

<<线性代数>>

图书基本信息

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前言

You are probably about to teach a course that will give students their second exposure to linear algebra. During their first brush with the subject, your students probably worked with Euclidean spaces and matrices. In contrast, this course will emphasize abstract vector spaces and linear maps. The audacious title of this book deserves an explanation. Almost all linear algebra books use determinants to prove that every linear operator on a finite-dimensional complex vector space has an eigenvalue. Determinants are difficult, nonintuitive, and often defined without motivation. To prove the theorem about existence of eigenvalues on complex vector spaces, most books must define determinants, prove that a linear map is not invertible if and only if its determinant equals 0, and then define the characteristic polynomial. This tortuous (torturous ?

) path gives students little feeling for why eigenvalues must exist. In contrast, the simple determinant-free proofs presented here offer more insight. Once determinants have been banished to the end of the book, a new route opens to the main goal of linear algebra—understanding the structure of linear operators. This book starts at the beginning of the subject, with no prerequisites other than the usual demand for suitable mathematical maturity. Even if your students have already seen some of the material in the first few chapters, they may be unaccustomed to working exercises of the type presented here, most of which require an understanding of proofs. Vector spaces are defined in Chapter 1, and their basic properties are developed.

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内容概要

The audacious title of this book deserves an explanation. Almost all linear algebra books use determinants to prove that every linear operator on a finite-dimensional complex vector space has an eigenvalue. Determinants are difficult, nonintuitive, and often defined without motivation. To prove the theorem about existence of eigenvalues on complex vector spaces, most books must define determinants, prove that a linear map is not invertible if and only if its determinant equals 0, and then define the characteristic polynomial. This tortuous (torturous?) path gives students little feeling for why eigenvalues must exist. In contrast, the simple determinant-free proofs presented here offer more insight. Once determinants have been banished to the end of the book, a new route opens to the main goal of linear algebra-- understanding the structure of linear operators.

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书籍目录

Preface to the Instructor Preface to the Student Acknowledgments CHAPTER 1 Vector Spaces Complex Numbers Definition of Vector Space Properties of Vector Spaces Subspaces Sums and Direct Sums Exercises CHAPTER 2 Finite-Dimensional Vector Spaces Span and Linear Independence Bases Dimension Exercises CHAPTER 3 Linear Maps Definitions and Examples Null Spaces and Ranges The Matrix of a Linear Map Invertibility Exercises CHAPTER 4 Polynomials Degree Complex Coefficients Real Coefficients Exercises CHAPTER 5 Eigenvalues and Eigenvectors Invariant Subspaces Polynomials Applied to Operators Upper-Triangular Matrices Diagonal Matrices Invariant Subspaces on Real Vector Spaces Exercises CHAPTER 6 Inner-Product Spaces Inner Products Norms Orthonormal Bases Orthogonal Projections and Minimization Problems Linear Functionals and Adjoints Exercises CHAPTER 7 Operators on Inner-Product Spaces Self-Adjoint and Normal Operators The Spectral Theorem Normal Operators on Real Inner-Product Spaces Positive Operators Isometries Polar and Singular-Value Decompositions Exercises CHAPTER 8 Operators on Complex Vector Spaces Generalized Eigenvectors The Characteristic Polynomial Decomposition of an Operator Square Roots The Minimal Polynomial Jordan Form Exercises CHAPTER 9 Operators on Real Vector Spaces Eigenvalues of Square Matrices Block Upper-Triangular Matrices The Characteristic Polynomial Exercises CHAPTER 10 Trace and Determinant Change of Basis Trace Determinant of an Operator Determinant of a Matrix Volume Exercises Symbol Index Index

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章节摘录

插图：

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