although it is primarily an introduction to programming in MATLAB, the book also has a chapter on circuit simulation using Spice, and it includes materials required by ABET Accreditation reviews, such as information on ethics, professional development, and lifelong learning. Discipline-specific: Introduces Electrical and Computer Engineering-specific topics, such as phasor analysis and complex exponentials, that are not covered in generic engineering Matlab texts Accessible: Pedagogically appropriate for freshmen and sophomores with little or no prior programming experience Scaffolded content: Addresses both script and functions but emphasizes the use of functions since scripts with non-scoped variables are less-commonly encountered after introductory courses Problem-centric: Introduces MATLAB commands as needed to solve progressively more complex EE/ECE-specific problems, and includes over 100 embedded, in-chapter questions to check comprehension in stages and support active learning exercises in the classroom Enrichment callouts: "Pro Tip" callouts cover common ABET topics, such as ethics and professional development, and "Digging Deeper" callouts provide optional, more detailed material for interested students

This book presents a concise and insightful view of the knowledge on fractional-order electrical circuits, which belongs to the subject of Electric Engineering and involves mathematics of fractional calculus. It offers an overview of fractional calculus and then describes and analyzes the basic theories and properties of fractional-order elements and fractional-order electrical circuit composed of fractional-order elements. Therein, the fundamental theorems, time-domain analysis, steady-state analysis, complex frequency domain analysis and state variable analysis of fractional-order electrical circuit are included. The fractional-order two-port networks and generalized fractional-order linear electrical circuits are also mentioned. Therefore, this book provides readers with enough background and understanding to go deeper into the topic of fractional-order electrical circuit, so that it is useful as a textbook for courses related to fractional-order elements, fractional-order electrical circuits, etc. This book is intended for students without an extensive mathematical background and is suitable for advanced undergraduate and graduate students, engineers and researchers who focus on the fractional-order elements, electrical circuits and systems.

A Calculus text written at an appropriate level for students pursuing the Associate or Bachelor's Degree in Electrical and Electronic Engineering Technology. The text includes many examples relating to these technical fields and has been classroom tested. 315 pages.

Transients for Electrical Engineers

Functional Fractional Calculus

Thyroid Systems Engineering

Engineering Mathematics-II

Advanced Mathematics for Electrical and Computer Engineers

A Primer in Mathematical Modeling of the Hypothalamus-Pituitary-Thyroid Axis

Basic Mathematics for Electronics combines electronictheory and applications with the mathematical principles necessary to solve a wide range of circuit problems. Coverage of mathematical topics reflects current trends in electronics. A complete chapter is devoted to Karnaugh mapping to help students cope with the greater complexity of modern digital circuit devices. Marginal notes indicate areas of special interest in computers and computer usage.To facilitate learning, material is presented in a block form that employs a two-color, single-column format. After the initial chapters, sections may be studied ndependently. As each new topic is introduced, illustrative examples and numerous problems, graded from easy to difficult, are given for reinforcement. Answers to odd-numbered problems are provided in the back of the book. The Answers to Even-Numbered Problems booklet contains answers and selected worked-out solutions. A computerized Test Bank and Transparency Masters are also available with this edition.

Advanced Mathematics for Electrical and Computer Engineers, by Randall L. Musselman, applies comprehensive math topics specifically to electrical and computer-engineering applications. These topics include:?Discrete mathothe mathematics of computation?Probability and random variablesofundamental to communication theory and solid-state devices?Ordinary differential equationsothe mathematics of circuit analysis?Laplace transforms othat makes the math of circuit analysis much more manageable?Fourier series and Fourier transformsothe mathematical backbone of signal analysis?Partial differential equationsothe math description of waves and boundary value problems?Linear algebraothe mathematical language of modern robotics?Vector calculusofundamental to electromagnetism and radio-wave propagationThis book explores each of these topics their own chapters, employing electrical and computer-engineering examples as applications.

