Linear Algebra 3rd Edition Fraleigh Beauregard

With the inclusion of applications of singular value decomposition (SVD) and principal component analysis (PCA) to image compression and data analysis, this edition provides a strong foundation of linear algebra needed for a higher study in signal processing. The use of MATLAB in the study of linear algebra for a variety of computational purposes and the programmes provided in this text are the most attractive features of this book which strikingly distinguishes it from the existing linear algebra books needed as pre-requisites for the study of engineering subjects. This book is highly suitable for undergraduate as well as postgraduate students of mathematics, statistics, and all engineering disciplines. The book will also be useful to Ph.D. students for relevant mathematical resources.NEW TO THIS EDITION The Third Edition of this book includes: • Simultaneous diagonalization of two diagonalizable matrices • Comprehensive exposition of SVD with applications in shear analysis in engineering • Polar Decomposition of a matrix • Numerical experimentation with a colour and a black-and-white image compression using MATLAB • PCA methods of data analysis and image compression with a list of MATLAB codes

Fraleigh and Beauregard's text is known for its clear presentation and writing style, mathematical appropriateness, and overall usability. Its inclusion of calculus-related examples, true/false problems, section summaries, integrated applications, and coverage of Cn make it a superb text for the sophomore or junior-level linear algebra course. This Third Edition retains the features that have made it successful over the years, while addressing recent developments of how linear algebra is taught and learned. Key concepts are presented early on, with an emphasis on geometry. KEY TOPICS: Vectors, Matrices, and Linear Systems; Dimension, Rank, and Linear Transformations; Vector Spaces; Determinants; Eigenvalues and Eigenvectors; Orthogonality; Change of Basis; Eigenvalues: Further Applications and Computations; Complex Scalars; Solving Large Linear Systems MARKET: For all readers interested in linear algebra.

The first edition (94301-3) was published in 1995 in TIMS and had 2264 regular US sales, 928 IC, and 679 bulk. This new edition updates the text to Mathematica 5.0 and offers a more extensive treatment of linear algebra. It has been thoroughly revised and corrected throughout.

This updated bestseller provides an introduction to programming interactive computer graphics, with an emphasis on game development using DirectX 11. The book is divided into three main parts: basic mathematical tools, fundamental tasks in Direct3D, and techniques and special effects. It includes new Direct3D 11 features such as hardware tessellation, the compute shader, dynamic shader linkage and covers advanced rendering techniques such as screen-space ambient occlusion, level-of-detail handling, cascading shadow maps, volume rendering, and character animation. Includes a companion CD-ROM with code and figures. eBook Customers: Companion files are available for downloading with order number/proof of purchase by writing to the publisher at info@merclearning.com.

Important though the general concepts and propositions may be with which the modern and industrious passion for axiomatizing and generalizing has presented us, in algebra perhaps more than anywhere else, nevertheless I am convinced that the special

problems in all their complexity constitute the stock and core of mathematics, and that to master their difficulties requires on the whole the harder labor. HERMANN WEYL Die Arbeit an diesem Buch begann vor etwa zwanzig Jahren mit Aufzeichnungen zur Ergänzung meiner Algebravorlesungen. Ich wollte einige konkrete Themen, wie Symmetrie, lineare Gruppen und quadratische Zahlkörper, ausführlicher be handeln als dies im vorgesehenen Text der Fall war, und darüberhinaus wollte ich den Schwerpunkt in der Gruppentheorie von den Permutationsgruppen auf Matrixgruppen verlagern. Ein anderes ständig wiederkehrendes Thema, nämlich Gitter, sind spontan aufgetaucht. Ich hoffte, der konkrete Stoff könne das Interesse der Studenten wecken und gleichzeitig die Abstraktionen verständlicher machen, kurz gesagt, sie sollten weiter kommen, indem sie beides gleichzeitig lernten. Das bewährte sich gut. Es dauerte einige Zeit, bis ich entschieden hatte, welche Themen ich behandeln wollte, und allmählich verteilte ich mehr und mehr Aufzeichnungen und ging schließlich dazu über, die ganze Vorlesung mit diesem Skript zu bestrei ten. Auf diese Weise ist ein Buch entstanden, das, wie ich meine, etwas anders ist als die existierenden Bücher. Allerdings haben mir die Probleme, die ich damit hatte, die einzelnen Teile des Buches zu einem Ganzen zusammenzufügen, einige Kopfschmerzen bereitet; ich kann also nicht empfehlen, auf diese Art anzufangen, ein Buch zu schreiben.

