

best linear algebra textbooks

Best Linear Algebra Textbooks: A Comprehensive Guide for Students and Professionals

Introduction:

Linear algebra is a cornerstone of mathematics, underpinning fields from machine learning and computer graphics to quantum physics and economics. Choosing the right textbook can significantly impact your understanding and enjoyment of this crucial subject. This comprehensive guide dives deep into the world of linear algebra textbooks, offering detailed reviews and comparisons to help you find the perfect fit for your needs, whether you're a beginner undergraduate student or a seasoned researcher. We'll explore a range of texts, considering their strengths, weaknesses, and target audience, ultimately guiding you toward making an informed decision. This post will cover everything from introductory texts suitable for first-year undergraduates to more advanced books delving into deeper theoretical concepts.

Understanding Your Needs: Choosing the Right Linear Algebra Textbook

Before jumping into specific recommendations, let's consider what you should look for in a linear algebra textbook. Different books cater to different learning styles and mathematical backgrounds. Ask yourself these questions:

What's your mathematical background? Do you have a strong foundation in calculus? Some texts assume a higher level of prior knowledge than others.

What's your learning style? Do you prefer a rigorous, proof-oriented approach, or a more intuitive, application-focused one?

What's your goal? Are you taking a course, self-studying, or using linear algebra for a specific application?

Considering these factors will narrow down your choices and lead you to a textbook that truly resonates with you.

Top Linear Algebra Textbooks: A Detailed Review

Here are some of the most highly regarded linear algebra textbooks, categorized to help you find the perfect match:

1. Linear Algebra and Its Applications (David C. Lay, Steven R. Lay, Judi J. McDonald)

Target Audience: Undergraduate students, particularly those in engineering, science, or computer

science.

Strengths: Excellent balance between theory and applications. Clear explanations, numerous examples, and a wealth of practice problems. Focuses on understanding concepts rather than just memorizing formulas.

Weaknesses: Can be somewhat verbose for students seeking a concise treatment of the subject.

1. Introduction to Linear Algebra (Gilbert Strang)

Target Audience: Undergraduate students, with a preference for intuitive explanations and geometric insights.

Strengths: Strang's engaging writing style and insightful explanations make complex concepts accessible. Excellent use of visuals and geometric interpretations. Comes with accompanying online resources including video lectures.

Weaknesses: Some readers might find the lack of rigorous proofs unsatisfying.

1. Linear Algebra Done Right (Sheldon Axler)

Target Audience: Advanced undergraduates and graduate students seeking a rigorous, proof-based approach.

Strengths: Provides a deep and thorough treatment of linear algebra, focusing on abstract linear algebra concepts. Develops the subject systematically and logically. Excellent for developing strong mathematical reasoning skills.

Weaknesses: Can be challenging for students without a solid foundation in proof-writing techniques. Not ideal for a first introduction to linear algebra.

1. Linear Algebra with Applications (Otto Bretscher)

Target Audience: Undergraduate students, particularly those in economics and social sciences.

Strengths: Emphasizes the applications of linear algebra in real-world problems. Clear and concise explanations, with a focus on understanding the underlying principles.

Weaknesses: Might lack the depth of other texts for students aiming for a deeper theoretical understanding.

1. A First Course in Linear Algebra (Robert A. Beezer)

Target Audience: Undergraduate students seeking a thorough, yet accessible introduction.

Strengths: Very comprehensive coverage, combining theoretical development with practical application. Provides a good balance between rigor and readability. Numerous exercises and

examples at varying levels of difficulty.

Weaknesses: The sheer volume of material can be overwhelming for some learners.

Detailed Textbook Breakdown: "Linear Algebra and Its Applications"

Let's examine "Linear Algebra and Its Applications" by Lay, Lay, and McDonald in more detail. This textbook is a popular choice for its balanced approach.

Introduction: The introduction sets the stage, briefly outlining the importance of linear algebra and introducing fundamental concepts. It aims to ease the reader into the subject, dispelling initial anxieties.

Main Chapters: The core of the book covers topics such as:

Systems of Linear Equations: This chapter thoroughly explores methods for solving systems of linear equations, including Gaussian elimination and matrix methods.

Matrix Algebra: A comprehensive treatment of matrix operations, including addition, multiplication, inverses, and determinants.

Vector Spaces: A detailed exploration of vector spaces, subspaces, linear independence, and bases.

Eigenvalues and Eigenvectors: A critical chapter covering eigenvalues and eigenvectors, their computation, and their applications in various fields.