This book gives a practical overview of Fractional Calculus as it relates to Signal Processing

This book offers a concise introduction to the analysis of electrical transients aimed at students who have completed introductory circuits and freshman calculus courses. While it is written under the assumption that these students are encountering transient electrical circuits for the first time, the mathematical and physical theory is not ‘ watered-down. ’ That is, the analysis of both lumped and continuous (transmission line) parameter circuits is performed with the use of differential equations (both ordinary and partial) in the time domain, and the Laplace transform. The transform is fully developed in the book for readers who are not assumed to have seen it before. The use of singular time functions (unit step and impulse) is addressed and illustrated through detailed examples. The appearance of paradoxical circuit situations, often ignored in many textbooks (because they are, perhaps, considered ‘ difficult ’ to explain) is fully embraced as an opportunity to challenge students. In addition, historical commentary is included throughout the book, to combat the misconception that the material in engineering textbooks was found engraved on Biblical stones, rather than painstakingly discovered by people of genius who often went down many wrong paths before finding the right one. MATLAB ® is used throughout the book, with simple codes to quickly and easily generate transient response curves.

An Introduction to Functional Programming Through Lambda Calculus

Fractional Calculus Perspective

With Applications to Mechanics, Elasticity and Aeronautics

Engineering Problems

Prentice-Hall Electrical Engineering Series

Introductory Electrical Engineering With Math Explained in Accessible Language

In this book, not only are mathematical abstractions discussed in a lucid manner, but also several practical applications are given particularly for system identification, description and then efficient controls. The reader gets a feeling of the wide applicability of fractional calculus in the field of science and engineering. With this book, a starter can understand the concepts of this emerging field with a minimal effort and basic mathematics.

This book follows an advanced course in analysis (vector analysis, complex analysis and Fourier analysis) for engineering students, but can also be useful, as a complement to a more theoretical course, to mathematics and physics students. The first three parts of the book represent the theoretical aspect and are independent of each other. The fourth part gives detailed solutions to all exercises that are proposed in the first three parts. Foreword Foreword (71 KB) Sample Chapter(s) Chapter 1: Differential Operators of Mathematical Physics (272 KB) Chapter 9: Holomorphic functions and Cauchy – Riemann equations (248 KB) Chapter 14: Fourier series (281 KB) Request Inspection Copy Contents: Vector Analysis:Differential Operators of Mathematical PhysicsLine IntegralsGradient Vector FieldsGreen TheoremSurface IntegralsDivergence TheoremStokes TheoremAppendixComplex Analysis:Holomorphic Functions and Cauchy – Riemann EquationsComplex IntegrationLaurent SeriesResidue Theorem and ApplicationsConformal MappingFourier Analysis:Fourier SeriesFourier TransformLaplace TransformApplications to Ordinary Differential EquationsApplications to Partial Differential EquationsSolutions to the Exercises:Differential Operators of Mathematical PhysicsLine IntegralsGradient Vector FieldsGreen TheoremSurface IntegralsDivergence TheoremStokes TheoremHolomorphic Functions and Cauchy – Riemann EquationsComplex IntegrationLaurent SeriesResidue Theorem and ApplicationsConformal MappingFourier SeriesFourier TransformLaplace TransformApplications to Ordinary Differential EquationsApplications to Partial Differential Equations Readership: Undergraduate students in analysis & differential equations, complex analysis, civil, electrical and mechanical engineering.

