

linear algebra books

Linear Algebra Books: Your Guide to Mastering the Fundamentals and Beyond

Are you ready to unlock the power of linear algebra? This fundamental branch of mathematics underpins countless fields, from machine learning and computer graphics to quantum physics and economics. But finding the right linear algebra book can feel overwhelming, given the sheer number of options available. This comprehensive guide dives deep into the world of linear algebra textbooks, offering expert recommendations categorized by skill level, learning style, and specific applications. We'll explore different approaches, highlight key features to look for, and ultimately help you choose the perfect companion on your linear algebra journey.

Understanding Your Needs: Choosing the Right Linear Algebra Book

Before diving into specific recommendations, it's crucial to assess your learning style and goals. Are you a beginner needing a gentle introduction? Or are you a more advanced student tackling complex proofs and abstract concepts? Consider these factors:

Your mathematical background: Do you have a strong foundation in calculus and pre-calculus? A book designed for beginners might be too slow if you already possess a solid mathematical foundation. Conversely, jumping into an advanced text without sufficient preparation could be frustrating and unproductive.

Your learning style: Do you prefer a highly theoretical approach with rigorous proofs, or a more practical, application-focused methodology? Some books emphasize intuition and visualization, while others prioritize formal rigor.

Your goals: Are you learning linear algebra for a specific application, such as machine learning or computer graphics? In that case, look for a textbook that incorporates relevant examples and case studies. If you're pursuing a mathematics degree, a more theoretical and comprehensive text will likely be necessary.

Top Linear Algebra Books Categorized by Skill Level

We've categorized the books below to cater to diverse learning needs. Remember that the best book for you will depend on your individual background and aspirations:

Beginner-Friendly Linear Algebra Books:

"Linear Algebra and Its Applications" by David C. Lay, Steven R. Lay, and Judi J. McDonald: This widely adopted textbook excels at presenting concepts clearly and intuitively. It balances theoretical rigor with practical applications, making it suitable for students with varying mathematical backgrounds. The numerous solved examples and exercises are invaluable for reinforcing understanding.

"Introduction to Linear Algebra" by Gilbert Strang: Professor Strang's book is renowned for its engaging writing style and insightful explanations. He masterfully connects abstract concepts to real-world applications, making even challenging topics accessible. His accompanying video lectures on MIT OpenCourseware further enhance the learning experience.

Intermediate Linear Algebra Books:

"Linear Algebra Done Right" by Sheldon Axler: This book takes a more abstract and theoretically rigorous approach. It's ideal for students who have a solid mathematical foundation and are comfortable with proofs. Axler's focus on linear transformations provides a powerful and elegant perspective on the subject.

"Linear Algebra" by Friedberg, Insel, and Spence: A classic text known for its comprehensive coverage and rigorous treatment of the subject. It's well-suited for students preparing for advanced mathematics courses or research.

Advanced Linear Algebra Books:

"Algebra" by Michael Artin: This book delves into the more abstract aspects of algebra, including linear algebra. It's designed for students with a strong mathematical background and a desire to understand the deeper theoretical underpinnings of the subject.

"Linear Algebra and Geometry" by A.S. Mishchenko: This book offers a different perspective, focusing on the geometric interpretation of linear algebraic concepts. It's suitable for students interested in the connections between algebra and geometry.

Book Deep Dive: "Linear Algebra and Its Applications" by Lay, Lay, and McDonald

Let's delve into a detailed examination of one highly recommended book: "Linear Algebra and Its Applications" by David C. Lay, Steven R. Lay, and Judi J. McDonald.

Outline:

Introduction: Sets the stage for linear algebra, highlighting its importance and applications.

Chapters 1-4: Covers fundamental concepts like vectors, matrices, systems of linear equations, and vector spaces.

Chapters 5-7: Explores eigenvalues, eigenvectors, and diagonalization.

Chapters 8-10: Delves into orthogonal matrices, linear transformations, and applications to various fields.

Conclusion: Summarizes key concepts and looks ahead to more advanced topics.

Detailed Explanation of the Outline Points:

Introduction: This section effectively lays the groundwork by introducing the core concepts of linear algebra in an accessible manner. It avoids overwhelming beginners with excessive technicalities while still establishing the importance of the subject.