Difference sets belong both to group theory and to combinatorics. Studying them requires tools from geometry, number theory, and representation theory. This book lays a foundation for these topics, including a primer on representations and characters of f Algebra & Geometry: An Introduction to University Mathematics provides a bridge between high school and undergraduate mathematics courses on algebra and geometry. The author shows students how mathematics is more than a collection of methods by presenting important ideas and their historical origins throughout the text. He incorporates a hands-on approach to proofs and connects algebra and geometry to various applications. The text focuses on linear equations, polynomial equations, and quadratic forms. The first several chapters cover foundational topics, including the importance of proofs and properties commonly encountered when studying algebra. The remaining chapters form the mathematical core of the book. These chapters explain the solution of different kinds of algebraic equations, the nature of the solutions, and the interplay between geometry and algebra

Linear algebra is relatively easy for students during the early stages of the course, when the material is presented in a familiar, concrete setting. But when abstract concepts are introduced, students often hit a brick wall. Instructors seem to agree that certain concepts (such as linear independence, spanning, subspace, vector space, and linear transformations), are not easily understood, and require time to assimilate. Since they are fundamental to the study of linear algebra, students' understanding of these concepts is vital to their mastery of the subject. Lay introduces these concepts early in a familiar, concrete Rn setting, develops them gradually, and returns to them again and again throughout the text. Finally, when discussed in the abstract, these concepts are more accessible. - New full color design allows for clearer understanding of figures and graphically important concepts and procedures. - MyMathLab is now available, integrating the texts content with the Student Study Guide. All of the texts many electronic resources can be found on MyMathLab. - MathXL is now available for the text, allowing students to take tests and quizzes online. - An electronic test generato

Highly regarded by instructors in past editions for its sequencing of topics and extensive set of exercises, the latest edition of Abstract Algebra retains its concrete approach with its gentle introduction to basic background material and its gradual increase in the level of sophistication as the student progresses through the book. Abstract concepts are introduced only after a careful study of important examples. Beachy and Blair's clear narrative presentation responds to the needs of inexperienced students who stumble over proof writing, who understand definitions and theorems but cannot do the problems, and who want more examples that tie into their previous experience. The authors introduce chapters by indicating why the material is important and, at the same time, relating the new material to things from the student's background and linking the subject matter of the chapter to the broader picture. The fourth edition includes a new chapter of selected topics in group theory: nilpotent groups, semidirect products, the classification of groups of small order, and an application of groups to the geometry of the plane. Students can download solutions to selected problems here.
Fraleigh and Beauregard's text is known for its clear presentation and writing style, mathematical appropriateness, and overall student usability. Its inclusion of calculus-related examples, true/false problems, section summaries, integrated applications, and coverage of Cn make it a superb text for the sophomore or junior-level linear algebra course. This Third Edition retains the features that have made it successful over the years, while addressing recent developments of how linear algebra is taught and learned. Key concepts are presented early on, with an emphasis on geometry.
The Handbook of Linear Algebra provides comprehensive coverage of linear algebra concepts, applications, and computational software packages in an easy-to-use handbook format. The esteemed international contributors guide you from the very elementary aspects of the subject to the frontiers of current research. The book features an accessibl
Making Sense of Factor Analysis: The Use of Factor Analysis for Instrument Development in Health Care Research presents a straightforward explanation of the complex statistical procedures involved in factor analysis. Authors Marjorie A. Pett, Nancy M. Lackey, and John J. Sullivan provide a step-by-step approach to analyzing data using statistical computer packages like SPSS and SAS. Emphasizing the interrelationship between factor analysis and test construction, the authors examine numerous practical and theoretical decisions that must be made to efficiently run and accurately interpret the outcomes of these sophisticated computer programs.
This textbook is intended as a guide for undergraduate and graduate students in engineering, science and technology courses. Chapters of the book cover the numerical concepts of errors, approximations, differential equations and partial differential equations. The simple presentation of numerical concepts and illustrative examples helps students and general readers to understand the topics covered in the text.
Matrices are used in many areas of mathematics, and have applications in diverse areas such as engineering, computer graphics, image processing, physical sciences, biological sciences and social sciences. Powerful calculators and computers can now carry out complicated and difficult numeric and algebraic computations involving matrix methods, and such technology is a vital tool in related real-life, problem-solving applications. This book provides mathematics teachers with an elementary introduction

to matrix algebra and its uses in formulating and solving practical problems, solving systems of linear equations, representing combinations of affine (including linear) transformations of the plane and modeling finite state Markov chains. The basic theory in each of these areas is explained and illustrated using a broad range of examples. A feature of the book is the complementary use of technology, particularly computer algebra systems, to do the calculations involving matrices required for the applications. A selection of student activities with solutions and text and web references are included throughout the book