Mathematics for Electrical Engineering and Computing embraces many applications of modern mathematics, such as Boolean Algebra and Sets and Functions, and also teaches both discrete and continuous systems - particularly vital for Digital Signal Processing (DSP). In addition, as most modern engineers are required to study software, material suitable for Software Engineering - set theory, predicate and prepositional calculus, language and graph theory - is fully integrated into the book. Excessive technical detail and language are avoided, recognising that the real requirement for practising engineers is the need to understand the applications of mathematics in everyday engineering contexts. Emphasis is given to an appreciation of the fundamental concepts behind the mathematics, for problem solving and undertaking critical analysis of results, whether using a calculator or a computer. The text is backed up by numerous exercises and worked examples throughout, firmly rooted in engineering practice, ensuring that all mathematical theory introduced is directly relevant to real-world engineering. The book includes introductions to advanced topics such as Fourier analysis, vector calculus and random processes, also making this a suitable introductory text for second year undergraduates of electrical, electronic and computer engineering, undertaking engineering mathematics courses. Dr Attenborough is a former Senior Lecturer in the School of Electrical, Electronic and Information Engineering at South Bank University. She is currently Technical Director of The Webbery - Internet development company, Co. Donegal, Ireland. Fundamental principles of mathematics introduced and applied in engineering practice, reinforced through over 300 examples directly relevant to real-world engineering

The theory of optimal control systems has grown and flourished since the 1960's. Many texts, written on varying levels of sophistication, have been published on the subject. Yet even those purportedly designed for beginners in the field are often riddled with complex theorems, and many treatments fail to include topics that are essential to a thorough grounding in the various aspects of and approaches to optimal control. Optimal Control Systems provides a comprehensive but accessible treatment of the subject with just the right degree of mathematical rigor to be complete but practical. It provides a solid bridge between "traditional" optimization using the calculus of variations and what is called "modern" optimal control. It also treats both continuous-time and discrete-time optimal control systems, giving students a firm grasp on both methods. Among this book's most outstanding features is a summary table that accompanies each topic or problem and includes a statement of the problem with a step-by-step solution. Students will also gain valuable experience in using industry-standard MATLAB and SIMULINK software, including the Control System and Symbolic Math Toolboxes. Diverse applications across fields from power engineering to medicine make a foundation in optimal control systems an essential part of an engineer's background. This clear, streamlined presentation is ideal for a graduate level course on control systems and as a quick reference for working engineers.

The Laplace Transform for Electrical Engineers

Fundamentals, Real Problems, and Computers

Applications of Calculus

Calculus for Engineering Students

Stochastic Calculus and Applications

6th Conference on Non-integer Order Calculus and Its Applications, 2014 Opole, Poland

In the last two decades, fractional (or non integer) differentiation has played a very important role in various fields such as mechanics, electricity, chemistry, biology, economics, control theory and signal and image processing. For example, in the last three fields, some important considerations such as modelling, curve fitting, filtering, pattern recognition, edge detection, identification, stability, controllability, observability and robustness are now linked to long-range dependence phenomena. Similar progress has been made in other fields listed here. The scope of the book is thus to present the state of the art in the study of fractional systems and the application of fractional differentiation. As this volume covers recent applications of fractional calculus, it will be of interest to engineers, scientists, and applied mathematicians.

This is the little-known part of the mathematical history of what we nowadays call the Laplace Transform method of solving differential equations. It is a purely mathematical development of Heaviside's operational methods of electric circuit analysis which requires of the reader a basic knowledge of differential equations, electric circuit theory, Laplace transforms, and some vector analysis, as applied to electromagnetic theory.

When a new extraordinary and outstanding theory is stated, it has to face criticism and skeptism, because it is beyond the usual concept. The fractional calculus though not new, was not discussed or developed for a long time, particularly for lack of its application to real life problems. It is extraordinary because it does not deal with ‘ ordinary ’ differential calculus. It is outstanding because it can now be applied to situations where existing theories fail to give satisfactory results. In this book not only mathematical abstractions are discussed in a lucid manner, with physical mathematical and geometrical explanations, but also several practical applications are given particularly for system identification, description and then efficient controls. The normal physical laws like, transport theory, electrodynamics, equation of motions, elasticity, viscosity, and several others of are based on ‘ ordinary ’ calculus. In this book these physical laws are generalized in fractional calculus contexts; taking, heterogeneity effect in transport background, the space having traps or islands, irregular distribution of charges, non-ideal spring with mass connected to a pointless-mass ball, material behaving with viscous as well as elastic properties, system relaxation with and without memory, physics of random delay in computer network; and several others; mapping the reality of nature closely. The concept of fractional and complex order differentiation and integration are elaborated mathematically, physically and geometrically with examples. The practical utility of local fractional differentiation for enhancing the character of singularity at phase transition or characterizing the irregularity measure of response function is deliberated. Practical results of viscoelastic experiments, fractional order controls experiments, design of fractional controller and practical circuit synthesis for fractional order elements are elaborated in this book. The book also maps theory of classical integer order differential equations to fractional calculus contexts, and deals in details with conflicting and demanding initialization issues, required in classical techniques.

