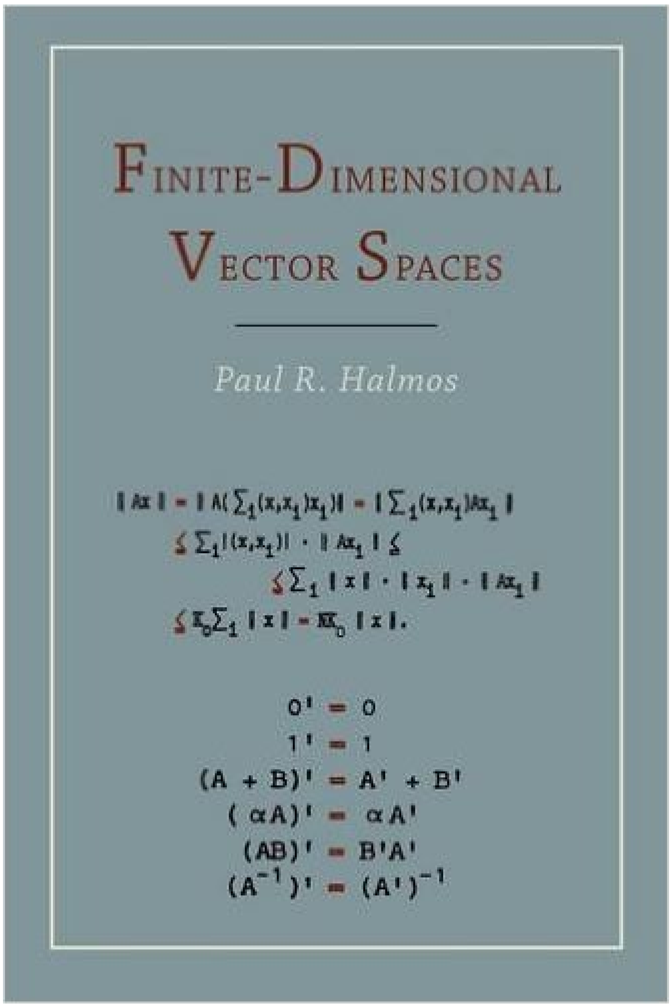
Finite Dimensional Vector Spaces



Synopsis

2012 Reprint of 1942 Edition. Exact facsimile of the original edition, not reproduced with Optical Recognition Software. As a newly minted Ph.D., Paul Halmos came to the Institute for Advanced Study in 1938--even though he did not have a fellowship--to study among the many giants of mathematics who had recently joined the faculty. He eventually became John von Neumann’s research assistant, and it was one of von Neumann’s inspiring lectures that spurred Halmos to write "Finite Dimensional Vector Spaces." The book brought him instant fame as an expositor of mathematics. Finite Dimensional Vector Spaces combines algebra and geometry to discuss the three-dimensional area where vectors can be plotted. The book broke ground as the first formal introduction to linear algebra, a branch of modern mathematics that studies vectors and vector spaces. The book continues to exert its influence sixty years after publication, as linear algebra is now widely used, not only in mathematics but also in the natural and social sciences, for studying such subjects as weather problems, traffic flow, electronic circuits, and population genetics. In 1983 Halmos received the coveted Steele Prize for exposition from the American Mathematical Society for "his many graduate texts in mathematics dealing with finite dimensional vector spaces, measure theory, ergodic theory, and Hilbert space."

Book Information

Paperback: 208 pages

Publisher: Martino Fine Books (April 11, 2012)

Language: English

ISBN-10: 1614272816

ISBN-13: 978-1614272816

Product Dimensions: 6 x 0.5 x 9 inches

Shipping Weight: 10.6 ounces (View shipping rates and policies)

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Customer Reviews

This was one of the two textbooks (along with Rudin’s Principles of Mathematical Analysis) that was used for the hot-shot freshman Math 218x course taught by Elias Stein at Princeton some years ago.It is a great book, one of my all-time favorites. It requires a bit of mathematical maturity, that is a love of mathematical proof and simplifying abstractions. This book abstractly defines vector spaces and linear transformations between them without immediately introducing coordinates. This approach is vastly superior to immediately extorting the reader to study the algebraic and arithmetic properties n-tuples of numbers (vectors) and matrices (n x n tables of numbers) which parameterize the underlying abstract vectors and linear transformations, respectively.If I taught a linear algebra course using this book then there are a few deficiencies I would try to correct, however.1. The polar decomposition is covered but the singular value decomposition (for linear transformations between different inner product spaces) is not mentioned. This is a pretty big gap in terms of applications, although it's trivial to get the singular value decomposition if you have the polar decomposition.2. The identification of an reflexive vector space with its double-dual was a stumbling block for me when I took the course. There was no mathematical definition of "identify", and so I was confused. Perhaps a good way to remedy this is to give a problem with the example of the Banach space L^p (perhaps just on a finite set of just two elements), and show how L^p is dual to L^p'.3. The section on tensor products should be improved and expanded, especially in light of the new field of quantum information theory.

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