Chapters 1-4 (Fundamentals): These chapters meticulously cover the building blocks of linear algebra. They provide a robust understanding of vectors, matrices, and their operations. The explanation of systems of linear equations is particularly clear and well-illustrated with numerous examples. Vector spaces are introduced gradually, building intuition before diving into abstract concepts.

Chapters 5-7 (Eigenvalues and Eigenvectors): This section presents the crucial concepts of eigenvalues and eigenvectors with clarity. The book effectively explains their significance in understanding the behavior of linear transformations and their applications in various fields. Diagonalization is explained thoroughly, emphasizing its practical implications.

Chapters 8-10 (Advanced Topics and Applications): These chapters explore more advanced concepts such as orthogonal matrices and linear transformations in detail. The inclusion of real-world applications, ranging from computer graphics to economics, distinguishes this book from many others. It effectively connects theoretical knowledge to practical usage.

Conclusion: The concluding chapter provides a succinct summary of the key concepts covered throughout the book, reinforcing learning and providing a solid foundation for further exploration of advanced topics.

Frequently Asked Questions (FAQs)

1. What is the best linear algebra book for beginners? "Linear Algebra and Its Applications" by Lay, Lay, and McDonald or "Introduction to Linear Algebra" by Gilbert Strang are excellent starting points.

1. Which book is best for a rigorous theoretical approach? "Linear Algebra Done Right" by Sheldon Axler is a popular choice for a more abstract and

proof-oriented approach.

1. Do I need calculus to understand linear algebra? While not strictly required for basic linear algebra, a solid understanding of calculus is beneficial for more advanced topics and applications.
1. What are the best resources to complement a linear algebra textbook? Online courses (like MIT OpenCourseware), video lectures, and practice problems are highly recommended supplements.
1. How much time should I dedicate to learning linear algebra? The time commitment varies depending on your background and goals, but expect to invest a substantial amount of time and effort.
1. Are there any free online linear algebra resources? Yes, many universities offer free online courses and lecture notes on linear algebra. Khan Academy is another excellent free resource.
1. What software is helpful for learning linear algebra? MATLAB, Python with NumPy and SciPy, and R are commonly used for linear algebra computations and visualization.
1. What are some common applications of linear algebra? Applications span various fields, including machine learning, computer graphics, quantum physics, economics, and engineering.
1. Is it possible to self-teach linear algebra? Yes, but it requires self-discipline, a strong work ethic, and access to reliable learning resources.

Related Articles:

1. **Linear Algebra for Machine Learning:** Explores the specific applications of linear algebra in machine learning algorithms.
2. **Linear Algebra in Computer Graphics:** Focuses on the role of linear algebra in creating 3D graphics and animations.
3. **Eigenvalues and Eigenvectors: A Deep Dive:** A more detailed exploration of these crucial concepts.
4. **Linear Transformations: A Geometric Perspective:** Examines linear transformations through a geometric lens.
5. **Solving Systems of Linear Equations:** A comprehensive guide to different methods of solving linear systems.
6. **Vector Spaces and Subspaces:** A detailed explanation of these fundamental concepts in linear algebra.
7. **The Importance of Linear Algebra in Data Science:** Highlights the use of linear algebra in data analysis and manipulation.
8. **Linear Algebra for Quantum Mechanics:** Examines the applications of linear algebra in the field of quantum mechanics.
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linear algebra books: [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.

linear algebra books: *Introduction to Linear Algebra* Gilbert Strang, 1993 Book Description: Gilbert Strang's textbooks have changed the entire approach to learning linear algebra -- away from abstract vector spaces to specific examples of the four fundamental subspaces: the column space and nullspace of A and A' . *Introduction to Linear Algebra*, Fourth Edition includes challenge problems to complement the review problems that have been highly praised in previous editions. The basic course is followed by seven applications: differential equations, engineering, graph theory, statistics, Fourier methods and the FFT, linear programming, and computer graphics. Thousands of

teachers in colleges and universities and now high schools are using this book, which truly explains this crucial subject.

linear algebra books: *A Second Course in Linear Algebra* Stephan Ramon Garcia, Roger A. Horn, 2017-05-11 A second course in linear algebra for undergraduates in mathematics, computer science, physics, statistics, and the biological sciences.