The book presents a modern approach to solve the ‘ solvable ’ system of fractional and other differential equations, linear, non-linear; without perturbation or transformations, but by applying physical principle of action-and-opposite-reaction, giving ‘ approximately exact ’ series solutions. Historically, Sir Isaac Newton and Gottfried Wihelm Leibniz independently discovered calculus in the middle of the 17th century. In recognition to this remarkable discovery, J.von Neumann remarked, “ ...the calculus was the first achievement of modern mathematics and it is difficult to overestimate its importance. I think it defines more equivocally than anything else the inception of modern mathematical analysis which is logical development, still constitute the greatest technical advance in exact thinking. ” This XXI century has thus started to ‘ think-exactly ’ for advancement in science & technology by growing application of fractional calculus, and this century has started speaking the language which nature understands the best.

Calculus for Engineering Students: Fundamentals, Real Problems, and Computers insists that mathematics cannot be separated from chemistry, mechanics, electricity, electronics, automation, and other disciplines. It emphasizes interdisciplinary problems as a way to show the importance of calculus in engineering tasks and problems. While concentrating on actual problems instead of theory, the book uses Computer Algebra Systems (CAS) to help students incorporate lessons into their own studies. Assuming a working familiarity with calculus concepts, the book provides a hands-on opportunity for students to increase their calculus and mathematics skills while also learning about engineering applications. Organized around project-based rather than traditional homework-based learning Reviews basic mathematics and theory while also introducing applications Employs uniform chapter sections that encourage the comparison and contrast of different areas of engineering

Mathematical Analysis for Engineers

MATLAB and Spice

Theoretical Developments and Applications in Physics and Engineering

Optimal Control Systems

Elementary Mathematical and Computational Tools for Electrical and Computer Engineers Using MATLAB

The Heaviside Operational Calculus

Outliers play an important, though underestimated, role in control engineering. Traditionally they are unseen and neglected. In opposition, industrial practice gives frequent examples of their existence and their mostly negative impacts on the control quality. The origin of outliers is never fully known. Some of them are generated externally to the process (exogenous), like for instance erroneous observations, data corrupted by control systems or the effect of human intervention. Such outliers appear occasionally with some unknow probability shifting real value often to some strange and nonsense value. They are frequently called deviants, anomalies or contaminants. In most cases we are interested in their detection and removal. However, there exists the second kind of outliers. Quite often strange looking data observations are not artificial data occurrences. They may be just representatives of the underlying generation mechanism being inseparable internal part of the process (endogenous outliers). In such a case they are not wrong and should be treated with cautiousness, as they may include important information about the dynamic nature of the process. As such they cannot be neglected nor simply removed. The Outlier should be detected, labelled and suitably treated. These activities cannot be performed without proper analytical tools and modeling approaches. There are dozens of methods proposed by scientists, starting from Gaussian-based statistical scoring up to data mining artificial intelligence tools. The research presented in this book presents novel approach incorporating non-Gaussian statistical tools and fractional calculus approach revealing new data analytics applied to this important and challenging task. The proposed book includes a collection of contributions addressing different yet cohesive subjects, like dynamic modelling, classical control, advanced control, fractional calculus, statistical analytics focused on an ultimate goal: robust and outlier-proof analysis. All studied problems show that outliers play an important role and classical methods, in which outlier are not taken into account, do not give good results. Applications from different engineering areas are considered such as semiconductor process control and monitoring, MIMO peltier temperature control and health monitoring, networked control systems, and etc.

