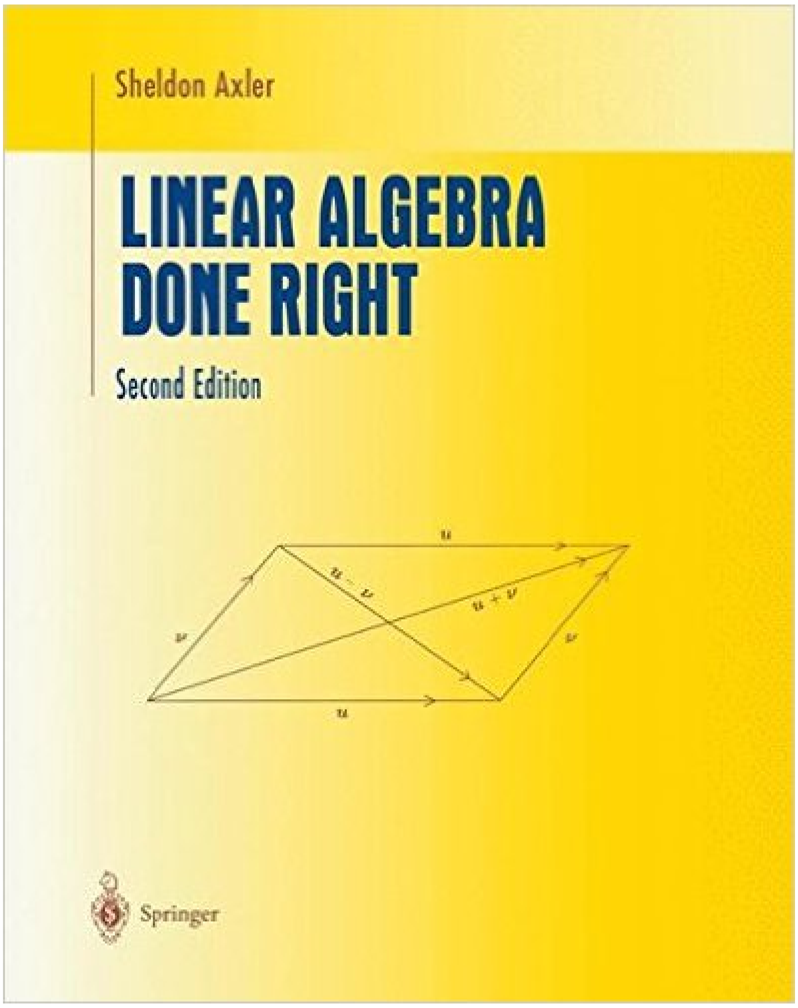
Linear Algebra Done Right (Undergraduate Texts In Mathematics)



Synopsis

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.

Book Information

Series: Undergraduate Texts in Mathematics

Paperback: 251 pages

Publisher: Springer; 2nd edition (June 2, 2010)

Language: English

ISBN-10: 0387982582

ISBN-13: 978-0387982588

Product Dimensions: 7.5 x 0.6 x 9.2 inches

Shipping Weight: 1.2 pounds

Average Customer Review: 4.0 out of 5 starsÂ Â See all reviewsÂ (101 customer reviews)

Best Sellers Rank: #253,595 in Books (See Top 100 in Books)   #97 inÂ Books > Science & Math > Mathematics > Pure Mathematics > Algebra > Linear   #630 inÂ Books > Textbooks > Science & Mathematics > Mathematics > Algebra & Trigonometry

Customer Reviews

I have used this text for a beginning graduate course in linear algebra, mostly because I prefer its treatment of eigenvalues and eigenvectors over Hoffman and Kunze, and it sticks to the basics: complex scalars. It also has a good treatment of inner product spaces. The basic concepts and theorems are indeed presented cleanly and elegantly. Its use of linearly independent sequences (rather than sets) is a little nonstandard (what if the set of vectors is infinite?) but the adjustment is minor. Two things though I found treated in a less than desirable fashion: He pretends that we don't know about matrices, doesn't want to develop the machinery, and the treatment of coordinate vectors and matrix representations suffers. Students also get no sense of how to compute the solution of concrete vector space problems, which is easily done once the theory is established, and which is an essential skill to have after a second course in linear algebra. I have to give them supplementary notes. Second, the treatment of determinants suffers, apparently for ideological/political reasons. I think students deserve a straightforward development of determinants simply because that theory is widely used in applications, in engineering, and in discrete mathematics, and it has its own beauty. It is not hard to do, and I do it myself from notes, adapted from the treatment of Hoffman and Kunze. Now that undergraduate linear algebra courses have in many places dropped any substantial theorem-proving component, students need a serious course in linear algebra which can take them, e.g. all the way into Jordan form. There are not many good books for this, and this text does a good job with the basics without overkill on the abstraction, so I use it despite the drawbacks mentioned above.

