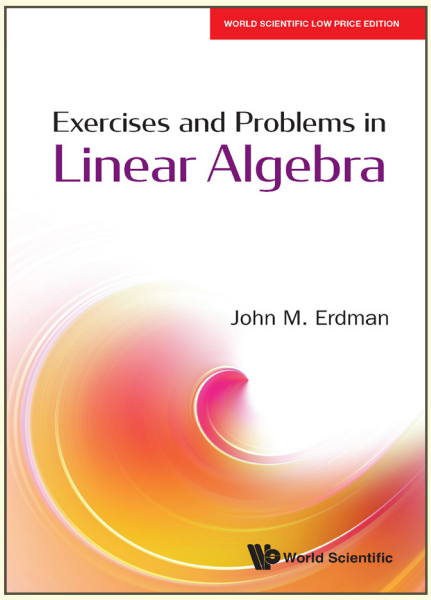
Exercises and Problems in Linear Algebra



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ABOUT THE BOOK

This book contains an extensive collection of exercises and problems that address relevant topics in linear algebra. Topics that the author finds missing or inadequately covered in most existing books are also included. The exercises will be both interesting and helpful to an average student. Some are fairly routine calculations, while others require serious thought.

The format of the questions makes them suitable for teachers to use in quizzes and assigned homework. Some of the problems may provide excellent topics for presentation and discussions. Furthermore, answers are given for all odd-numbered exercises which will be extremely useful for self-directed learners. In each chapter, there is a short background section which includes important definitions and statements of theorems to provide context for the following exercises and problems.

READERSHIP

Students and teachers of linear algebra.

CONTENTS

- Basis for a Vector Space
- **Linear Maps Between Vector Spaces:**
  - Linearity
  - Linear Maps Between Euclidean Spaces
  - Projection Operators
- **Spectral Theory of Vector Spaces:**
  - Eigenvalues and Eigenvectors
  - Diagonalization of Matrices
  - Spectral Theorem for Vector Spaces
  - Some Applications of the Spectral Theorem
  - Every Operator is Diagonalizable Plus Nilpotent
- **The Geometry of Inner Product Spaces:**
  - Complex Arithmetic
  - Real and Complex Inner Product Spaces
  - Orthonormal Sets of Vectors
  - Quadratic Forms
  - Optimization
- **Adjoint Operators:**
  - Adjoints and Transposes
  - The Four Fundamental Subspaces
  - Orthogonal Projections
  - Least Squares Approximation
- **Spectral Theory of Inner Product Spaces:**
  - Spectral Theorem for Real Inner Product Spaces
  - Spectral Theorem for Complex Inner Product Spaces
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