An authorised reissue of the long out of print classic textbook, Advanced Calculus by the late Dr Lynn Loomis and Dr Shlomo Sternberg both of Harvard University has been a revered but hard to find textbook for the advanced calculus course for decades. This book is based on an honors course in advanced calculus that the authors gave in the 1960's. The foundational material, presented in the unstarred sections of Chapters 1 through 11, was normally covered, but different applications of this basic material were stressed from year to year, and the book therefore contains more material than was covered in any one year. It can accordingly be used (with omissions) as a text for a year's course in advanced calculus, or as a text for a three-semester introduction to analysis. The prerequisites are a good grounding in the calculus of one variable from a mathematically rigorous point of view, together with some acquaintance with linear algebra. The reader should be familiar with limit and continuity type arguments and have a certain amount of mathematical sophistication. As possible introductory texts, we mention Differential and Integral Calculus by R Courant, Calculus by T Apostol, Calculus by M Spivak, and Pure Mathematics by G Hardy. The reader should also have some experience with partial derivatives. In overall plan the book divides roughly into a first half which develops the calculus (principally the differential calculus) in the setting of normed vector spaces, and a second half which deals with the calculus of differentiable manifolds.

This volume presents selected aspects of non-integer, or fractional order systems, whose analysis, synthesis and applications have increasingly become a real challenge for various research communities, ranging from science to engineering. The spectrum of applications of the fractional order calculus has incredibly expanded, in fact it would be hard to find a science/engineering-related subject area where the fractional calculus had not been incorporated. The content of the fractional calculus is ranged from pure mathematics to engineering implementations and so is the content of this volume. The volume is subdivided into six parts, reflecting particular aspects of the fractional order calculus. The first part contains a single invited paper on a new formulation of fractional-order descriptor observers for fractional-order descriptor continous LTI systems. The second part provides new elements to the mathematical theory of fractional-order systems. In the third part of this volume, a bunch of new results in approximation, modeling and simulations of fractional-order systems is given. The fourth part presents new solutions to some problems in controllability and control of non-integer order systems, in particular fractional PID-like control. The fifth part analyzes the stability of non-integer order systems and some new results are offered in this important respect, in particular for discrete-time systems. The final, sixth part of this volume presents a spectrum of applications of the noninteger order calculus, ranging from bi-fractional filtering, in particular of electromyographic signals,

through the thermal diffusion and advection diffusion processes to the SIEMENS platform implementation. This volume's papers were all subjected to stimulating comments and discussions from the active audience of the RRNR'2014, the 6th Conference on Non-integer Order Calculus and Its Applications that was organized by the Department of Electrical, Control and Computer Engineering, Opole University of Technology, Opole, Poland.

Suitable for advanced undergraduate and graduate students of mathematics, physics, or engineering, this introduction to the calculus of variations focuses on variational problems involving one independent variable. It also discusses more advanced topics such as the inverse problem, eigenvalue problems, and Noether's theorem. The text includes numerous examples along with problems to help students consolidate the material.

Calculus

Revised

Calculus for the Electrical and Electronic Technologies

Calculus for Scientists and Engineers

Outliers in Control Engineering

Multivector Electromagnetism

The purpose of the calculus of variations is to find optimal solutions to engineering problems whose optimum may be a certain quantity, shape, or function. Applied Calculus of Variations for Engineers addresses this important mathematical area applicable to many engineering disciplines. Its unique, application-oriented approach sets it apart from the theoretical treatises of most texts, as it is aimed at enhancing the engineer's understanding of the topic. This Second Edition text: Contains new chapters discussing analytic solutions of variational problems and Lagrange-Hamilton equations of motion in depth Provides new sections detailing the boundary integral and finite element methods and their calculation techniques Includes enlightening new examples, such as the compression of a beam, the optimal cross section of beam under bending force, the solution of Laplace's equation, and Poisson's equation with various methods Applied Calculus of Variations for Engineers, Second Edition extends the collection of techniques aiding the engineer in the application of the concepts of the calculus of variations.