Orthogonality: This chapter focuses on orthogonal vectors, orthogonal projections, and their use in solving linear systems and approximation problems.

Linear Transformations: A thorough treatment of linear transformations, their representation by matrices, and their properties.

Applications: Several chapters dedicated to applying linear algebra concepts to diverse fields such as computer graphics, cryptography, and data analysis.

Conclusion: The concluding chapter summarizes key concepts and provides a roadmap for further study in related areas of mathematics.

Each Chapter Explained:

The chapters are not simply theoretical expositions. They are meticulously structured with examples that reinforce the underlying principles. Each concept is carefully introduced with clear explanations and supported by worked-out examples, followed by exercises of varying difficulty that test comprehension and problem-solving skills. The applications chapters provide practical context, showing how linear algebra is used in diverse real-world settings. This reinforces the learning process and encourages deeper understanding.

Frequently Asked Questions (FAQs)

1. What is the best linear algebra textbook for beginners? For beginners, "Linear Algebra and Its Applications" or "Introduction to Linear Algebra" by Strang are excellent choices due to their clear explanations and ample examples.

1. Which textbook is best for self-study? "Introduction to Linear Algebra" by Strang, with its accompanying online resources, is particularly well-suited for self-study.
1. Which book is best for a rigorous, proof-based approach? "Linear Algebra Done Right" by Axler is the definitive choice for a rigorous, proof-oriented approach.
1. What is the difference between Lay's and Strang's books? Lay's book offers a more balanced approach, while Strang's book emphasizes intuitive understanding and geometric interpretations.
1. Are there any free linear algebra textbooks available online? Yes, several open-source linear algebra textbooks are available online, though their quality can vary.
1. Which textbook is best for engineers? "Linear Algebra and Its Applications" is a popular choice for engineering students due to its strong emphasis on applications.
1. Which textbook is best for computer science students? Both "Linear Algebra and Its Applications" and "Introduction to Linear Algebra" are suitable for computer science students.
1. How much linear algebra do I need to know for machine learning? A solid understanding of vectors, matrices, eigenvalues, and eigenvectors is essential for machine learning.
1. Are there any linear algebra textbooks with solutions manuals? Solutions manuals are available for many linear algebra textbooks, but they are usually sold separately.

Related Articles:

1. Linear Algebra for Machine Learning: Explores the key linear algebra concepts essential for machine learning algorithms.

2. **Eigenvalues and Eigenvectors: A Practical Guide:** Provides a deeper dive into the concepts of eigenvalues and eigenvectors and their applications.
3. **Solving Systems of Linear Equations: A Step-by-Step Guide:** Offers a detailed tutorial on solving linear equations using various methods.
4. **Introduction to Vector Spaces:** Explains the fundamental concepts of vector spaces and their properties.
5. **Linear Transformations and Matrices:** Explores the relationship between linear transformations and matrices.
6. **Applications of Linear Algebra in Computer Graphics:** Illustrates the practical applications of linear algebra in computer graphics.
7. **Linear Algebra for Data Science:** Shows how linear algebra is used in data analysis and manipulation.
8. **The Role of Linear Algebra in Quantum Mechanics:** Explains the importance of linear algebra in the field of quantum mechanics.
9. **Choosing the Right Mathematical Software for Linear Algebra:** Compares and contrasts different mathematical software packages suitable for linear algebra computations.

best linear algebra textbooks: Linear Algebra As An Introduction To Abstract Mathematics Bruno Nachtergaele, Anne Schilling, Isaiah Lankham, 2015-11-30 This is an introductory textbook designed for undergraduate mathematics majors with an emphasis on abstraction and in particular, the concept of proofs in the setting of linear algebra. Typically such a student would have taken calculus, though the only prerequisite is suitable mathematical grounding. The purpose of this book is to bridge the gap between the more conceptual and computational oriented undergraduate classes to the more abstract oriented classes. The book begins with systems of linear equations and complex numbers, then relates these to the abstract notion of linear maps on finite-dimensional vector spaces, and covers diagonalization, eigenspaces, determinants, and the Spectral Theorem. Each chapter concludes with both proof-writing and computational exercises.

best linear algebra textbooks: A First Course in Linear Algebra Kenneth Kuttler, Ilijas Farah, 2020 A First Course in Linear Algebra, originally by K. Kuttler, has been redesigned by the Lyryx editorial team as a first course for the general students who have an understanding of basic high school algebra and intend to be users of linear algebra methods in their profession, from business & economics to science students. All major topics of linear algebra are available in detail, as well as justifications of important results. In addition, connections to topics covered in advanced courses are introduced. The textbook is designed in a modular fashion to maximize flexibility and facilitate adaptation to a given course outline and student profile. Each chapter begins with a list of student learning outcomes, and examples and diagrams are given throughout the text to reinforce ideas and provide guidance on how to approach various problems. Suggested exercises are included at the end of each section, with selected answers at the end of the textbook.--BCcampus website.

