Algebra Lineare Per Tutti Unitext

L'opera fornisce una introduzione alla geometria delle varietà differenziabili, illustrandone le principali proprietà e descrivendo le principali tecniche e i più importanti strumenti usati per il loro studio. Uno degli obiettivi primari dell'opera è di fungere da testo di riferimento per chi (matematici, fisici, ingegneri) usa la geometria differenziale come strumento; inoltre può essere usato come libro di testo per diversi corsi introduttivi alla geometria differenziale, concentrandosi su alcuni dei vari aspetti della teoria presentati nell'opera. Più in dettaglio, nell'opera saranno trattati i seguenti argomenti: richiami di algebra multilineare e tensoriale, spesso non presentati nei corsi standard di algebra lineare; varietà differenziali, incluso il teorema di Whitney; fibrati vettoriali, incluso il teorema di Frobenius e un'introduzione ai fibrati principali; gruppi di Lie, incluso il teorema di corrispondenza fra sottogruppi e sottoalgebre; coomologia di de Rham, inclusa la dualità di Poincaré e il teorema di de Rham; connessioni, inclusa la teoria delle geodetiche; e geometria Riemanniana, con particolare attenzione agli operatori di curvatura e inclusi teoremi di Cartan-Hadamard, Bonnet-Myers, e Synge-Weinstein. Come abitudine degli autori, il testo è scritto in modo da favorire una lettura attiva, cruciale per un buon apprendimento di argomenti matematici; inoltre è corredato da numerosi esempi svolti ed esercizi proposti. In the first decade of the twentieth century as Albert Einstein began formulating a revolutionary theory of gravity, the Italian mathematician Gregorio Ricci was entering the later stages of what appeared to be a productive if not particularly memorable career, devoted largely to what his colleagues regarded as the dogged development of a mathematical language he called the absolute differential calculus. In 1912, the work of these two dedicated scientists would intersect—and physics and mathematics would never be the same. Einstein's Italian Mathematicians chronicles the lives and intellectual contributions of Ricci and his brilliant student Tullio Levi-Civita, including letters, interviews, memoranda, and other personal and professional papers, to tell the remarkable, little-known story of how two Italian academicians, of widely divergent backgrounds and temperaments, came to provide the indispensable mathematical foundation—today known as the tensor calculus—for general relativity.

With the Bologna Accords a bachelor-master-doctor curriculum has been introduced in various countries with the intention that students may enter the job market already at the bachelor level. Since financial Institutions provide non negligible job opportunities also for mathematicians, and scientists in general, it appeared to be appropriate to have a financial mathematics course already at the bachelor level in mathematics. Most mathematical techniques in use in financial mathematics are related to continuous time models and require thus notions from stochastic analysis that bachelor students do in general not possess. Basic notions and methodologies in use in financial mathematics can however be transmitted to students also without the technicalities from stochastic analysis by using discrete time (multi-period) models for which general notions from Probability suffice and these are generally familiar to students not only from science courses, but also from economics with quantitative curricula. There do not exists many textbooks for multi-period models and the present volume is intended to fill in this gap. It deals with the basic topics in financial mathematics and, for each topic, there is a theoretical section and a problem section. The latter includes a great variety of possible problems with complete solution.

This book presents a large collection of problems in Quantum Mechanics that are solvable within a limited time and using simple mathematics. The problems test both the student's understanding of each topic and their ability to apply this understanding concretely. Solutions to the problems are provided in detail, eliminating only the simplest steps. No problem has been included that requires knowledge of mathematical methods not covered in standard courses, such as Fuchsian differential equations. The book is in particular designed to assist all students who are preparing for written examinations in Quantum Mechanics, but will also be very useful for teachers who have to pose problems to their students in lessons and examinations.

