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Eminently readable and completely elementary, this treatment begins with linear spaces and ends with analytic geometry. Additional topics include multilinear forms, tensors, linear transformation, eigenvectors and eigenvalues, matrix polynomials, and more. More than 250 carefully chosen problems appear throughout the book, most with hints and answers. 1972 edition. 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. "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. Rigorous, self-contained coverage of determinants, vectors, matrices and linear equations, quadratic forms, more. Elementary, easily readable account with numerous examples and problems at the end of each chapter. 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. To learn and understand mathematics, students must engage in the process of doing mathematics. Emphasizing active learning, Abstract Algebra: An Inquiry-Based Approach not only teaches abstract algebra but also provides a deeper understanding of what mathematics is, how it is done, and how mathematicians think. The book can be used in both rings-first and groups-first abstract algebra courses. Numerous activities, examples, and exercises illustrate the definitions, theorems, and concepts. Through this engaging learning process, students discover new ideas and develop the necessary communication skills and rigor to understand and apply concepts from abstract algebra. In addition to the activities and exercises, each chapter includes a short discussion of the connections among topics in ring theory and group theory. These discussions help students see the relationships between the two main types of algebraic objects studied throughout the text. Encouraging students to do mathematics and be more than passive learners, this text shows students that the way mathematics is developed is often different than how it is presented; that definitions, theorems, and proofs do not simply appear fully formed in the minds of mathematicians; that mathematical ideas are highly interconnected; and that even in a field like abstract algebra, there is a considerable amount of intuition to be found. Building on the author's previous edition on the subject (Introduction to Linear Algebra, Jones & Bartlett, 1996), this book offers a refreshingly concise text suitable for a standard course in linear algebra, presenting a carefully selected array of essential topics that can be thoroughly covered in a single semester. Although the exposition generally falls in line with the material recommended by the Linear Algebra Curriculum Study Group, it notably deviates in providing an early emphasis on the geometric foundations of linear algebra. This gives students a more intuitive understanding of the subject and enables an

easier grasp of more abstract concepts covered later in the course. The focus throughout is rooted in the mathematical fundamentals, but the text also investigates a number of interesting applications, including a section on computer graphics, a chapter on numerical methods, and many exercises and examples using MATLAB. Meanwhile, many visuals and problems (a complete solutions manual is available to instructors) are included to enhance and reinforce understanding throughout the book. Brief yet precise and rigorous, this work is an ideal choice for a one-semester course in linear algebra targeted primarily at math or physics majors. It is a valuable tool for any professor who teaches the subject. "Linear Algebra" is intended for a one-term course at the junior or senior level. It begins with an exposition of the basic theory of vector spaces and proceeds to explain the fundamental structure theorem for linear maps, including eigenvectors and eigenvalues, quadratic and hermitian forms, diagonalization of symmetric, hermitian, and unitary linear maps and matrices, triangulation, and Jordan canonical form. The book also includes a useful chapter on convex sets and the finite-dimensional Krein-Milman theorem. The presentation is aimed at the student who has already had some exposure to the elementary theory of matrices, determinants and linear maps. However the book is logically self-contained. In this new edition, many parts of the book have been rewritten and reorganized, and new exercises have been added. A groundbreaking introduction to vectors, matrices, and least squares for engineering applications, offering a wealth of practical examples. Excellent introductory text focuses on complex numbers, determinants, orthonormal bases, symmetric and hermitian matrices, first order non-linear equations, linear differential equations, Laplace transforms, Bessel functions, more. Includes 48 black-and-white illustrations. Exercises with solutions. Index. 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. Learn to: Solve linear algebra equations in several ways Put data in order with matrices Determine values with determinants Work with eigenvalues and eigenvectors Your hands-on guide to real-world applications of linear algebra Does linear algebra leave you feeling lost? No worries —this easy-to-follow guide explains the how and the why of solving linear algebra problems in plain English. From matrices to vector spaces to linear transformations, you'll understand the key concepts and see how they relate to everything from genetics to nutrition to spotted owl extinction. Line up the basics — discover several different approaches to organizing numbers and equations, and solve systems of equations algebraically or with matrices Relate vectors and linear transformations — link vectors and matrices with linear combinations and seek solutions of homogeneous systems Evaluate determinants — see how to perform the determinant function on different sizes of matrices and take advantage of Cramer's rule Hone your skills with vector spaces — determine the properties of vector spaces and their subspaces and see linear transformation in action Tackle eigenvalues and eigenvectors — define and solve for eigenvalues and eigenvectors and understand how they interact with specific matrices Open the book and find: Theoretical and practical ways of solving linear algebra problems