Focusing on the "why's" of mathematics rather than the "how's," the unique approach of this text will appeal to a wide range of readers, from those taking a first course in calculus to those seeking deeper insights or needing a transition from calculus to analysis. The author takes care to supply strong motivations for abstract concepts, thereby helping beginners overcome the intimidation often felt when first confronting abstraction. While emphasizing the "why's," the book does not entirely neglect the "how's" and provides sufficient exposure to the techniques through numerous exercises, with answers supplied in the back of the book.

Well-respected text for computer science students provides an accessible introduction to functional programming. Cogent examples illuminate the central ideas, and numerous exercises offer reinforcement. Includes solutions. 1989 edition.

Gilbert Strang's clear, direct style and detailed, intensive explanations make this textbook ideal as both a course companion and for self-study. Single variable and multivariable calculus are covered in depth. Key examples of the application of calculus to areas such as physics, engineering and economics are included in order to enhance students' understanding. New to the third edition is a chapter on the 'Highlights of calculus', which accompanies the popular video lectures by the author on MIT's OpenCourseWare. These can be accessed from math.mit.edu/~gs.

Advanced Calculus

Transform Calculus for Electrical Engineers

Practice Problems, Methods, and Solutions

Mathematics for Electrical Engineering and Computing

Fractional Calculus for Scientists and Engineers

An Analytical Approach

Expanded coverage of essential math, including integral equations,calculus of variations, tensor analysis, and specialintegrals Math Refresher for Scientists and Engineers, Third Edition isspecifically designed as a self-study guide to help busyprofessionals and students in science and engineering quicklyrefresh and improve the math skills needed to perform their jobsand advance their careers. The book focuses on practicalapplications and exercises that readers are likely to face in theirprofessional environments. All the basic math skills needed tomanage contemporary technology problems are addressed and presentedin a clear, lucid style that readers familiar with previouseditions have come to appreciate and value. The book begins with basic concepts in college algebra andtrigonometry, and then moves on to explore more advanced conceptsin calculus, linear algebra (including matrices), differentialequations, probability, and statistics. This Third Edition has beengreatly expanded to reflect the needs of today's professionals. Newmaterial includes: * A chapter on integral equations * A chapter on calculus of variations * A chapter on tensor analysis * A section on time series * A section on partial fractions * Many new exercises and solutions Collectively, the chapters teach most of the basic math skillsneeded by scientists and engineers. The wide range of topicscovered in one title is unique. All chapters provide a review ofimportant principles and methods. Examples, exercises, andapplications are used liberally throughout to engage the readersand assist them in applying their new math skills to actualproblems. Solutions to exercises are provided in an appendix. Whether to brush up on professional skills or prepare for exams,readers will find this self-study guide enables them to quicklymaster the math they need. It can additionally be used as atextbook for advanced-level undergraduates in physics andengineering.

Engineers around the world depend on MATLAB for its power, usability, and outstanding graphics capabilities. Yet too often, engineering students are either left on their own to acquire the background they need to use MATLAB, or they must learn the program concurrently within an advanced course. Both of these options delay students from solving realistic design problems, especially when they do not have a text focused on applications relevant to their field and written at the appropriate level of mathematics. Ideal for use as a short-course textbook and for self-study Elementary Mathematical and Computational Tools for Electrical and Computer Engineers Using MATLAB fills that gap. Accessible after just one semester of calculus, it introduces the many practical analytical and numerical tools that are essential to success both in future studies and in professional life. Sharply focused on the needs of the electrical and computer engineering communities, the text provides a wealth of relevant exercises and design problems. Changes in MATLAB's version 6.0 are included in a special addendum. The lack of skills in fundamental quantitative tools can seriously impede progress in one's engineering studies or career. By working through this text, either in a lecture/lab environment or by themselves, readers will not only begin mastering MATLAB, but they will also hone their analytical and computational skills to a level that will help them to enjoy and succeed in subsequent electrical and computer engineering pursuits.