This introduction can be used, at the beginning graduate level, for a one-semester course on probability theory or for self-direction without benefit of a formal course; the measure theory needed is developed in the text. It will also be useful for students and teachers in related areas such as finance theory, electrical engineering, and operations research. The text covers the essentials in a directed and lean way with 28 short chapters, and assumes only an undergraduate background in mathematics. Readers are taken right up to a knowledge of the basics of Martingale Theory, and the interested student will be ready to continue with the study of more advanced topics, such as Brownian Motion and Ito Calculus, or Statistical Inference.

Stemmatology studies aspects of textual criticism that use genealogical methods. This handbook is the first to cover the entire field, encompassing both theoretical and practical aspects, ranging from traditional to digital methods. Authors from all

Practical recommendations for application developers who want to generate efficient PDF files. New PDF 1.4 features include Tagged PDF, Referenced PDF, PDF Metadata Architecture, forms enhancements, JBIG2 support, and more. Example files, predefined font encodings, PDF page-marking operators, and other essential information.

Published Nov 25, 2003 by Addison-Wesley Professional. Part of the Tools and Techniques for Computer Typesetting series. The series editor may be contacted at frank.mittelbach@latex-project.org. LaTeX is the text-preparation system of choice for scientists and academics, and is especially useful for typesetting technical materials. This popular book shows you how to begin using LaTeX to create high-quality documents. The book also serves as a handy reference for all LaTeX users. In this completely revised edition, the authors cover the LaTeX2? standard and offer more details, examples, exercises, tips, and tricks. They go beyond the core installation to describe the key contributed packages that have become essential to LaTeX processing. Inside, you will find: Complete coverage of LaTeX fundamentals, including how to input text, symbols, and mathematics; how to produce lists and tables; how to include graphics and color; and how to organize and customize documents Discussion of more advanced concepts such as bibliographical databases and BIBTeX, math extensions with AMS-LaTeX, drawing, slides, and letters Helpful appendices on installation, error messages, creating packages, using LaTeX with HTML and XML, and fonts An extensive alphabetized listing of commands and their uses New to this edition: More emphasis on LaTeX as a markup language that separates content and form--consistent with the essence of XML Detailed discussions of contributed packages alongside relevant standard topics In-depth information on PDF output, including extensive coverage of how to use the hyperref package to create links, bookmarks, and active buttons As did the three best-selling editions that preceded it, Guide to LaTeX, Fourth Edition, will prove indispensable to anyone wishing to gain the benefits of LaTeX. The accompanying CD-ROM is part of the TeX Live set distributed by TeX Users Groups, containing a full LaTeX installation for Windows, MacOSX, and Linux, as well as many extensions, including those discussed in the book. 0321173856B10162003

Algebra lineareper tuttiSpringer Science & Business Media

The bioeconomy consists of the management of renewable biological resources and their conversion into food, livestock feed, bio-based products and bioenergy via innovative and efficient technologies. It involves tackling major challenges, both now and in the future. These include the sustainable production of sufficient nutritious and safe food for our growing population, developing new and more environmentally friendly sources of energy, and combating global warming, which can have serious consequences both on land and in the oceans. In 2015, the Nordic Bioeconomy Panel was established with the mandate to develop a proposal on a joint Nordic bioeconomy strategy designed to stimulate innovation and support a sustainable transition in the Nordic bioeconomy. As a stepping-stone towards the strategy, the Nordic Council of Ministers and the Nordic Bioeconomy Panel have collaborated with the Danish think-tank Sustainia (Monday Morning) on collecting and categorizing 25 Nordic cases on the 'new' Nordic bioeconomy. This catalogue presents a selection of the many excellent cases that deserve attention but the selected cases seek to illustrate the diverse bioeconomy activities in the Nordic countries. We hope that

they will inspire you and enhance your understanding of the bioeconomy, its importance and its potential.