Designed for advanced undergraduate and beginning graduate students in linear or abstract algebra, Advanced Linear Algebra covers theoretical aspects of the subject, along with examples, computations, and proofs. It explores a variety of advanced topics in linear algebra that highlight the rich interconnections of the subject to geometry, algebra, analysis, combinatorics, numerical computation, and many other areas of mathematics. The book's 20 chapters are grouped into six main areas: algebraic structures, matrices, structured matrices, geometric aspects of linear algebra, modules, and multilinear algebra. The level of abstraction gradually increases as students proceed through the text, moving from matrices to vector spaces to modules. Each chapter consists of a mathematical vignette devoted to the development of one specific topic. Some chapters look at introductory material from a sophisticated or abstract viewpoint while others provide elementary expositions of more theoretical concepts. Several chapters offer unusual perspectives or novel treatments of standard results. Unlike similar advanced mathematical texts, this one minimizes the dependence of each chapter on material found in previous chapters so that students may immediately turn to the relevant chapter without first wading through pages of earlier material to access the necessary algebraic background and theorems. Chapter summaries contain a structured list of the principal definitions and results. End-of-chapter exercises aid students in digesting the material. Students are encouraged to use a computer algebra system to help solve computationally intensive exercises.

This book covers recent advances in image processing and imaging sciences from an optimization viewpoint, especially convex optimization with the goal of designing tractable algorithms. Throughout the handbook, the authors introduce topics on the most key aspects of image acquisition and processing that are based on the formulation and solution of novel optimization problems. The first part includes a review of the mathematical methods and foundations required, and covers topics in image quality optimization and assessment. The second part of the book discusses concepts in image formation and capture from color imaging to radar and multispectral imaging. The third part focuses on sparsity constrained optimization in image processing and vision and includes inverse problems such as image restoration and de-noising, image classification and recognition and learning-based problems pertinent to image understanding. Throughout, convex optimization techniques are shown to be a critically important mathematical tool for imaging science problems and applied extensively. Convex Optimization Methods in Imaging Science is the first book of its kind and will appeal to undergraduate and graduate students, industrial researchers and engineers and those generally interested in computational aspects of modern, real-world imaging and image processing problems.

Following the work of Yorke and Li in 1975, the theory of discrete dynamical systems

and difference equations developed rapidly. The applications of difference equations also grew rapidly, especially with the introduction of graphical-interface software that can plot trajectories, calculate Lyapunov exponents, plot bifurcation diagrams, and find basins of attraction. Modern computer algebra systems have opened the door to the use of symbolic calculation for studying difference equations. This book offers an introduction to discrete dynamical systems and difference equations and presents the Dynamica software. Developed by the authors and based on Mathematica, Dynamica provides an easy-to-use collection of algebraic, numerical, and graphical tools and techniques that allow users to quickly gain the ability to: Find and classify the stability character of equilibrium and periodic points Perform semicycle analysis of solutions Calculate and visualize invariants Calculate and visualize Lyapunov functions and numbers Plot bifurcation diagrams Visualize stable and unstable manifolds Calculate Box Dimension While it presents the essential theoretical concepts and results, the book's emphasis is on using the software. The authors present two sets of Dynamica sessions: one that serves as a tutorial of the different techniques, the other features case studies of well-known difference equations. Dynamica and notebooks corresponding to particular chapters are available for download from the Internet. With a substantial amount of new material, the Handbook of Linear Algebra, Second Edition provides comprehensive coverage of linear algebra concepts, applications, and computational software packages in an easy-to-use format. It guides you from the very elementary aspects of the subject to the frontiers of current research. Along with revisions and updates throughout, the second edition of this bestseller includes 20 new chapters. New to the Second Edition Separate chapters on Schur complements, additional types of canonical forms, tensors, matrix polynomials, matrix equations, special types of matrices, generalized inverses, matrices over finite fields, invariant subspaces, representations of quivers, and spectral sets New chapters on combinatorial matrix theory topics, such as tournaments, the minimum rank problem, and spectral graph theory, as well as numerical linear algebra topics, including algorithms for structured matrix computations, stability of structured matrix computations, and nonlinear eigenvalue problems More chapters on applications of linear algebra, including epidemiology and quantum error correction New chapter on using the free and open source software system Sage for linear algebra Additional sections in the chapters on sign pattern matrices and applications to geometry Conjectures and open problems in most chapters on advanced topics Highly praised as a valuable resource for anyone who uses linear algebra, the first edition covered virtually all aspects of linear algebra and its applications. This edition continues to encompass the fundamentals of linear algebra, combinatorial and numerical linear algebra, and applications of linear algebra to various disciplines while also covering up-to-date software packages for linear algebra computations.