This study guide is designed for students taking courses in calculus. The textbook includes practice problems that will help students to review and sharpen their knowledge of the subject and enhance their performance in the classroom. Offering detailed solutions, multiple methods for solving problems, and clear explanations of concepts, this hands-on guide will improve student's problem-solving skills and basic understanding of the topics covered in their calculus courses. Exercises cover a wide selection of basic and advanced questions and problems; Categorizes and orders the problems based on difficulty level, hence suitable for both knowledgeable and under-prepared students; Provides detailed and instructor-recommended solutions and methods, along with clear explanations; Can be used along with core calculus textbooks.

This volume offers a working knowledge of the fundamentals of matrix and tensor calculus. Relevant to several fields, particularly aeronautical engineering, the text skillfully combines mathematical statements with practical applications. 1947 edition.

Fractional-Order Electrical Circuit Theory

The Calculus of Variations

Calculus for Electronics

Geometric Algebra for Electrical Engineers

Functional Fractional Calculus for System Identification and Controls

Basic Mathematics for Electronics

Pocket Book of Electrical Engineering Formulas provides key formulas used in practically all areas of electrical engineering and applied mathematics. This handy, pocket-sized guide has been organized by topic field to make finding information quick and easy. The book features an extensive index and is an excellent quick reference for electrical engineers, educators, and students.

This book explains how calculus can be used to explain and analyze many diverse phenomena.

Acclaimed text on engineering math for graduate students covers theory of complex variables, Cauchy-Riemann equations, Fourier and Laplace transform theory, Z-transform, and much more. Many excellent problems.

Offers an understanding of the theoretical principles in electronic engineering, in clear and understandable terms Introductory Electrical Engineering With Math Explained in Accessible Language offers a text that explores the basic concepts and principles of electrical engineering. The author—a noted expert on the topic—explains the underlying mathematics involved in electrical engineering through the use of examples that help with an understanding of the theory. The text contains clear explanations of the mathematical theory that is needed to understand every topic presented, which will aid students in engineering courses who may lack the necessary basic math knowledge. Designed to breakdown complex math concepts into understandable terms, the book incorporates several math tricks and knowledge such as matrices determinant and multiplication. The author also explains how certain mathematical formulas are derived. In addition, the text includes tables of integrals and other tables to help, for example, find resistors' and capacitors' values. The author provides the accessible language, examples, and images that make the topic accessible and understandable. This important book: • Contains discussion of concepts that go from the basic to the complex, always using simplified language • Provides examples, diagrams, and illustrations that work to enhance explanations • Explains the mathematical knowledge that is crucial to understanding electrical concepts • Contains both solved exercises in-line with the explanations Written for students, electronic hobbyists and technicians, Introductory Electrical Engineering With Math Explained in Accessible Language is a much-needed text that is filled with the basics concepts of electrical engineering with the approachable math that aids in an understanding of the topic.

Pocket Book of Electrical Engineering Formulas

Elementary Switched-Circuit Analysis in the Time and Laplace Transform Domains (with a touch of MATLAB®)