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linear algebra books: *Advanced Linear Algebra* Steven Roman, 2007-09-20 This graduate level textbook covers an especially broad range of topics. The book first offers a careful discussion of the basics of linear algebra. It then proceeds to a discussion of modules, emphasizing a comparison with vector spaces, and presents a thorough discussion of inner product spaces, eigenvalues, eigenvectors, and finite dimensional spectral theory, culminating in the finite dimensional spectral theorem for normal operators. The new edition has been revised and contains a chapter on the QR decomposition, singular values and pseudoinverses, and a chapter on convexity, separation and positive solutions to linear systems.

linear algebra books: *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.

linear algebra books: *Matrices And Linear Algebra* Akhilesh Chandra Yadav, This book covers an undergraduate course on Matrices and Linear Algebra.

linear algebra books: *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.

linear algebra books: Introduction to Linear and Matrix Algebra Nathaniel Johnston, 2021-05-19 This textbook emphasizes the interplay between algebra and geometry to motivate the study of linear algebra. Matrices and linear transformations are presented as two sides of the same coin, with their connection motivating inquiry throughout the book. By focusing on this interface, the author offers a conceptual appreciation of the mathematics that is at the heart of further theory and applications. Those continuing to a second course in linear algebra will appreciate the companion volume Advanced Linear and Matrix Algebra. Starting with an introduction to vectors, matrices, and linear transformations, the book focuses on building a geometric intuition of what these tools represent. Linear systems offer a powerful application of the ideas seen so far, and lead onto the introduction of subspaces, linear independence, bases, and rank. Investigation then focuses on the algebraic properties of matrices that illuminate the geometry of the linear transformations that they represent. Determinants, eigenvalues, and eigenvectors all benefit from this geometric viewpoint. Throughout, "Extra Topic" sections augment the core content with a wide range of ideas and applications, from linear programming, to power iteration and linear recurrence relations. Exercises of all levels accompany each section, including many designed to be tackled using computer software. Introduction to Linear and Matrix Algebra is ideal for an introductory proof-based linear algebra course. The engaging color presentation and frequent marginal notes showcase the author's visual approach. Students are assumed to have completed one or two university-level mathematics courses, though calculus is not an explicit requirement. Instructors will appreciate the ample opportunities to choose topics that align with the needs of each classroom, and the online homework sets that are available through WeBWork.

linear algebra books: Linear Algebra and Differential Equations Alexander Givental, 2001 The material presented in this book corresponds to a semester-long course, "Linear Algebra and Differential Equations", taught to sophomore students at UC Berkeley. In contrast with typical undergraduate texts, the book offers a unifying point of view on the subject, namely that linear algebra solves several clearly-posed classification problems about such geometric objects as quadratic forms and linear transformations. This attractive viewpoint on the classical theory agrees well with modern tendencies in advanced mathematics and is shared by many research mathematicians. However, the idea of classification seldom finds its way to basic programs in mathematics, and is usually unfamiliar to undergraduates. To meet the challenge, the book first guides the reader through the entire agenda of linear algebra in the elementary environment of two-dimensional geometry, and prior to spelling out the general idea and employing it in higher dimensions, shows how it works in applications such as linear ODE systems or stability of equilibria. Appropriate as a text for regular junior and honors sophomore level college classes, the book is accessible to high school students familiar with basic calculus, and can also be useful to engineering graduate students.

linear algebra books: Elementary Linear Algebra Stephen Andrilli, David Hecker, 2022-04-05 Elementary Linear Algebra, Sixth Edition provides a solid introduction to both the computational and theoretical aspects of linear algebra, covering many important real-world applications, including graph theory, circuit theory, Markov chains, elementary coding theory, least-squares polynomials and least-squares solutions for inconsistent systems, differential equations, computer graphics and quadratic forms. In addition, many computational techniques in linear algebra are presented, including iterative methods for solving linear systems, LDU Decomposition, the Power Method for finding eigenvalues, QR Decomposition, and Singular Value Decomposition and its usefulness in digital imaging. - Prepares students with a thorough coverage of the fundamentals of introductory linear algebra - Presents each chapter as a coherent, organized theme, with clear explanations for each new concept - Builds a foundation for math majors in the reading and writing of elementary mathematical proofs

linear algebra books: 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.