Discusses in a concise but thorough manner fundamental statement of the theory, principles and methods on vectors and vector spaces, matrix analysis, ordinary and partial differential equations, Fourier analysis and transforms, vector differential calculus, vector integral calculus, frames of reference, variational calculus, canonical transformations, and Hamilton-Jacobi theory.

This book presents the latest numerical solutions to initial value problems and boundary value problems described by ODEs and PDEs. The author offers practical methods that

can be adapted to solve wide ranges of problems and illustrates them in the increasingly popular open source computer language R, allowing integration with more statistically based methods. The book begins with standard techniques, followed by an overview of 'high resolution' flux limiters and WENO to solve problems with solutions exhibiting high gradient phenomena. Meshless methods using radial basis functions are then discussed in the context of scattered data interpolation and the solution of PDEs on irregular grids. Three detailed case studies demonstrate how numerical methods can be used to tackle very different complex problems. With its focus on practical solutions to real-world problems, this book will be useful to students and practitioners in all areas of science and engineering, especially those using R.

This volume presents mathematical formulas and theorems commonly used in economics. It offers the first grouping of this material for a specifically economist audience, and it includes formulas like Roy's identity and Leibniz's rule.

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This is the last of three volumes that, together, give an exposition of the mathematics of grades 9–12 that is simultaneously mathematically correct and grade-level appropriate. The volumes are consistent with CCSSM (Common Core State Standards for Mathematics) and aim at presenting the mathematics of K–12 as a totally transparent subject. This volume distinguishes itself from others of the same genre in getting the mathematics right. In trigonometry, this volume makes explicit the fact that the trigonometric functions cannot even be defined without the theory of similar triangles. It also provides details for extending the domain of definition of sine and cosine to all real numbers. It explains as well why radians should be used for angle measurements and gives a proof of the conversion formulas between degrees and radians. In calculus, this volume pares the technicalities concerning limits down to the essential minimum to make the proofs of basic facts about differentiation and integration both correct and accessible to school teachers and educators; the exposition may also benefit beginning math majors who are learning to write proofs. An added bonus is a correct proof that one can get a repeating decimal equal to a given fraction by the "long division" of the numerator by the denominator. This proof attends to all three things all at once: what an infinite decimal is, why it is equal to the fraction, and how long division enters the picture. This book should be useful for current and future teachers of K–12 mathematics, as well as for some high school students and for education professionals.

Handbook of Discrete and Combinatorial Mathematics provides a comprehensive reference volume for mathematicians, computer scientists, engineers, as well as students and reference librarians. The material is presented so that key information can be located and used quickly and easily. Each chapter includes a glossary. Individual topics are covered in sections and subsections within chapters, each of which is organized into clearly identifiable parts: definitions, facts, and examples. Examples are provided to illustrate some of the key definitions, facts, and algorithms. Some curious and entertaining facts and puzzles are also

included. Readers will also find an extensive collection of biographies. This second edition is a major revision. It includes extensive additions and updates. Since the first edition appeared in 1999, many new discoveries have been made and new areas have grown in importance, which are covered in this edition.

