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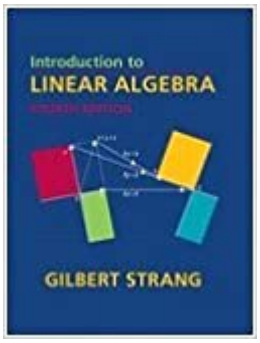
Introduction To Linear Algebra, Fourth Edition



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Synopsis

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. Chapter 1: Introduction to Vectors; Chapter 2: Solving Linear Equations; Chapter 3: Vector Spaces and Subspaces; Chapter 4: Orthogonality; Chapter 5: Determinants; Chapter 6: Eigenvalues and Eigenvectors; Chapter 7: Linear Transformations; Chapter 8: Applications; Chapter 9: Numerical Linear Algebra; Chapter 10: Complex Vectors and Matrices; Solutions to Selected Exercises; Final Exam. Matrix Factorizations. Conceptual Questions for Review. Glossary: A Dictionary for Linear Algebra Index Teaching Codes Linear Algebra in a Nutshell.

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Customer Reviews

A leading textbook for first courses in linear algebra. Instead of teaching students by repetitive drill, Gilbert Strang encourages students to real mathematical thinking; an approach that has been successful over many years at MIT. The book is supported by online lectures and learning material

via http://web.mit.edu/18.06/www/.

Gilbert Strang is a Professor of Mathematics at Massachusetts Institute of Technology and an Honorary Fellow of Balliol College, of the University of Oxford, UK. His current research interests include linear algebra, wavelets and filter banks, applied mathematics, and engineering mathematics. He is the author or co-author of six textbooks and has published a monograph with George Fix titled “An Analysis of the Finite Element Method.” Professor Strang served as SIAM’s president from 1999-2000, chaired the U.S. National Committee on Mathematics from 2003–2004, and won the Neumann Medal of the US Association of Computational Mechanics in 2005. He is a fellow of the American Academy of Arts and Sciences.

I wanted a re-introduction to Linear Algebra after taking a course in "Elementary Linear Algebra with Differential Equations" as an engineer back in college. As a note I have only worked through chapters 1-6, and looked over other portions of the text. But, I found it very refreshing how the author managed to connect the concepts from the very basics of vectors.The masterful thing about this book is that by adding just a little bit each chapter and connecting it back to the Four Fundamental Subspaces, orthogonality, basis, and linear independence, every new idea is very easy to grasp. The problems range from easy to medium difficulty (though these usually depend on tricks which you may/may not easily get) and help in building your abstraction muscle and thankfully shy away from the tedious computational realm most of the time. I find the way I look at matrices and systems of equations have been forever molded by this book. Perhaps most importantly, and the reason I believe this book is stellar, is that I believe this book is ideal for self-study. I did not even use his online video lectures, I simply did the examples along with him in the book and did all of the problems with solutions in the back. I say this not as a math genius, but as someone with an interest in learning some math a couple of hours per week. This book has given me the confidence to pursue a more abstract treatment of the subject, as well as a numerical linear algebra text which fleshes out the complexity of matrix decompositions and such.

This book is a great accompaniment to the free video lectures available from MIT, Linear Algebra Spring 2005. I would say that a reader should have at least completed Pre-Calculus to do well in this course. Any introductory experience in discrete math, differential equations, or 3D graphing will be helpful but not required. I was able to easily complete randomly selected homework problems after watching the video lectures, as the lecturer (Dr. Strang) is also the author of this book.

Remember, Linear Algebra is much different from your standard Algebra class - you'll need to stretch your brain to consider higher dimensions, matrix operations, etc.

Gilbert Strang is an exceptional teacher, from that very thin group of educators that not only tell you both the WHY and the HOW but also show you how beautiful it all is.Don't miss the pleasure that arises from coupling the book to the MIT OCW videos !This type of experience has been tried on french TV 15 years ago and failed abysmally : the so-called teacher --although from the world-famous math institution, NormaleSup -- seemed to come from outer space, using an alien peer-to-alien peer jargon...That's why such a successful effort from Gil Strang should be encouraged and developed, e.g. from what I read, there's a demand for an OCW based on Apostol's superb trilogy of Analysis (Calculus 1, 2 and Math Analysis) (see my review).