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Contains a discussion of the basics of linear algebra

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Linear Algebra Problem Book can be either the main course or the dessert for someone who needs linear algebra and today that means every user of mathematics. It can be used as the basis of either an official course or a program of private study. If used as a course, the book can stand by itself, or if so desired, it can be stirred in with a standard linear algebra course as the seasoning that provides the interest, the challenge, and the motivation that is needed by experienced scholars as much as by beginning students. The best way to learn is to do, and the purpose of this book is to get the reader to DO linear algebra. The approach is Socratic: first ask a question, then give a hint (if necessary), then, finally, for security and completeness, provide the detailed answer.

best linear algebra textbooks: Linear Algebra Kuldeep Singh, 2013-10 This book is intended for first- and second-year undergraduates arriving with average mathematics grades ... The strength of the text is in the large number of examples and the step-by-step explanation of each topic as it is introduced. It is compiled in a way that allows distance learning, with explicit solutions to all of the set problems freely available online <http://www.oup.co.uk/companion/singh> -- From preface.

best linear algebra textbooks: Introduction to Linear Algebra Serge Lang, 2012-12-06 This is a short text in linear algebra, intended for a one-term course. In the first chapter, Lang discusses the relation between the geometry and the algebra underlying the subject, and gives concrete examples of the notions which appear later in the book. He then starts with a discussion of linear equations, matrices and Gaussian elimination, and proceeds to discuss vector spaces, linear maps, scalar products, determinants, and eigenvalues. The book contains a large number of exercises, some of the routine computational type, while others are conceptual.

best linear algebra textbooks: Linear Algebra Done Right Sheldon Axler, 1997-07-18 This text for a second course in linear algebra, aimed at math majors and graduates, adopts a novel approach by banishing determinants to the end of the book and focusing on understanding the structure of linear operators on vector spaces. The author has taken unusual care to motivate concepts and to simplify proofs. For example, the book presents - without having defined determinants - a clean proof that every linear operator on a finite-dimensional complex vector space has an eigenvalue. The book starts by discussing vector spaces, linear independence, span, basics, and dimension. Students are introduced to inner-product spaces in the first half of the book and shortly thereafter to the finite-dimensional spectral theorem. A variety of interesting exercises in each chapter helps students understand and manipulate the objects of linear algebra. This second edition features new chapters on diagonal matrices, on linear functionals and adjoints, and on the spectral theorem; some sections, such as those on self-adjoint and normal operators, have been entirely rewritten; and hundreds of minor improvements have been made throughout the text.

best linear algebra textbooks: Basics of Linear Algebra for Machine Learning Jason Brownlee, 2018-01-24 Linear algebra is a pillar of machine learning. You cannot develop a deep understanding and application of machine learning without it. In this laser-focused Ebook, you will finally cut through the equations, Greek letters, and confusion, and discover the topics in linear algebra that you need to know. Using clear explanations, standard Python libraries, and step-by-step tutorial lessons, you will discover what linear algebra is, the importance of linear algebra to machine learning, vector, and matrix operations, matrix factorization, principal component analysis, and much more.

best linear algebra textbooks: Introduction to Applied Linear Algebra Stephen Boyd, Lieven Vandenberghe, 2018-06-07 A groundbreaking introduction to vectors, matrices, and least squares for engineering applications, offering a wealth of practical examples.

best linear algebra textbooks: Finite Dimensional Vector Spaces Paul R. Halmos, 2016-03-02 As a newly minted Ph.D., Paul Halmos came to the Institute for Advanced Study in 1938--even though he did not have a fellowship--to study among the many giants of mathematics who had recently joined the faculty. He eventually became John von Neumann's research assistant, and it was one of von Neumann's inspiring lectures that spurred Halmos to write Finite Dimensional