Definitions of terms throughout and in the glossary New ways of looking at 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 This book is a linear algebra textbook for high school students. This book contains only the minimum necessary and essential concepts. It will be the best book for those who are learning linear algebra for the first time. It consists of 10 chapters and the table of contents is as follows. 1. Introduction to Systems of Linear Equations 2. Row Operation 3. Matrix 4. Independence 5. Inverse Matrix 6. Solution of Linear System 7. LU-Decomposition 8. Determinants 9. Eigenvalues 10. Diagonalization 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. This self-contained, clearly written textbook on linear algebra is easily accessible for students. It begins with the simple linear equation and generalizes several notions from this equation for the system of linear equations and introduces the main ideas using matrices. It then offers a detailed chapter on determinants and introduces the main ideas with detailed proofs. The third chapter introduces the Euclidean spaces using very simple geometric ideas and discusses various major inequalities and identities. These ideas offer a solid basis for understanding general Hilbert spaces in functional analysis. The following two chapters address general vector spaces, including some rigorous proofs to all the main results, and linear transformation: areas that are ignored or are poorly explained in many textbooks. Chapter 6 introduces the idea of matrices using linear transformation, which is easier to understand than the usual theory of matrices approach. The final two chapters are more advanced, introducing the necessary concepts of eigenvalues and eigenvectors, as well as the theory of symmetric and orthogonal matrices. Each idea presented is followed by examples. The book includes a set of exercises at the end of each chapter, which have been carefully chosen to illustrate the main ideas. Some of them were taken (with some modifications) from recently published papers, and appear in a textbook for the first time. Detailed solutions are provided for every exercise, and these refer to the main theorems in the text when necessary, so students can see the tools used in the solution. *Concise Introduction to Linear Algebra* deals with the subject of linear algebra, covering vectors and linear systems, vector spaces, orthogonality, determinants, eigenvalues and eigenvectors, singular value decomposition. It adopts an efficient approach to lead students from vectors, matrices quickly into more advanced topics including, LU decomposition, orthogonal decomposition, Least squares solutions, Gram-Schmidt process, eigenvalues and eigenvectors, diagonalizability, spectral decomposition, positive definite matrix, quadratic forms, singular value decompositions and principal component analysis. This book is designed for onesemester teaching to undergraduate students. Reiji wants two things in life: a black belt in karate and Misa, the girl of his dreams. Luckily, Misa's big brother is the captain of the university karate club and is ready to strike a deal: Reiji can join the club if he tutors Misa in linear algebra. Follow along in *The Manga Guide to Linear Algebra* as Reiji takes Misa from the absolute basics of this tricky subject through mind-bending operations like performing linear transformations, calculating determinants, and finding eigenvectors and eigenvalues. With memorable examples like miniature golf games and karate tournaments, Reiji transforms abstract concepts into something concrete, understandable, and even fun. As you follow Misa through her linear algebra crash course, you'll learn about: -Basic vector and matrix operations such as addition, subtraction, and multiplication -Linear dependence, independence, and bases -Using Gaussian elimination to calculate inverse matrices -Subspaces, dimension, and linear span -Practical applications of linear algebra in fields like computer graphics, cryptography, and engineering But Misa's brother may get more than he bargained for as sparks start to fly between student and tutor. Will Reiji end up with the girl—or just a pummeling from her oversized brother? Real math, real romance, and real action come together like never before in *The Manga Guide to Linear Algebra*. *Linear Algebra: A First Course with Applications*