linear algebra books: Linear Algebra Michael L. O'Leary, 2021-05-04 LINEAR ALGEBRA EXPLORE A COMPREHENSIVE INTRODUCTORY TEXT IN LINEAR ALGEBRA WITH COMPELLING SUPPLEMENTARY MATERIALS, INCLUDING A COMPANION WEBSITE AND SOLUTIONS MANUALS Linear Algebra delivers a fulsome exploration of the central concepts in linear algebra, including multidimensional spaces, linear transformations, matrices, matrix algebra, determinants, vector spaces, subspaces, linear independence, basis, inner products, and eigenvectors. While the text provides challenging problems that engage readers in the mathematical theory of linear algebra, it is written in an accessible and simple-to-grasp fashion appropriate for junior undergraduate students. An emphasis on logic, set theory, and functions exists throughout the book, and these topics are introduced early to provide students with a foundation from which to attack the rest of the material in the text. Linear Algebra includes accompanying material in the form of a companion website that features solutions manuals for students and instructors. Finally, the concluding chapter in the book includes discussions of advanced topics like generalized eigenvectors, Schur's Lemma, Jordan canonical form, and quadratic forms. Readers will also benefit from the inclusion of: A thorough introduction to logic and set theory, as well as descriptions of functions and linear transformations An exploration of Euclidean spaces and linear transformations between Euclidean spaces, including vectors, vector algebra, orthogonality, the standard matrix, Gauss-Jordan elimination, inverses, and determinants Discussions of abstract vector spaces, including subspaces, linear independence, dimension, and change of basis A treatment on defining geometries on vector spaces, including the Gram-Schmidt process Perfect for undergraduate students taking their first course in the subject matter, Linear Algebra will also earn a place in the libraries of researchers in computer science or statistics seeking an accessible and practical foundation in linear algebra.

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linear algebra books: Numerical Linear Algebra Lloyd N. Trefethen, David Bau, III, 1997-01-01 A concise, insightful, and elegant introduction to the field of numerical linear algebra. Designed for use as a stand-alone textbook in a one-semester, graduate-level course in the topic, it has already been class-tested by MIT and Cornell graduate students from all fields of mathematics, engineering, and the physical sciences. The authors' clear, inviting style and evident love of the field, along with their eloquent presentation of the most fundamental ideas in numerical linear algebra, make it popular with teachers and students alike.

linear algebra books: 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.

linear algebra books: *Linear Algebra and Matrix Theory* Robert R. Stoll, 2012-10-17 Advanced undergraduate and first-year graduate students have long regarded this text as one of the best available works on matrix theory in the context of modern algebra. Teachers and students will find it particularly suited to bridging the gap between ordinary undergraduate mathematics and completely abstract mathematics. The first five chapters treat topics important to economics, psychology, statistics, physics, and mathematics. Subjects include equivalence relations for matrixes, postulational approaches to determinants, and bilinear, quadratic, and Hermitian forms in their natural settings. The final chapters apply chiefly to students of engineering, physics, and advanced mathematics. They explore groups and rings, canonical forms for matrixes with respect to similarity via representations of linear transformations, and unitary and Euclidean vector spaces. Numerous examples appear throughout the text.

linear algebra books: *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.

linear algebra books: *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.

linear algebra books: *Linear Algebra for the Young Mathematician* Steven H. Weintraub, 2019-10-29 Linear Algebra for the Young Mathematician is a careful, thorough, and rigorous introduction to linear algebra. It adopts a conceptual point of view, focusing on the notions of vector spaces and linear transformations, and it takes pains to provide proofs that bring out the essential ideas of the subject. It begins at the beginning, assuming no prior knowledge of the subject, but goes quite far, and it includes many topics not usually treated in introductory linear algebra texts, such as Jordan canonical form and the spectral theorem. While it concentrates on the finite-dimensional case, it treats the infinite-dimensional case as well. The book illustrates the centrality of linear

algebra by providing numerous examples of its application within mathematics. It contains a wide variety of both conceptual and computational exercises at all levels, from the relatively straightforward to the quite challenging. Readers of this book will not only come away with the knowledge that the results of linear algebra are true, but also with a deep understanding of why they are true.