TABLE OF CONTENTS: ALGEBRA, WHAT ELSE?: 1. The Birth of a Masterwork - 2. Commutativity and Left- and Right-Division - 3. Algorithms, Algorithms, Algorithms - 4. Formalism - 5. A Fateful Choice - 6. Overview - 7. A Strange Document - 8. Acknowledgements - 9. Tools - Notes — ON THE FORMAL ELEMENTS OF THE ABSOLUTE ALGEBRA: §. 1. Character des zu behandelnden Problems. Character of the Problem in Issue - §. 2. Einschränkungen der Aufgabe. Restrictions of our Scope - §. 3. Die Fundamentalgleichungen für nur zwei Zahlen. Algorithmen. The Fundamental Equations for only Two Numbers. Algorithms - §. 4. Vertauschungsprincipien. Principles of Permutation - §. 5. Die Fundamentalgleichungen für drei Zahlen. Elementarcyklen und Gruppen. The Fundamental Equations for Three Numbers. Elementary Cycles and Groups - §. 6. Consequenzen der Algorithmen C1; C2; C3 für drei Zahlen. Consequences of the Algorithms C1; C2; C3 for Three Numbers - §. 7. Consequenzen von C0. Consequences of C0 - §. 8. Combination der Ci. Combination of the Ci - §. 9. Das Formelsystem O1 der ordinäre Algebra. The Formal System O1 of the Usual Algebra - §. 10. Untergeordnete Algorithmen von O1: Weitere ermittelte Tragweitezahlen. Subordinate Algorithms of O1: Further Sizes — FIGURES - Notes — APPENDIX - Notes — ILLUSTRATIONS - Bibliography - Index of the Main Concepts - Index of the Illustrations.

This book provides students with the rudiments of Linear Algebra, a fundamental subject for students in all areas of science and technology. The book would also be good for statistics students studying linear algebra. It is the translation of a successful textbook currently being used in Italy. The author is a mathematician sensitive to the needs of a general audience. In addition to introducing fundamental ideas in Linear Algebra through a wide variety of interesting examples, the book also discusses topics not usually covered in an elementary text (e.g. the "cost" of operations, generalized inverses, approximate solutions). The challenge is to show why the "everyone" in the title can find Linear Algebra useful and easy to learn. The translation has been prepared by a native English speaking mathematician, Professor Anthony V. Geramita.

The purpose of the volume is to provide a support for a first course in Mathematics. The contents are organised to appeal especially to Engineering, Physics and Computer Science students, all areas in which mathematical tools play a crucial role. Basic notions and methods of differential and integral calculus for functions of one real variable are presented in a manner that elicits critical reading and prompts a hands-on approach to concrete applications. The layout has a specifically-designed modular nature, allowing the instructor to make flexible didactical choices when planning an introductory lecture course. The book may in fact be employed at three levels of depth. At the elementary level the student is supposed to grasp the very essential ideas and familiarise with the corresponding key techniques. Proofs to the main results befit the intermediate level, together with several remarks and complementary notes enhancing the treatise. The last, and farthest-reaching, level requires the additional study of the material contained in the appendices, which enable the strongly motivated reader to explore further into the subject. Definitions and properties are furnished with substantial examples to stimulate the learning process. Over 350 solved exercises complete the text, at least half of which guide the reader to the solution. This new edition features additional material with the aim of matching the widest range of educational choices for a first course of Mathematics.

Networking & Security

Differential equations play a relevant role in many disciplines and provide powerful tools for analysis and modeling in applied sciences. The book contains several classical and modern methods for the study of ordinary and partial differential equations. A broad space is reserved to Fourier and Laplace transforms together with their applications to the solution of boundary value and/or initial value problems for differential equations. Basic prerequisites concerning analytic functions of complex variable and Lp spaces are synthetically presented in the first two chapters. Techniques based on integral transforms and Fourier series are presented in specific chapters, first in the easier framework of integrable functions and later in the general framework of distributions. The less elementary distributional context allows to deal also with differential equations with highly irregular data and pulse signals. The theory is introduced concisely, while learning of miscellaneous methods is achieved step-by-step through the proposal of many exercises of increasing difficulty. Additional recap exercises are collected in dedicated sections. Several tables for easy reference of main formulas are available at the end of the book. The presentation is oriented mainly to students of Schools in Engineering, Sciences and Economy. The partition of various topics in several self-contained and independent sections allows an easy splitting in at least two didactic modules: one at undergraduate level, the other at graduate level.