explores the fundamental ideas of linear algebra, including vector spaces, subspaces, basis, span, linear independence, linear transformation, eigenvalues, and eigenvectors, as well as a variety of applications, from inventories to graphics to Google's PageRank. Unlike other texts on the subject, this classroom-tested book gives students enough time to absorb the material by focusing on vector spaces early on and using computational sections as numerical interludes. It offers introductions to Maple™, MATLAB®, and TI-83 Plus for calculating matrix inverses, determinants, eigenvalues, and eigenvectors. Moving from the specific to the general, the author raises questions, provides motivation, and discusses strategy before presenting answers. Discussions of motivation and strategy include content and context to help students learn. Introduction to Linear Algebra in Geology introduces linear algebra to students of geology and explores the possibilities of using the techniques as an aid to solving geological problems which can be solved numerically. A basic knowledge of geology is assumed. Rigorous yet engaging, Linear Algebra offers a unified treatment of both matrix-oriented and theoretical approaches to the course. This book is intended for a first linear algebra course. The text includes all essential topics in a concise manner and can therefore be fully covered in a one term course. After this course, the student is fully equipped to specialize further in their direction(s) of choice (advanced pure linear algebra, numerical linear algebra, optimization, multivariate statistics, or one of the many other areas of linear algebra applications). Linear Algebra is an exciting area of mathematics that is gaining more and more importance as the world is becoming increasingly digital. It has the following very appealing features: It is a solid axiomatic based mathematical theory that is accessible to a large variety of students. It has a multitude of applications from many different fields, ranging from traditional science and engineering applications to more 'daily life' applications (internet searches, guessing consumer preferences, etc.). It easily allows for numerical experimentation through the use of a variety of readily available software (both commercial and open source). This book incorporates all these aspects throughout the whole text with the intended effect that each student can find their own niche in the field. Several suggestions of different software are made. While MATLAB is certainly still a favorite choice, open source programs such as Sage (especially among algebraists) and the Python libraries are increasingly popular. This text guides the student through different programs by providing specific commands. Linear Algebra: An Inquiry-based Approach is written to give instructors a tool to teach students to develop a mathematical concept from first principles. The Inquiry-based Approach is central to this development. The text is organized around and offers the standard topics expected in a first undergraduate course in linear algebra. In our approach, students begin with a problem and develop the mathematics necessary to describe, solve, and generalize it. Thus students learn a vital skill for the 21st century: the ability to create a solution to a problem. This text is offered to foster an environment that supports the creative process. The twin goals of this textbook are: Providing opportunities to be creative, Teaching "ways of thinking" that will make it easier for to be creative. To motivate the development of the concepts and techniques of linear algebra, we include more than two hundred Activities on a wide range of problems, from purely mathematical questions, through applications in biology, computer science, cryptography, and more. Table of Contents Introduction and Features For the Student . . . and Teacher Prerequisites Suggested Sequences 1. Tuples and Vectors 2. Systems of Linear Equations 3. Transformations 4. Matrix Algebra 5. Vector Spaces 6. Determinants 7. Eigenvalues and Eigenvectors 8. Decomposition 9. Extras Bibliography Index Bibliography Jeff Suzuki is Associate Professor of Mathematics at Brooklyn College and holds a Ph.D. from Boston University. His research interests include mathematics education, history of mathematics, and the application of mathematics to society and technology. He is a two-time winner of the prestigious Carl B. Allendoerfer Award for expository writing. His publications have appeared in The College Mathematics Journals; Mathematics Magazine; Mathematics Teacher; and the American Mathematical Society's blog on teaching and learning mathematics. His YouTube channel (<http://youtube.com/jeffsuzuki1>) includes videos on mathematical subjects ranging from elementary arithmetic to linear algebra, cryptography, and differential equations. Emphasis is placed on applications in preference to more theoretical aspects throughout this readable introduction to linear algebra for specialists as well as non-specialists. An expanded version of A First Course in Linear Algebra. "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. Advanced Linear Algebra features a student-friendly approach to the theory of linear algebra. The author's emphasis on vector spaces over general fields, with corresponding current applications, sets the book apart. He focuses on finite fields and complex numbers, and discusses matrix algebra over these fields. The text then proceeds to cover vector spaces in depth. Also discussed are standard topics in linear algebra including linear transformations, Jordan canonical form, inner product spaces, spectral theory, and, as supplementary topics, dual spaces, quotient spaces, and tensor products. Written in clear and concise language, the text sticks to the development of linear algebra without excessively