This volume contains the proceedings from the workshops held in conjunction with the IEEE International Parallel and Distributed Processing Symposium, IPDPS 2000, on 1-5 May 2000 in Cancun, Mexico. The workshopsprovidea forum for bringing together researchers,practiti- ers, and designers from various backgrounds to discuss the state of the art in parallelism.Theyfocusondi erentaspectsofparallelism,fromruntimesystems to formal methods, from optics to irregular problems, from biology to networks of personal computers, from embedded systems to programming environments; the following workshops are represented in this volume: { Workshop on Personal Computer Based Networks of Workstations { Workshop on Advances in Parallel and Distributed Computational Models { Workshop on Par. and Dist. Comp. in Image, Video, and Multimedia { Workshop on High-Level Parallel Prog. Models and Supportive Env. { Workshop on High Performance Data Mining { Workshop on Solving Irregularly Structured Problems in Parallel { Workshop on Java for Parallel and Distributed Computing { WorkshoponBiologicallyInspiredSolutionsto ParallelProcessingProblems { Workshop on Parallel and Distributed Real-Time Systems { Workshop on Embedded HPC Systems and Applications { Recon gurable Architectures Workshop { Workshop on Formal Methods for Parallel Programming { Workshop on Optics and Computer Science { Workshop on Run-Time Systems for Parallel Programming { Workshop on Fault-Tolerant Parallel and Distributed Systems All papers published in the workshops proceedings were selected by the p- gram committee on the basis of referee reports. Each paper was reviewed by independent referees who judged the papers for originality, quality, and cons- tency with the themes of the workshops.

Introduction to 3D Game Programming with DirectX 10 provides an introduction to programming interactive computer graphics, with an emphasis on game development, using DirectX 10. The book is divided into three main parts. Part I explores basic mathematical tools, Part II shows how to implement fundamental tasks in Direct3D, and Part III demonstrates a variety of techniques and special effects. With this book understand how vectors, matrices, and transfomations are used in the creation of computer games; discover how to implement lighting, texture mapping, blending, and stenciling to increase the realism of your scenes; explore techniques for creating special effects, including terrain rendering, shadow mapping, particle systems, and reflections; learn about new Direct3D 10 features such as geometry shaders, the stream out pipeline stage, texture arrays, and primitive IDs; test your knowledge and programming skills with the end-of-chapter exercises.

Generative Modelle haben sich zu einem der spannendsten Themenbereiche der Künstlichen Intelligenz entwickelt: Mit generativem Deep Learning ist es inzwischen möglich, einer Maschine das Malen, Schreiben oder auch das Komponieren von Musik beizubringen – kreative Fähigkeiten, die bisher dem Menschen vorbehalten waren. Mit diesem praxisnahen Buch können Data Scientists einige der eindrucksvollsten generativen Deep-Learning-Modelle nachbilden, wie z.B. Generative Adversarial Networks (GANs), Variational Autoencoder (VAEs), Encoder-Decoder- sowie World-Modelle. David Foster vermittelt zunächst die Grundlagen des Deep Learning mit Keras und veranschaulicht die Funktionsweise jeder Methode, bevor er zu einigen der modernsten Algorithmen auf diesem Gebiet vorstößt. Die zahlreichen praktischen Beispiele und Tipps helfen Ihnen herauszufinden, wie Ihre Modelle noch effizienter lernen und noch kreativer werden können. - Entdecken Sie, wie Variational Autoencoder den Gesichtsausdruck auf Fotos verändern können - Erstellen Sie praktische GAN-Beispiele von Grund auf und nutzen Sie CycleGAN zur Stilübertragung und MuseGAN zum Generieren von Musik - Verwenden Sie rekurrente generative Modelle, um Text zu

erzeugen, und lernen Sie, wie Sie diese Modelle mit dem Attention-Mechanismus verbessern können - Erfahren Sie, wie generatives Deep Learning Agenten dabei unterstützen kann, Aufgaben im Rahmen des Reinforcement Learning zu erfüllen - Lernen Sie die Architektur von Transformern (BERT, GPT-2) und Bilderzeugungsmodellen wie ProGAN und StyleGAN kennen "Dieses Buch ist eine leicht zugängliche Einführung in das Deep-Learning-Toolkit für generatives Modellieren. Wenn Sie ein kreativer Praktiker sind, der es liebt, an Code zu basteln, und Deep Learning für eigene Aufgaben nutzen möchte, dann ist dieses Buch genau das Richtige für Sie." — David Ha, Research Scientist bei Google Brain

Linear AlgebraAddison Wesley Publishing Company

Ian Stewart's Galois Theory has been in print for 30 years. Resoundingly popular, it still serves its purpose exceedingly well. Yet mathematics education has changed considerably since 1973, when theory took precedence over examples, and the time has come to bring this presentation in line with more modern approaches. To this end, the story now begins with polynomials over the complex numbers, and the central quest is to understand when such polynomials have solutions that can be expressed by radicals. Reorganization of the material places the concrete before the abstract, thus motivating the general theory, but the substance of the book remains the same.