Gestures are ubiquitous and natural in our everyday life. They convey information about culture, discourse, thought, intentionality, emotion, intersubjectivity, cognition, and first and second language acquisition. Additionally, they are used by non-human primates to communicate with their peers and with humans. Consequently, the modern field of gesture studies has attracted researchers from a number of different disciplines such as anthropology, cognitive science, communication, neuroscience, psycholinguistics, primatology, psychology, robotics, sociology and semiotics. This volume presents an overview of the depth and breadth of current research in gesture. Its focus is on the interdisciplinary nature of gesture. The twenty-six chapters included in the volume are divided into six sections or themes: the nature and functions of gesture, first language development and gesture, second language effects on gesture, gesture in the classroom and in problem solving, gesture aspects of discourse and interaction, and gestural analysis of music and dance.

A commonsense, self-contained introduction to the mathematics and physics of music; essential reading for musicians, music engineers, and anyone interested in the intersection of art and science. "Mathematics can be as effortless as humming a tune, if you know the tune," writes Gareth Loy. In Musimathics, Loy teaches us the tune, providing a friendly and spirited tour of the mathematics of music—a commonsense, self-contained introduction for the nonspecialist reader. It is designed for musicians who find their art increasingly mediated by technology, and for anyone who is interested in the intersection of art and science. In Volume 1, Loy presents the materials of music (notes, intervals, and scales); the physical properties of music (frequency, amplitude, duration, and timbre); the perception of music and sound (how we hear); and music composition. Calling himself "a composer seduced into mathematics," Loy provides answers to foundational questions about the mathematics of music accessibly yet rigorously. The examples given are all practical problems in music and audio. Additional material can be found at http://www.musimathics.com.

-- New March 2019 REVISED EDITION -- A friendly and non-formal approach to a subject of abstract mathematics that has important applications in physics, especially in General Relativity, but also in other fields. The purpose of the book is mainly didactic and requires a minimum of mathematical background (differential calculus, partial derivatives included).

Linear algebra provides the essential mathematical tools to tackle all the problems in Science. Introduction to Linear Algebra is primarily aimed at students in applied fields (e.g. Computer Science and Engineering), providing them with a concrete, rigorous approach to face and solve various types of problems for the applications of their interest. This book offers a straightforward introduction to linear algebra that requires a minimal mathematical background to read and engage with. Features Presented in a brief, informative and engaging style Suitable for a wide broad range of undergraduates Contains many worked examples and exercises

"Having been born a freeman, and for more than thirty years enjoyed the blessings of liberty in a free State—and having at the end of that time been kidnapped and sold into Slavery, where I remained, until happily rescued in the month of January, 1853, after a bondage of twelve years—it has been suggested that an account of my life and fortunes would not be uninteresting to the public." -an excerpt

One of the most widely used texts in its field, this volume introduces the differential geometry of curves and surfaces in both local and global aspects. The presentation departs from the traditional approach with its more extensive use of elementary linear algebra and its emphasis on basic geometrical facts rather than machinery or random details. Many examples and exercises enhance the clear, well-written exposition,

along with hints and answers to some of the problems. The treatment begins with a chapter on curves, followed by explorations of regular surfaces, the geometry of the Gauss map, the intrinsic geometry of surfaces, and global differential geometry. Suitable for advanced undergraduates and graduate students of mathematics, this text's prerequisites include an undergraduate course in linear algebra and some familiarity with the calculus of several variables. For this second edition, the author has corrected, revised, and updated the entire volume.