addressing applications. A unique chapter on "How to Use Linear Algebra" is offered after the theory is presented. In addition, students are given pointers on how to start a research project. The proofs are clear and complete and the exercises are well designed. In addition, full solutions are included for almost all exercises. Evolving from an elementary discussion, this book develops the Euclidean algorithm to a very powerful tool to deal with general continued fractions, non-normal Padé tables, look-ahead algorithms for Hankel and Toeplitz matrices, and for Krylov subspace methods. It introduces the basics of fast algorithms for structured problems and shows how they deal with singular situations. Links are made with more applied subjects such as linear system theory and signal processing, and with more advanced topics and recent results such as general bi-orthogonal polynomials, minimal Padé approximation, polynomial root location problems in the complex plane, very general rational interpolation problems, and the lifting scheme for wavelet transform computation. The text serves as a supplement to existing books on structured linear algebra problems, rational approximation and orthogonal polynomials. Features of this book: • provides a unifying approach to linear algebra, rational approximation and orthogonal polynomials • requires an elementary knowledge of calculus and linear algebra yet introduces advanced topics. The book will be of interest to applied mathematicians and engineers and to students and researchers. This volume presents a thorough discussion of systems of linear equations and their solutions. Vectors and matrices are introduced as required and an account of determinants is given. Great emphasis has been placed on keeping the presentation as simple as possible, with many illustrative examples. While all mathematical assertions are proved, the student is led to view the mathematical content intuitively, as an aid to understanding. The text treats the coordinate geometry of lines, planes and quadrics, provides a natural application for linear algebra and at the same time furnished a geometrical interpretation to illustrate the algebraic concepts. NOTE: This edition features the same content as the traditional text in a convenient, three-hole-punched, loose-leaf version. Books a la Carte also offer a great value--this format costs significantly less than a new textbook. Before purchasing, check with your instructor or review your course syllabus to ensure that you select the correct ISBN. Several versions of Pearson's MyLab & Mastering products exist for each title, including customized versions for individual schools, and registrations are not transferable. In addition, you may need a CourseID, provided by your instructor, to register for and use Pearson's MyLab & Mastering products. xxxxxxxxxxxxxxxx For courses in linear algebra. This package includes MyMathLab(R). With traditional linear algebra texts, the course is relatively easy for students during the early stages as material is presented in a familiar, concrete setting. However, when abstract concepts are introduced, students often hit a wall. Instructors seem to agree that certain concepts (such as linear independence, spanning, subspace, vector space, and linear transformations) are not easily understood and require time to assimilate. These concepts are fundamental to the study of linear algebra, so students' understanding of them is vital to mastering the subject. This text makes these concepts more accessible by introducing them early in a familiar, concrete "Rn" setting, developing them gradually, and returning to them throughout

the text so that when they are discussed in the abstract, students are readily able to understand. Personalize learning with MyMathLabMyMathLab is an online homework, tutorial, and assessment program designed to work with this text to engage students and improve results. MyMathLab includes assignable algorithmic exercises, the complete eBook, interactive figures, tools to personalize learning, and more. 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 and Matrix Analysis for Statistics offers a gradual exposition to linear algebra without sacrificing the rigor of the subject. It presents both the vector space approach and the canonical forms in matrix theory. The book is as self-contained as possible, assuming no prior knowledge of linear algebra. The authors first address the rudimentary mechanics of linear systems using Gaussian elimination and the resulting decompositions. They introduce Euclidean vector spaces using less abstract concepts and make connections to systems of linear equations wherever possible. After illustrating the importance of the rank of a matrix, they discuss complementary subspaces, oblique projectors, orthogonality, orthogonal projections and projectors, and orthogonal reduction. The text then shows how the theoretical concepts developed are handy in analyzing solutions for linear systems. The authors also explain how determinants are useful for characterizing and deriving properties concerning matrices and linear systems. They then cover eigenvalues, eigenvectors, singular value decomposition, Jordan decomposition (including a proof), quadratic forms, and Kronecker and Hadamard products. The book concludes with accessible treatments of advanced topics, such as linear iterative systems, convergence of matrices, more general vector spaces, linear transformations, and Hilbert spaces. 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. 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. This is the first book on linear algebra written specifically for social scientists. It deals only with those aspects of the subject applicable in the social sciences and provides a thorough understanding of linear algebra for those who wish to use it as a tool in the design, execution, and interpretation of research. Linear mathematical models play an important role in all of the social sciences. This book provides a step-by-step introduction to those parts of linear algebra which are useful in such model building. It illustrates some of