Vector Spaces. The book brought him instant fame as an expositor of mathematics. Finite Dimensional Vector Spaces combines algebra and geometry to discuss the three-dimensional area where vectors can be plotted. The book broke ground as the first formal introduction to linear algebra, a branch of modern mathematics that studies vectors and vector spaces. The book continues to exert its influence sixty years after publication, as linear algebra is now widely used, not only in mathematics but also in the natural and social sciences, for studying such subjects as weather problems, traffic flow, electronic circuits, and population genetics. In 1983 Halmos received the coveted Steele Prize for exposition from the American Mathematical Society for his many graduate texts in mathematics dealing with finite dimensional vector spaces, measure theory, ergodic theory, and Hilbert space.

best linear algebra textbooks: Linear Algebra Georgi? Evgen?evich Shilov, 1977-06-01 Covers determinants, linear spaces, systems of linear equations, linear functions of a vector argument, coordinate transformations, the canonical form of the matrix of a linear operator, bilinear and quadratic forms, Euclidean spaces, unitary spaces, quadratic forms in Euclidean and unitary spaces, finite-dimensional space. Problems with hints and answers.

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best linear algebra textbooks: Abstract Algebra Dan Saracino, 2008-09-02 The Second Edition of this classic text maintains the clear exposition, logical organization, and accessible breadth of coverage that have been its hallmarks. It plunges directly into algebraic structures and incorporates an unusually large number of examples to clarify abstract concepts as they arise. Proofs of theorems do more than just prove the stated results; Saracino examines them so readers gain a better impression of where the proofs come from and why they proceed as they do. Most of the exercises range from easy to moderately difficult and ask for understanding of ideas rather than flashes of insight. The new edition introduces five new sections on field extensions and Galois theory, increasing its versatility by making it appropriate for a two-semester as well as a one-semester course.

best linear algebra textbooks: Linear Algebra Jim Hefferon, 2015 This text covers a standard first course : Gauss's method, vector spaces, linear maps and matrices, determinants, and eigenvalues and eigenvectors. In addition, each chapter ends with some topics such as brief applications. What sets it apart is careful motivation, many examples, and extensive exercise sets. Together these help each student master the material of this course, and also help an instructor develop that student's level of mathematical maturity. This book has been available online for many years and is widely used, both in classrooms and for self-study. It is supported by worked answers for all exercises, beamer slides for classroom use, and a lab manual of computer work--Page 4 of cover.

best linear algebra textbooks: The Linear Algebra a Beginning Graduate Student Ought to Know Jonathan S. Golan, 2007-04-05 This book rigorously deals with the abstract theory and, at the same time, devotes considerable space to the numerical and computational aspects of linear algebra. It features a large number of thumbnail portraits of researchers who have contributed to the development of linear algebra as we know it today and also includes over 1,000 exercises, many of which are very challenging. The book can be used as a self-study guide; a textbook for a course in advanced linear algebra, either at the upper-class undergraduate level or at the first-year graduate level; or as a reference book.

best linear algebra textbooks: Numerical Linear Algebra Holger Wendland, 2018 This self-contained introduction to numerical linear algebra provides a comprehensive, yet concise, overview of the subject. It includes standard material such as direct methods for solving linear systems and least-squares problems, error, stability and conditioning, basic iterative methods and the calculation of eigenvalues. Later chapters cover more advanced material, such as Krylov subspace methods, multigrid methods, domain decomposition methods, multipole expansions,

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best linear algebra textbooks: Linear Algebra and Its Applications Peter D. Lax, 2013-05-20 This set features Linear Algebra and Its Applications, Second Edition (978-0-471-75156-4) Linear Algebra and Its Applications, Second Edition presents linear algebra as the theory and practice of linear spaces and linear maps with a unique focus on the analytical aspects as well as the numerous applications of the subject. In addition to thorough coverage of linear equations, matrices, vector spaces, game theory, and numerical analysis, the Second Edition features student-friendly additions that enhance the book's accessibility, including expanded topical coverage in the early chapters, additional exercises, and solutions to selected problems. Beginning chapters are devoted to the abstract structure of finite dimensional vector spaces, and subsequent chapters address convexity and the duality theorem as well as describe the basics of normed linear spaces and linear maps between normed spaces. Further updates and revisions have been included to reflect the most up-to-date coverage of the topic, including: The QR algorithm for finding the eigenvalues of a self-adjoint matrix The Householder algorithm for turning self-adjoint matrices into tridiagonal form The compactness of the unit ball as a criterion of finite dimensionality of a normed linear space

Additionally, eight new appendices have been added and cover topics such as: the Fast Fourier Transform; the spectral radius theorem; the Lorentz group; the compactness criterion for finite dimensionality; the characterization of commentators; proof of Liapunov's stability criterion; the construction of the Jordan Canonical form of matrices; and Carl Pearcy's elegant proof of Halmos' conjecture about the numerical range of matrices. Clear, concise, and superbly organized, *Linear Algebra and Its Applications*, Second Edition serves as an excellent text for advanced undergraduate- and graduate-level courses in linear algebra. Its comprehensive treatment of the subject also makes it an ideal reference or self-study for industry professionals. and *Functional Analysis* (978-0-471-55604-6) both by Peter D. Lax.