Questo manuale è stato realizzato per permettere ai futuri studenti di Ingegneria di affrontare con successo i propri studi. Vengono presentati alcuni concetti di base in matematica, generalmente già appresi prima dell'ingresso all'Università. Si è constatato che non tutti gli studenti hanno una padronanza completa di questo insieme di nozioni fondamentali: perciò il presente manuale fornisce un utile supporto, sotto forma sia di esercizi sia di nozioni teoriche. Il futuro studente potrà scegliere i capitoli che più lo interessano, al fine di verificare la propria capacità a risolvere problemi quali i "Problemi di revisione", ricorrendo alle proprie abilità di ragionamento ed alle proprie conoscenze.

The purpose of this book is to provide the mathematical foundations of numerical methods, to analyze their basic theoretical properties and to demonstrate their performances on examples and counterexamples. Within any specific class of problems, the most appropriate scientific computing algorithms are reviewed, their theoretical analyses are carried out and the expected results are verified using the MATLAB software environment. Each chapter contains examples, exercises and applications of the theory discussed to the solution of real-life problems. While addressed to senior undergraduates and graduates in engineering, mathematics, physics and computer sciences, this text is also valuable for researchers and users of scientific computing in a large variety of professional fields.

What do Bach's compositions, Rubik's Cube, the way we choose our mates, and the physics of subatomic particles have in common? All are governed by the laws of symmetry, which elegantly unify scientific and artistic principles. Yet the mathematical language of symmetry-known as group theory-did not emerge from the study of symmetry at all, but from an equation that couldn't be solved. For thousands of years mathematicians solved progressively more difficult algebraic equations, until they encountered the quintic equation, which resisted solution for three centuries. Working independently, two great prodigies ultimately proved that the quintic cannot be solved by a simple formula. These geniuses, a Norwegian named Niels Henrik Abel and a romantic Frenchman named Évariste Galois, both died tragically young. Their incredible labor, however, produced the origins of group theory. The first extensive, popular account of the mathematics of symmetry and order, The Equation That Couldn't Be Solved is told not through abstract formulas but in a beautifully written and dramatic account of the lives and work of some of the greatest and most intriguing mathematicians in history.

This volume describes the spectral theory of the Weyl quantization of systems of polynomials in phase-space variables, modelled after the harmonic oscillator. The main technique used is pseudodifferential calculus, including global and semiclassical variants. The main results concern the meromorphic continuation of the spectral zeta function associated with the spectrum, and the localization (and the multiplicity) of the eigenvalues of such systems, described in terms of "classical" invariants (such as the periods of the periodic trajectories of the bicharacteristic flow associated with the eiganvalues of the symbol). The book utilizes techniques that are very powerful and flexible and presents an approach that could also be used for a variety of other problems. It also features expositions on different results throughout the literature.

Gnuplot is a portable command-line driven graphing utility for Linux, OS/2, MS Windows, OSX, VMS, and many other platforms. The source code is copyrighted but freely distributed (i.e., you don't have to pay for it). It was originally created to allow scientists and students to visualize mathematical functions and data interactively, but has grown to support many non-interactive uses such as web scripting. It is also used as a plotting engine by third-party applications like Octave. Gnuplot has been supported and under active development since 1986. Gnuplot supports many types of plots in either 2D and 3D. It can draw using lines, points, boxes, contours, vector fields, surfaces, and various associated text. It also supports various specialized plot types. This manual is available online for free at gnuplot.info. This manual is printed in grayscale.