Thinking Geometrically: A Survey of Geometries is a well written and comprehensive survey of college geometry that would serve a wide variety of courses for both mathematics majors and mathematics education majors. Great care and attention is spent on developing visual insights and geometric intuition while stressing the logical structure, historical development, and deep interconnectedness of the ideas. Students with less mathematical preparation than upper-division mathematics majors can successfully study the topics needed for the preparation of high school teachers. There is a multitude of exercises and projects in those chapters developing all aspects of geometric thinking for these students as well as for more advanced students. These chapters include Euclidean Geometry, Axiomatic Systems and Models, Analytic Geometry, Transformational Geometry, and Symmetry. Topics in the other chapters, including Non-Euclidean Geometry, Projective Geometry, Finite Geometry, Differential Geometry, and Discrete Geometry, provide a broader view of geometry. The different chapters are as independent as possible, while the text still manages to highlight the many connections between topics. The text is self-contained, including appendices with the material in Euclid's first book and a high school axiomatic system as well as Hilbert's axioms. Appendices give brief summaries of the parts of linear algebra and multivariable calculus needed for certain chapters. While some chapters use the language of groups, no prior experience with abstract algebra is presumed. The text will support an approach emphasizing dynamical geometry software without being tied to any particular software.

In the field of molecular evolution, inferences about past evolutionary events are made using molecular data from currently living species. With the availability of genomic data from multiple related species, molecular evolution has become one

of the most active and fastest growing fields of study in genomics and bioinformatics. Most studies in molecular evolution rely heavily on statistical procedures based on stochastic process modelling and advanced computational methods including high-dimensional numerical optimization and Markov Chain Monte Carlo. This book provides an overview of the statistical theory and methods used in studies of molecular evolution. It includes an introductory section suitable for readers that are new to the field, a section discussing practical methods for data analysis, and more specialized sections discussing specific models and addressing statistical issues relating to estimation and model choice. The chapters are written by the leaders of field and they will take the reader from basic introductory material to the state-of-the-art statistical methods. This book is suitable for statisticians seeking to learn more about applications in molecular evolution and molecular evolutionary biologists with an interest in learning more about the theory behind the statistical methods applied in the field. The chapters of the book assume no advanced mathematical skills beyond basic calculus, although familiarity with basic probability theory will help the reader. Most relevant statistical concepts are introduced in the book in the context of their application in molecular evolution, and the book should be accessible for most biology graduate students with an interest in quantitative methods and theory. Rasmus Nielsen received his Ph.D. form the University of California at Berkeley in 1998 and after a postdoc at Harvard University, he assumed a faculty position in Statistical Genomics at Cornell University. He is currently an Ole Rømer Fellow at the University of Copenhagen and holds a Sloan Research Fellowship. His is an associate editor of the Journal of Molecular Evolution and has published more than fifty original papers in peer-reviewed journals on the topic of this book. From the reviews: "...Overall this is a very useful book in an area of increasing importance." Journal of the Royal Statistical Society "I find Statistical Methods in Molecular Evolution very interesting and useful. It delves into problems that were considered very difficult just several years ago...the book is likely to stimulate the interest of statisticians that are unaware of this exciting field of applications. It is my hope that it will also help the 'wet lab' molecular evolutionist to better understand mathematical and statistical methods." Marek Kimmel for the Journal of the American Statistical Association, September 2006 "Who should read this book? We suggest that anyone who deals with molecular data (who does not?) and anyone who asks evolutionary questions (who should not?) ought to consult the relevant chapters in this book." Dan Graur and Dror Berel for Biometrics, September 2006 "Coalescence theory facilitates the merger of population genetics theory with phylogenetic approaches, but still, there are mostly two camps: phylogeneticists and population geneticists. Only a few people are moving freely between them. Rasmus Nielsen is certainly one of these researchers, and his work so far has merged many population genetic and phylogenetic aspects of biological research under the umbrella of molecular evolution. Although Nielsen did not contribute a chapter to his book, his work

permeates all its chapters. This book gives an overview of his interests and current achievements in molecular evolution. In short, this book should be on your bookshelf." Peter Beerli for Evolution, 60(2), 2006