I have read two other linear algebra texts, and this is by far the most intutitive. I was even able to get in contact with the author and ask a few questions here and there. Highly recommended for anyone intersted in self studying linear algebra.

This book is very good for studying linear algebra for the first time (especially self-study). It goes well together with Prof. Strang MIT OCW. The book explanation focuses more on intuition and concept. It does not favour readers who prefer rigorous math. However exercises/problems will require solid understanding and rigorous math to solve; they will leave "knowledge mark" in ones' mind if they invest enough effort/time.

My bookshelves are lined with materials that support my work in data science and machine learning. I have a large section of mathematics books including several on the subject of linear algebra. For many years my Ã¢Â Âœgo toÃ¢Â Â• text on linear algebra was an old 2nd edition of MIT Professor Gilbert StrangÃ¢Â Â™s seminal book on the subject that I picked up at a swap meet. To my surprise, the good professor recently sent me a copy of his latest and greatest 5th edition of Ã¢Â ÂœIntroduction to Linear AlgebraÃ¢Â Â• (Wellesley-Cambridge Press).I found the new edition to be even better than previous editions. For one it is now 574 pages versus my old copyÃ¢Â Â™s 374. I also found the book to be impressively re-tooled for educational purposes. The chapters contain useful Ã¢Â ÂœReview of the Key IdeasÃ¢Â Â• sections, worked examples, and well thought out problem sets (with special Ã¢Â ÂœChallenge ProblemsÃ¢Â Â• for those who want to dive deeper). Gilbert StrangÃ¢Â Â™s textbooks have changed the entire approach to learning linear

algebra Ã¢Â Â“ away from abstract vector spaces to specific examples of the four fundamental subspaces: the column space and nullspace of A and AÃ¢Â Â™.The chapters directly apply to the needs of data scientists wishing to establish a firm foundation for how machine learning happens behind the scenes. All chapters are superbly crafted, but my favorites are: Chapter 7 because SVD plays an important role in Principal Component Analysis for dimensionality reduction as well as PCA regression; Chapter 10 as it enhances the math subject matter with practical applications; Chapter 11 which is a nice adjunct to the pure math content and reminds me of portions of the old Ã¢Â ÂœNumerical MethodsÃ¢Â Â• (Prentice-Hall) text by G. Dahlquist et al that I used in my early days of data science; and Chapter 12 which is perfect for data scientists who want to see the relationship with statistics and probability.StrangÃ¢Â Â™s new edition is a great launching point for newbies as well as practicing data scientists to gain a foothold in the theory behind the technology. If you feel a bit insecure with your mathematical prowess when reading the statistical leaning bible Ã¢Â ÂœElements of Statistical LearningÃ¢Â Â• by Hastie, Tibshirani and Friedman (a group of high-profile Stanford researchers), then StrangÃ¢Â Â™s book is the best way to lay a firm foundation.Gilbert Strang is a Professor of Mathematics at Massachusetts Institute of Technology and an Honorary Fellow of Balliol College, of the University of Oxford. His current research interests include linear algebra, wavelets and filter banks, applied mathematics, and engineering mathematics. He is the author or co-author of eight textbooks. He is a Fellow of the American Academy of Arts and Sciences and a member of the National Academy of Sciences.The book also comes with an excellent web resource which includes downloadable sections (PDFs) of many chapters, a complete chapter-by-chapter solutions manual for the problem sets, and practice exam questions. The book is used as the textbook for MITÃ¢Â Â™s undergrad linear algebra course 18.06. It is also the book used in MITÃ¢Â Â™s Open Courseware class on the subject, complete with video lectures. This means you can take a full-fledged MIT course to help you become well-versed with this important subject matter. I highly recommend this book for any up-and-coming data scientist.I do have a big complaint with this new book! ItÃ¢Â Â™s going to sap a lot of time from my busy schedule because with such a great learning resource in my hands, I know myself, IÃ¢Â Â™m going to spend time Ã¢Â Âœre-learningÃ¢Â Â• the subject for the nth time, doing the problem sets, and thinking hard about how important math is to a firm understanding of machine learning. I donÃ¢Â Â™t have time for this!

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