Complex Variables and the Laplace Transform for Engineers

Electric Circuit Theory and the Operational Calculus

Math Refresher for Scientists and Engineers

Applied Calculus of Variations for Engineers

In recent years, a considerable amount of effort has been devoted, both in industry and academia, towards the behavioral modeling, evaluation and prediction of the hypothalamus pituitary thyroid system.Thyroid Systems Engineering targets an optimal treatment of people suffering from thyroid hormone disorders. The content is motivated by in-depth observations of such patients whose rich data supported the theoretical framework arising from formal mathematical reasoning, guided by the nature of thyroid physiology. Leveraging on the insights emerging from the unique combination of an electrical engineer working with a clinical thyroidologist, and both being scientists skilled in mathematics, the authors introduce this new discipline and field of scientific investigation aptly designated as Thyroid Systems Engineering.Readers will discover that mathematics can indeed model the behavior of the hypothalamus-pituitary-thyroid (HPT) axis. Focused on modeling, each of the eighteen chapters gives the reader a notion of the application of relevant mathematics to pertinent issues encountered in mainstream thyroidology. Many cellular processes resemble the flux of variables and states in a complex multi-parameter space through time analogous to current flow in electrical networks. It is then logical to apply the principles and physical laws of electrodynamics, electrical network theory, control systems theory and signal theory to many of the biological phenomena encountered in endocrinology. Such an approach is used liberally throughout the book and successfully yields elegant solutions to a number of models presented within.This book can serve as a reference to mathematical modeling in other aspects of endocrine physiology, and as the starting point for a fundamental course in medical modeling. It will appeal to postgraduates in electrical engineering, academic physicians and biomedical researchers. Further, readers equipped with advanced calculus, electrical network theory, control theory and signal theory should be able to follow the mathematical expositions that describe thyrotropic control. They represent a new discipline based on mathematical modeling in physiology applicable to medical diagnostics, measurement and treatment to cooperate in the clinical team and realize an optimized treatment for patients.

Completely revised and greatly expanded, the new edition of this text takes readers who have been exposed to only basic courses in analysis through the modern general theory of random processes and stochastic integrals as used by systems theorists, electronic engineers and, more recently, those working in quantitative and mathematical finance. Building upon the original release of this title, this text will be of great interest to research mathematicians and graduate students working in those fields, as well as quants in the finance industry. New features of this edition include: End of chapter exercises; New chapters on basic measure theory and Backward SDEs; Reworked proofs, examples and explanatory material; Increased focus on motivating the mathematics; Extensive topical index. "Such a self-contained and complete exposition of stochastic calculus and applications fills an existing gap in the literature. The book can be recommended for first-year graduate studies. It will be useful for all who intend to work with stochastic calculus as well as with its applications."–Zentralblatt (from review of the First Edition)

This book introduces the fundamentals of geometric algebra and calculus, and applies those tools to the study of electromagnetism. Geometric algebra provides a structure that can represent oriented point, line, plane, and volume segments. Vectors, which can be thought of as a representation of oriented line segments, are generalized to multivectors. A full fledged, but non-commutative (i.e. order matters) mul- tiplication operation will be defined for products of vectors. Namely, the square of a vector is the square of its length. This simple rule, along with a requirement that we can sum vectors and their products, essentially defines geometric algebra. Such sums of scalars, vectors and vector products are called multivectors. The reader will see that familiar concepts such as the dot and cross product are related to a more general vector product, and that algebraic structures such as complex numbers can be represented as multivectors. We will be able to utilize generalized complex exponentials to do rotations in arbitrarily oriented planes in space, and will find that simple geometric algebra representations of many geometric transformations are possible. Generalizations of the divergence and Stokes' theorems are required once we choose to work with multivector functions. There is an unfortunate learning curve required to express this gen- eralization, but once overcome, we will be left with a single powerful multivector integration theorem that has no analogue in conventional vector calculus. This fundamental theorem of geo- metric calculus incorporates Green's (area) theorem, the divergence theorem, Stokes' theorems, and complex residue calculus. Multivector calculus also provides the opportunity to define a few unique and powerful Green's functions that almost trivialize solutions of Maxwell's equations. Instead of working separately with electric and magnetic fields, we will work with a hybrid multivector field that includes both electric and magnetic field contributions, and with a mul- tivector current that includes both charge and current densities. The natural representation of Maxwell's equations is a single multivector equation that is easier to solve and manipulate then the conventional mess of divergence and curl equations are familiar to the reader. This book is aimed at graduate or advanced undergraduates in electrical engineering or physics. While all the fundamental results of electromagnetism are derived from Maxwell's equations, there will be no attempt to motivate Maxwell's equations themselves, so existing familiarity with the subject is desirable.

Advances in Fractional Calculus

Occupational Outlook Handbook

Programming for Electrical Engineers

Advances in Modelling and Control of Non-integer-Order Systems

Matrix and Tensor Calculus