I was very much the typical person in the target audience of this. I was a computer science major and I had a semester of linear algebra where all I learned how to solve Ax = b. Then, I happened to pick up Axler one winter evening because the title looked intriguiging. That day changed my life.Now, I'm a pure math major and Axler is the reason. The exposition is clean and very elegant. By minimizing the use of matrices in his proofs, he presents the subject of linear algebra as an elegant piece of mathematics rather than a subject "spoilt" by applications. He starts with a study of vector spaces and then moves onto transformations, eigenvalues, inner product spaces, etc. all the way upto the jordan form. All along, the use of matrices in minimal. In fact, he introduces them quite late in the book just as a convenient notation and nothing else. This is an admirable aspect because it simplies a lot of the proofs. The proof that every linear operator over a finite-dimensional vector space has an eigenvalue is breathtakingly short and simple. He uses determinants in the last chapter of the book and there too, does an excellent job. (although the point of writing this book was NOT to use determinants, his exposition about determinants is itself one of the best ones I've seen).Get this book if you wish to understand the theory. It's a typical higher level math text - definition, theorem, proof, exercises (most of which are theorems). If you like math, you won't regret this.

I have no doubt that this is one of the most thought provoking math books that I have come across. I used this book for a linear algebra course last fall '07 and I learned a ton. Specifically about the structure of vector spaces and linear operators. However, the most important function that this book serves is to move students towards the methodology of mathematics, which means proof construction and counter examples. It also trains students to let go of their intuitions. But you can not self-study this book, there are no answers and more importantly the structure of the course begs for instruction. I would recommend before taking this course doing what i didn't do and have had to do since, make sure you have your first course of linear algebra solidly under your belt, and that doesn't mean having gotten an A in the prior class is sufficient. Go through the most difficult proof driven exercises in your first text, that should serve as practice for easiest homework problems in this book.All that said, there are serious limitations to this book. It would be nice if the author worked out 1 comprehensive semi-difficult exercise in each chapter of the text. While struggling to solve the problems can be enlightening, there is only so many times I can read the same sections over and over again, looking for some insight from the kiddie exercises provided by the author. It would also help if some of the kiddie exercises were accompanied with graphs, especially when describing the sums of vector spaces. Sometimes a picture is worth a thousand words - sometimes!

I've seen many linear algebra books and this is by far the best treatment of them all. After going through this book one wonder why most linear algebra presentations don't follow Axler's sound and more reasonable approach. It leaves Hoffman & Kunze in the dust (although you may still want to hang on to Hoffman since it contains some material not found in Axler).Not only is Axler's approach sound, but his writing is very lucid and clear as well. You will never leave a proof feeling unsatisfied or confused; it almost reads like a book. I wish all math books were written this way.My only gripe with the book is the lack of solutions to the problems. Those who use the book for self-study will feel particular frustrated in this regard. I hope some effort is taken to assuage this problem in future editions. Also, more material on linear functionals and multilinear mappings (tensors) would be nice.In summary, this is an outstanding book; I highly recommend it.

Linear Algebra Done Right (Undergraduate Texts in Mathematics) Applied Linear Algebra and Matrix Analysis (Undergraduate Texts in Mathematics) Linear Algebra and Its Applications plus New MyMathLab with Pearson eText -- Access Card Package (5th Edition) (Featured Titles for Linear Algebra (Introductory)) Linear Algebra with Applications (9th Edition) (Featured Titles for Linear Algebra (Introductory)) Linear Optimization: The Simplex Workbook (Undergraduate Texts in Mathematics) Linear Algebra With Applications (Jones and Bartlett Publishers Series in

Mathematics. Linear) Ideals, Varieties, and Algorithms: An Introduction to Computational Algebraic Geometry and Commutative Algebra (Undergraduate Texts in Mathematics) Elements of Algebra: Geometry, Numbers, Equations (Undergraduate Texts in Mathematics) Discrete Mathematics: Elementary and Beyond (Undergraduate Texts in Mathematics) Mathematics and Its History (Undergraduate Texts in Mathematics) Summary - Getting Things Done: David Allen's Book-- A Full Summary!(Version 2015) -- The Art of Stress Free Productivity! (Getting Things Done: A Full ... Book, Planner, Paperback, Audio, Summary) The Pleasures of Probability (Undergraduate Texts in Mathematics) Calculus with Vectors (Springer Undergraduate Texts in Mathematics and Technology) Conics and Cubics: A Concrete Introduction to Algebraic Curves (Undergraduate Texts in Mathematics) Elementary Number Theory: Primes, Congruences, and Secrets: A Computational Approach (Undergraduate Texts in Mathematics) Rational Points on Elliptic Curves (Undergraduate Texts in Mathematics) Elementary Topics in Differential Geometry (Undergraduate Texts in Mathematics) The Foundations of Geometry and the Non-Euclidean Plane (Undergraduate Texts in Mathematics) Topology (Undergraduate Texts in Mathematics) Basic Concepts of Algebraic Topology (Undergraduate Texts in Mathematics)