Introduction to 3D Game Programming with DirectX 9.0c: A Shader Approach presents an introduction to programming interactive computer graphics, with an emphasis on game development, using real-time shaders with DirectX 9.0. The book is divided into three parts that explain basic mathematical and 3D concepts, show how to describe 3D worlds and implement fundamental 3D rendering techniques, and demonstrate the application of Direct3D to create a variety of special effects. With this book understand basic mathematical tools used in video game creation such as vectors, matrices, and transformations; discover how to describe and draw interactive 3D scenes using Direct3D and the D3DX library; learn how to implement lighting, texture mapping, alpha blending, and stenciling using shaders and the high-level shading language (HLSL); explore a variety of techniques for creating special effects, including vertex blending, character animation, terrain rendering, multi-texturing, particle systems, reflections, shadows, and normal mapping;f ind out how to work with meshes, load and render .X files, program terrain/camera collision detection, and implement 3D object picking; review key ideas, gain programming experience, and explore new topics with the end-of-chapter exercises.

The famous problems of squaring the circle, doubling the cube and trisecting an angle captured the imagination of both professional and amateur mathematicians for over two thousand years. Despite the enormous effort and ingenious attempts by these men and women, the problems would not yield to purely geometrical methods. It was only the development. of abstract algebra in the nineteenth century which enabled mathematicians to arrive at the surprising conclusion that these constructions are not possible. In this book we develop enough abstract algebra to prove that these constructions are impossible. Our approach introduces all the relevant concepts about fields in a way which is more concrete than usual and which avoids the use of quotient structures (and even of the Euclidean algorithm for finding the greatest common divisor of two polynomials). Having the geometrical questions as a specific goal provides motivation for the introduction of the algebraic concepts and we have found that students respond very favourably. We have used this text to teach second-year students at La Trobe University over a period of many years, each time refining the material in the light of student performance.

Features The book provides a compressive overview of the fundamental skills underlying the mechanism and control of manipulators. Detailed chapter on Velocity Transformations, jacobian and Singularities. Trajectory Planning is developed using both joint space and Cartesian space methods. Dynamic Modeling is treated by Lagrange-Euler and Euler-Newton formulations; complex derivations are put in the appendix to ensure a smooth flow for the reader. A comprehensive chapter on Robotic Control covering control strategies like PD,

PID, computed torque control, force and impedance control at an appropriate level. A METLAB tutorial on using the package for Robotics is included as an appendix. A full chapter on the industrial applications of robots. All important industrial robot configurations with varying degrees of freedom are covered in various chapters and solved examples. An elaborate chapter (Chapter 9) devoted to Robotic Sensors and Vision. Includes over 50 solved examples and more than 270 simple-to-complex end-of-chapter exercises. Appendix on the underlying maths – Linear Algebra, Moment of Inertia Tensor and Equations of Motion
A practical, one-stop reference on the theory and applications of statistical data editing and imputation techniques Collected survey data are vulnerable to error. In particular, the data collection stage is a potential source of errors and missing values. As a result, the important role of statistical data editing, and the amount of resources involved, has motivated considerable research efforts to enhance the efficiency and effectiveness of this process. Handbook of Statistical Data Editing and Imputation equips readers with the essential statistical procedures for detecting and correcting inconsistencies and filling in missing values with estimates. The authors supply an easily accessible treatment of the existing methodology in this field, featuring an overview of common errors encountered in practice and techniques for resolving these issues. The book begins with an overview of methods and strategies for statistical data editing and imputation. Subsequent chapters provide detailed treatment of the central theoretical methods and modern applications, with topics of coverage including: Localization of errors in continuous data, with an outline of selective editing strategies, automatic editing for systematic and random errors, and other relevant state-of-the-art methods Extensions of automatic editing to categorical data and integer data The basic framework for imputation, with a breakdown of key methods and models and a comparison of imputation with the weighting approach to correct for missing values More advanced imputation methods, including imputation under edit restraints Throughout the book, the treatment of each topic is presented in a uniform fashion. Following an introduction, each chapter presents the key theories and formulas underlying the topic and then illustrates common applications. The discussion concludes with a summary of the main concepts and a real-world example that incorporates realistic data along with professional insight into common challenges and best practices. Handbook of Statistical Data Editing and Imputation is an essential reference for survey researchers working in the fields of business, economics, government, and the social sciences who gather, analyze, and draw results from data. It is also a suitable supplement for courses on survey methods at the upper-undergraduate and graduate levels.