Linear algebra has become the subject to know for people in quantitative disciplines of all kinds. No longer the exclusive domain of mathematicians and engineers, it is now used everywhere there is data and everybody who works with data needs to know more. This new book from Professor Gilbert Strang, author of the acclaimed Introduction to Linear Algebra, now in its fifth edition, makes linear algebra accessible to everybody, not just those with a strong background in mathematics. It takes a more active start, beginning by finding independent columns of small matrices, leading to the key concepts of linear combinations and rank and column space. From there it passes on to the classical topics of solving linear equations, orthogonality, linear transformations and subspaces, all clearly explained with many examples and exercises. The last major topics are eigenvalues and the important singular value decomposition, illustrated with applications to differential equations and image compression. A final optional chapter explores the ideas behind deep learning.

This book offers readers a primer on the theory and applications of Ordinary Differential Equations. The style used is simple, yet thorough and rigorous. Each chapter ends with a broad set of exercises that range from the routine to the more challenging and thought-provoking. Solutions to selected exercises can be found at the end of the book. The book contains many interesting examples on topics such as electric circuits, the pendulum equation, the logistic equation, the Lotka-Volterra system, the Laplace Transform, etc., which introduce students to a number of interesting aspects of the theory and applications. The work is mainly intended for students of Mathematics, Physics, Engineering, Computer Science and other areas of the natural and social sciences that use ordinary differential equations, and who have a firm grasp of Calculus and a minimal understanding of the basic concepts used in Linear Algebra. It also studies a few more advanced topics, such as Stability Theory and Boundary Value Problems, which may be suitable for more advanced undergraduate or first-year graduate students. The second edition has been revised to correct minor errata, and features a number of carefully selected new exercises, together with more detailed explanations of some of the topics. A complete Solutions Manual, containing solutions to all the exercises published in the book, is available. Instructors who wish to adopt the book may request the manual by writing directly to one of the authors.

Questo volume fornisce una introduzione all'analisi dei sistemi dinamici discreti. La materia è presentata mediante un approccio unitario tra il punto di vista modellistico e quello di varie discipline che sviluppano metodi di analisi e tecniche risolutive: Analisi Matematica, Algebra Lineare, Analisi Numerica, Teoria dei Sistemi, Calcolo delle Probabilità. All'esame di un'ampia serie di esempi, segue la presentazione degli strumenti per lo studio di sistemi dinamici scalari lineari e non lineari, con particolare attenzione all'analisi della stabilità. Si studiano in dettaglio le equazioni alle differenze lineari e si fornisce una introduzione elementare alle trasformate Z e DFT. Un capitolo è dedicato allo studio di biforcazioni e dinamiche caotiche. I sistemi dinamici vettoriali ad un passo e le applicazioni alle catene di Markov sono oggetto di tre capitoli. L'esposizione è autocontenuta: le appendici tematiche presentano prerequisiti, algoritmi e suggerimenti per simulazioni al computer. Ai numerosi esempi proposti si affianca un gran numero di esercizi, per la maggior parte dei quali si fornisce una soluzione dettagliata. Il volume è indirizzato principalmente agli studenti di Ingegneria, Scienze, Biologia ed Economia. Questa terza edizione comprende l'aggiornamento di vari argomenti, l'aggiunta di nuovi esercizi e l'ampliamento della trattazione relativa alle matrici positive ed alle loro proprietà utili nell'analisi di sistemi, reti e motori di ricerca.

The book provides an introduction to Differential Geometry of Curves and Surfaces. The theory of curves starts with a discussion of possible definitions of the concept of curve, proving in particular the classification of 1-dimensional manifolds. We then present the classical local theory of parametrized plane and space curves (curves in n-dimensional space are discussed in the complementary material): curvature, torsion, Frenet's formulas and the fundamental theorem of the local theory of curves. Then, after a self-contained presentation of degree theory for continuous self-maps of the circumference, we study the global theory of plane curves, introducing winding and rotation numbers,