the applications of linear analysis and helps the reader learn how to convert his formulation of a social science problem into algebraic terms. The author covers matrix algebra, computational methods, linear models involving discrete variables, and clear, complete explanations of necessary mathematical concepts. Prior knowledge of calculus is not required since no use is made of calculus or of complex numbers. A novel feature of the mathematical content of the book is the treatment of models expressed in terms of variables which must be whole numbers (integers). The book is distinguished by a step-by-step exposition that allows the reader to grasp quickly and fully the principles of linear algebra. All of the examples used to illustrate the text are drawn from the social sciences, enabling the reader to relate the subject to concrete problems in his field. Exercises are included as a necessary part of the text to develop points not covered in the text and to provide practice in the algebraic formulation of applied problems. An appendix gives solutions (or hints) for selected exercises. This self-contained textbook takes a matrix-oriented approach to linear algebra and presents a complete theory, including all details and proofs, culminating in the Jordan canonical form and its proof. Throughout the development, the applicability of the results is highlighted. Additionally, the book presents special topics from applied linear algebra including matrix functions, the singular value decomposition, the Kronecker product and linear matrix equations. The matrix-oriented approach to linear algebra leads to a better intuition and a deeper understanding of the abstract concepts, and therefore simplifies their use in real world applications. Some of these applications are presented in detailed examples. In several 'MATLAB-Minutes' students can comprehend the concepts and results using computational experiments. Necessary basics for the use of MATLAB are presented in a short introduction. Students can also actively work with the material and practice their mathematical skills in more than 300 exercises. Elementary Linear Algebra develops and explains in careful detail the computational techniques and fundamental theoretical results central to a first course in linear algebra. This highly acclaimed text focuses on developing the abstract thinking essential for further mathematical study. The authors give early, intensive attention to the skills necessary to make students comfortable with mathematical proofs. The text builds a gradual and smooth transition from computational results to general theory of abstract vector spaces. It also provides flexible coverage of practical applications, exploring a comprehensive range of topics. Ancillary list: * Maple Algorithmic testing- Maple TA-www.maplesoft.com Includes a wide variety of applications, technology tips and exercises, organized in chart format for easy reference More than 310 numbered examples in the text at least one for each new concept or application Exercise sets ordered by increasing difficulty, many with multiple parts for a total of more than 2135 questions Provides an early introduction to eigenvalues/eigenvectors A Student solutions manual, containing fully worked out solutions and instructors manual available This is the second edition of the best-selling introduction to linear algebra. Presupposing no knowledge beyond calculus, it provides a thorough treatment of all the basic concepts, such as vector space, linear transformation and inner product. The concept of a quotient space is introduced and related to solutions of linear system of equations, and a simplified treatment of Jordan normal form is given. Numerous applications of linear algebra are described, including systems of linear recurrence relations, systems of linear differential equations, Markov processes, and the Method of Least Squares. An entirely new chapter on linear programming introduces the reader to the simplex algorithm with emphasis on understanding the theory behind it. The book is addressed to students who wish to learn linear algebra, as well as to professionals who need to use the methods of the subject in their own fields. * Proposes a radically new and thoroughly algorithmic approach to linear algebra * Each proof is an algorithm described in English that can be translated into the computer language the class is using and put to work solving problems and generating new examples * Designed for a one-semester course, this text gives the student many examples to work through and copious exercises to test their skills and extend their knowledge of the subject 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. 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.

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