linear algebra books: *A Course in Linear Algebra* David B. Damiano, John B. Little, 2011-01-01 Suitable for advanced undergraduates and graduate students, this text introduces basic concepts of linear algebra. Each chapter contains an introduction, definitions, and propositions, in addition to multiple examples, lemmas, theorems, corollaries, and proofs. Each chapter features numerous supplemental exercises, and solutions to selected problems appear at the end. 1988 edition--

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linear algebra books: *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, hierarchical matrices and compressed sensing. The book provides rigorous mathematical proofs throughout, and gives algorithms in general-purpose language-independent form. Requiring only a solid knowledge in linear algebra and basic analysis, this book will be useful for applied mathematicians, engineers, computer scientists, and all those interested in efficiently solving linear problems.

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linear algebra books: *Applied Linear Algebra* Peter J. Olver, Chehrzad Shakiban, 2018-05-30 This textbook develops the essential tools of linear algebra, with the goal of imparting technique alongside contextual understanding. Applications go hand-in-hand with theory, each reinforcing and explaining the other. This approach encourages students to develop not only the technical proficiency needed to go on to further study, but an appreciation for when, why, and how the tools of linear algebra can be used across modern applied mathematics. Providing an extensive treatment of essential topics such as Gaussian elimination, inner products and norms, and eigenvalues and singular values, this text can be used for an in-depth first course, or an application-driven second course in linear algebra. In this second edition, applications have been updated and expanded to include numerical methods, dynamical systems, data analysis, and signal processing, while the pedagogical flow of the core material has been improved. Throughout, the text emphasizes the conceptual connections between each application and the underlying linear algebraic techniques, thereby enabling students not only to learn how to apply the mathematical tools in routine contexts, but also to understand what is required to adapt to unusual or emerging problems. No previous knowledge of linear algebra is needed to approach this text, with single-variable calculus as the only formal prerequisite. However, the reader will need to draw upon some mathematical maturity to engage in the increasing abstraction inherent to the subject. Once equipped with the main tools and concepts from this book, students will be prepared for further study in differential equations, numerical analysis, data science and statistics, and a broad range of applications. The first author's text, *Introduction to Partial Differential Equations*, is an ideal companion volume, forming a natural

extension of the linear mathematical methods developed here.

linear algebra books: 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.

linear algebra books: No Bullshit Guide to Linear Algebra Ivan Savov, 2020-10-25 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.

linear algebra books: Matrices and Linear Algebra Hans Schneider, George Phillip Barker, 1989-01-01 Linear algebra is one of the central disciplines in mathematics. A student of pure mathematics must know linear algebra if he is to continue with modern algebra or functional analysis. Much of the mathematics now taught to engineers and physicists requires it. This well-known and highly regarded text makes the subject accessible to undergraduates with little mathematical experience. Written mainly for students in physics, engineering, economics, and other fields outside mathematics, the book gives the theory of matrices and applications to systems of linear equations, as well as many related topics such as determinants, eigenvalues, and differential equations. Table of Contents: 1. The Algebra of Matrices 2. Linear Equations 3. Vector Spaces 4. Determinants 5. Linear Transformations 6. Eigenvalues and Eigenvectors 7. Inner Product Spaces 8. Applications to Differential Equations For the second edition, the authors added several exercises in each chapter and a brand new section in Chapter 7. The exercises, which are both true-false and multiple-choice, will enable the student to test his grasp of the definitions and theorems in the chapter. The new section in Chapter 7 illustrates the geometric content of Sylvester's Theorem by means of conic sections and quadric surfaces. 6 line drawings. Index. Two prefaces. Answer section.

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operations How linear algebra ties together vectors, matrices, determinants, and linear transformations Ten common mathematical representations of Greek letters Real-world applications of matrices and determinants

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