and proving the Jordan curve theorem for curves of class C2, and Hopf theorem on the rotation number of closed simple curves. The local theory of surfaces begins with a comparison of the concept of parametrized (i.e., immersed) surface with the concept of regular (i.e., embedded) surface. We then develop the basic differential geometry of surfaces in R3: definitions, examples, differentiable maps and functions, tangent vectors (presented both as vectors tangent to curves in the surface and as derivations on germs of differentiable functions; we shall consistently use both approaches in the whole book) and orientation. Next we study the several notions of curvature on a surface, stressing both the geometrical meaning of the objects introduced and the algebraic/analytical methods needed to study them via the Gauss map, up to the proof of Gauss' Teorema Egregium. Then we introduce vector fields on a surface (flow, first integrals, integral curves) and geodesics (definition, basic properties, geodesic curvature, and, in the complementary material, a full proof of minimizing properties of geodesics and of the Hopf-Rinow theorem for surfaces). Then we shall present a proof of the celebrated Gauss-Bonnet theorem, both in its local and in its global form, using basic properties (fully proved in the complementary material) of triangulations of surfaces. As an application, we shall prove the Poincaré-Hopf theorem on zeroes of vector fields. Finally, the last chapter will be devoted to several important results on the global theory of surfaces, like for instance the characterization of surfaces with constant Gaussian curvature, and the orientability of compact surfaces in R3.

Il volume è dedicato a tutti gli studenti delle Facoltà scientifiche che debbano affrontare l'esame di Algebra lineare

Questo testo è concepito per i corsi delle Facoltà di Ingegneria e di Scienze. Esso affronta tutti gli argomenti tipici della Matematica Numerica, spaziando dal problema di risolvere sistemi di equazioni lineari e non lineari a quello di approssimare una funzione, di calcolare i suoi minimi, le sue derivate ed il suo integrale definito fino alla risoluzione di equazioni differenziali ordinarie e alle derivate parziali con metodi alle differenze finite ed agli elementi finiti. Un capitolo iniziale conduce lo studente ad un rapido ripasso degli argomenti dell'Analisi Matematica e dell'Algebra Lineare di uso frequente nel volume e ad una introduzione ai linguaggi MATLAB e Octave. Al fine di rendere maggiormente incisiva la presentazione e fornire un riscontro quantitativo immediato alla teoria vengono implementati in linguaggio MATLAB e Octave tutti gli algoritmi che via via si introducono. Vengono inoltre proposti numerosi esercizi, tutti risolti per esteso, ed esempi, anche con riferimento ad applicazioni in vari ambiti scientifici. Questa sesta edizione si differenzia dalle precedenti per l'aggiunta di nuovi sviluppi, di nuovi esempi relativi ad applicazioni di interesse reale e di svariati esercizi con relative soluzioni.

Python for Software Design is a concise introduction to software design using the Python programming language. The focus is on the programming process, with special emphasis on debugging. The book includes a wide range of exercises, from short examples to substantial projects, so that students have ample opportunity to practice each new concept.

The Lynx and the Telescope challenges the traditional interpretation of a programmatic convergence between the visions of Galileo and Cesi's Academy, while offering a new interpretation of the dynamics that led to the condemnation of Galileo in 1633.

This book, intended as a practical working guide for calculus students, includes 450 exercises. It is designed for undergraduate students in Engineering, Mathematics, Physics, or any other field where rigorous calculus is needed, and will greatly benefit anyone seeking a problem-solving approach to calculus. Each chapter starts with a summary of the main definitions and results, which is followed by a selection of solved exercises accompanied by brief, illustrative comments. A selection of problems with indicated solutions rounds out each chapter. A final chapter explores problems that are not designed with a single issue in mind but instead call for the combination of a variety of techniques, rounding out the book's coverage. Though the book's primary focus is on functions of one real variable, basic ordinary differential equations (separation of variables, linear first order and constant coefficients ODEs) are also discussed. The material is taken from actual written tests that have been delivered at the Engineering School of the University of Genoa. Literally thousands of students have worked on these problems, ensuring their real-world applicability.