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best linear algebra textbooks: *Basic Linear Algebra* T.S. Blyth, E.F. Robertson, 2013-12-01 *Basic Linear Algebra* is a text for first year students leading from concrete examples to abstract theorems, via tutorial-type exercises. More exercises (of the kind a student may expect in examination papers) are grouped at the end of each section. The book covers the most important basics of any first course on linear algebra, explaining the algebra of matrices with applications to analytic geometry, systems of linear equations, difference equations and complex numbers. Linear equations are treated via Hermite normal forms which provides a successful and concrete explanation of the notion of linear independence. Another important highlight is the connection between linear mappings and matrices leading to the change of basis theorem which opens the door to the notion of similarity. This new and revised edition features additional exercises and coverage of Cramer's rule (omitted from the first edition). However, it is the new, extra chapter on computer assistance that will be of particular interest to readers: this will take the form of a tutorial on the use of the LinearAlgebra package in MAPLE 7 and will deal with all the aspects of linear algebra developed within the book.

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best linear algebra textbooks: Differential Equations & Linear Algebra Charles Henry Edwards, David E. Penney, David Calvis, 2010 For courses in Differential Equations and Linear Algebra. Acclaimed authors Edwards and Penney combine core topics in elementary differential equations with those concepts and methods of elementary linear algebra needed for a contemporary combined introduction to differential equations and linear algebra. Known for its real-world applications and its blend of algebraic and geometric approaches, this text discusses mathematical modeling of real-world phenomena, with a fresh new computational and qualitative flavor evident throughout in figures, examples, problems, and applications. In the Third Edition, new graphics and narrative have been added as needed-yet the proven chapter and section structure remains unchanged, so that class notes and syllabi will not require revision for the new edition.

best linear algebra textbooks: Linear Algebra and Its Applications with R Ruriko Yoshida, 2021-06-27 This book developed from the need to teach a linear algebra course to students focused on data science and bioinformatics programs. These students tend not to realize the importance of linear algebra in applied sciences, since traditional linear algebra courses tend to cover mathematical contexts but not the computational aspect of linear algebra or its applications to data science and bioinformatics. The author presents the topics in a traditional course, yet offers lectures as well as lab exercises on simulated and empirical data sets. This textbook provides students a theoretical basis which can then be applied to the practical R and Python problems, providing the tools needed for real-world applications. Each section starts with working examples to demonstrate how tools from linear algebra can help solve problems in applied sciences. These exercises start from easy computations, such as computing determinants of matrices, to practical applications on simulated and empirical data sets with R so that students learn how to get started with R, along with computational examples in each section, and then students learn how to apply what they've learned to problems in applied sciences. This book is designed from first principles to demonstrate the importance of linear algebra through working computational examples with R and Python, including tutorials on how to install R in the Appendix. If a student has never seen R, they can get started without any additional help. Since Python is one of the most popular languages in data science, optimization, and computer science, code supplements are available for students who feel more comfortable with Python. R is used primarily for computational examples to develop students' practical computational skills. About the Author: Dr. Ruriko Yoshida is an Associate Professor of Operations Research at the Naval Postgraduate School. She received her PhD in Mathematics from the University of California, Davis. Her research topics cover a wide variety of areas: applications of algebraic combinatorics to statistical problems such as statistical learning on non-Euclidean spaces, sensor networks, phylogenetics, and phylogenomics. She teaches courses in statistics, stochastic models, probability, and data science.

best linear algebra textbooks: Linear Algebra: Theory and Applications Kenneth Kuttler, 2012-01-29 This is a book on linear algebra and matrix theory. While it is self contained, it will work best for those who have already had some exposure to linear algebra. It is also assumed that the reader has had calculus. Some optional topics require more analysis than this, however. I think that the subject of linear algebra is likely the most significant topic discussed in undergraduate mathematics courses. Part of the reason for this is its usefulness in unifying so many different topics. Linear algebra is essential in analysis, applied math, and even in theoretical mathematics. This is the point of view of this book, more than a presentation of linear algebra for its own sake. This is why

there are numerous applications, some fairly unusual.

best linear algebra textbooks: A Course in Algebra Ernest Borisovich Vinberg, 2003-04-10 Presents modern algebra. This book includes such topics as affine and projective spaces, tensor algebra, Galois theory, Lie groups, and associative algebras and their representations. It is suitable for independent study for advanced undergraduates and graduate students.

best linear algebra textbooks: Advanced Linear Algebra Bruce Cooperstein, 2016-04-19 Advanced Linear Algebra focuses on vector spaces and the maps between them that preserve their structure (linear transformations). It starts with familiar concepts and then slowly builds to deeper results. Along with including many exercises and examples, each section reviews what students need to know before studying the material. The book first introduces vector spaces over fields as well as the fundamental concepts of linear combinations, span of vectors, linear independence, basis, and dimension. After covering linear transformations, it discusses the algebra of polynomials with coefficients in a field, concentrating on results that are consequences of the division algorithm. The author then develops the whole structure theory of a linear operator on a finite dimensional vector space from a collection of some simple results. He also explores the entire range of topics associated with inner product spaces, from the Gram-Schmidt process to the spectral theorems for normal and self-adjoint operators on an inner product space. The text goes on to rigorously describe the trace and determinant of linear operators and square matrices. The final two chapters focus on bilinear forms and tensor products and related material. Designed for advanced undergraduate and beginning graduate students, this textbook shows students the beauty of linear algebra. It also prepares them for further study in mathematics.

best linear algebra textbooks: Lectures on Linear Algebra I. M. Gelfand, 1989-01-01 Prominent Russian mathematician's concise, well-written exposition considers n -dimensional spaces, linear and bilinear forms, linear transformations, canonical form of an arbitrary linear transformation, and an introduction to tensors. While not designed as an introductory text, the book's well-chosen topics, brevity of presentation, and the author's reputation will recommend it to all students, teachers, and mathematicians working in this sector.

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Linear Algebra: A Geometric Approach, Second Edition, presents the standard computational aspects of linear algebra and includes a variety of intriguing interesting applications that would be interesting to motivate science and engineering students, as well as help mathematics students make the transition to more abstract advanced courses. The text guides students on how to think about mathematical concepts and write rigorous mathematical arguments.

best linear algebra textbooks: *Linear Algebra* Kenneth Hoffman, Ray Alden Kunze, 2015

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and outlier detection. The tight integration of linear algebra methods with examples from machine learning differentiates this book from generic volumes on linear algebra. The focus is clearly on the most relevant aspects of linear algebra for machine learning and to teach readers how to apply these concepts. 2. Optimization and its applications: Much of machine learning is posed as an optimization problem in which we try to maximize the accuracy of regression and classification models. The “parent problem” of optimization-centric machine learning is least-squares regression. Interestingly, this problem arises in both linear algebra and optimization, and is one of the key connecting problems of the two fields. Least-squares regression is also the starting point for support vector machines, logistic regression, and recommender systems. Furthermore, the methods for dimensionality reduction and matrix factorization also require the development of optimization methods. A general view of optimization in computational graphs is discussed together with its applications to back propagation in neural networks. A frequent challenge faced by beginners in machine learning is the extensive background required in linear algebra and optimization. One problem is that the existing linear algebra and optimization courses are not specific to machine learning; therefore, one would typically have to complete more course material than is necessary to pick up machine learning. Furthermore, certain types of ideas and tricks from optimization and linear algebra recur more frequently in machine learning than other application-centric settings. Therefore, there is significant value in developing a view of linear algebra and optimization that is better suited to the specific perspective of machine learning.

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This textbook covers the material for an undergraduate linear algebra course: vectors, matrices, linear transformations, computational techniques, geometric constructions, and theoretical foundations. The explanations are given in an informal conversational tone. The book also contains 100+ problems and exercises with answers and solutions. A special feature of this textbook is the prerequisites chapter that covers topics from high school math, which are necessary for learning linear algebra. The presence of this chapter makes the book suitable for beginners and the general audience-readers need not be math experts to read this book. Another unique aspect of the book are the applications chapters (Ch 7, 8, and 9) that discuss applications of linear algebra to engineering, computer science, economics, chemistry, machine learning, and even quantum mechanics.

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