La prima parte del presente volume fornisce strumenti dell'algebra lineare nel caso finito dimensionale, ma con la prospettiva infinito-dimensionale, giungendo a trattare argomenti quali funzioni di matrice, equazioni matriciali e matrici dipendenti da parametri.La seconda parte tratta di equazioni/sistemi differenziali ordinari, con particolare enfasi sulla stabilità dei punti di equilibrio e delle orbite periodiche (per esempio il Teorema di Poincaré).Non mancano applicazioni alle equazioni alle derivate parziali (metodo delle caratteristiche ed equazione di Hamilton-Jacobi).La prima parte può essere utilizzata autonomamente, mentre la seconda dipende in parte dai risultati esposti nella prima.Nel testo sono presenti esercizi in forma di verifica di proprietà indicate e, alla fine di ciascuna parte, esercizi volti alla verifica della comprensione degli argomenti trattati ed esercizi riguardanti possibili generalizzazioni.Si tratta di un testo avanzato, rivolto a studenti della laurea magistrale o del dottorato di ricerca.

Preface to the First Edition This textbook is an introduction to Scienti?c Computing. We will illustrate several numerical methods for the computer solution of c- tain classes of mathematical problems that cannot be faced by paper and pencil. We will show how to compute the zeros or the integrals of continuous functions, solve linear systems, approximate functions by polynomials and construct accurate approximations for the solution of di?erential equations. With this aim, in Chapter 1 we will illustrate the rules of the game thatcomputersadoptwhenstoringandoperatingwith realandcomplex numbers, vectors and matrices. In order to make our presentation concrete and appealing we will 1 adopt the programming environment MATLAB as a faithful c- panion. We will gradually discover its principal commands, statements and constructs. We will show how to execute all the algorithms that we introduce throughout the book. This will enable us to furnish an - mediate quantitative assessment of their theoretical properties such as stability, accuracy and complexity. We will solve several problems that will be raisedthrough exercises and examples, often stemming from s- ci?c applications.

This book is an introduction to the study of ordinary differential equations and partial differential equations, ranging from elementary techniques to advanced tools. The presentation focusses on initial value problems, boundary value problems, equations with delayed argument and analysis of periodic solutions: main goals are the analysis of diffusion equation, wave equation, Laplace equation and signals. The study of relevant examples of differential models highlights the notion of well-posed problem. An expanded tutorial chapter collects the topics from basic undergraduate calculus that are used in subsequent chapters. A wide exposition concerning classical methods for solving problems related to differential equations is available: mainly separation of variables and Fourier series, with basic worked exercises. A whole chapter deals with the analytic functions of complex variable. An introduction to function spaces, distributions and basic notions of functional analysis is present. Several chapters are devoted to Fourier and Laplace transforms methods to solve boundary value problems and initial value problems for differential equations. Tools for the analysis appear gradually: first in function spaces, then in the more general framework of distributions, where a powerful arsenal of techniques allows dealing with impulsive signals and singularities in both data and solutions of differential problems. This Second Edition contains additional exercises and a new chapter concerning signals and filters analysis in connection to integral transforms.

Lo psicologo contemporaneo deve fare i conti con sfide sempre maggiori e opportunita di studio e di ricerca usando nuove tecnologie fino a pochi anni fa impensabili. Elementi di Psicometria Computazionale, rappresenta un prezioso strumento per formare gli psicologi di domani, attenti al passato, orientati al futuro e con una corposa conoscenza del presente. In modo pratico e semplice il volume accompagna il lettore all'uso degli strumenti della misura in psicologia, alla luce delle piu recenti tecnologie. Un percorso che parte dall'acquisizione dei dati con questionari elettronici, biosensori, social networks, realta virtuale e altro, per proseguire con la gestione avanzata dei dati e chiudere con una prima introduzione ai modelli computazionali. Caratteristica importante del volume e il totale orientamento al mondo open source e la costante disponibilita di software gratuito per tutti gli strumenti utilizzati.