

## Linear Algebra

An Introductory Approach

Linear algebra is the branch of mathematics that has grown from a careful study of the problem of solving systems of linear equations. The ideas that developed in this way have become part of the language of much of higher mathematics. They also provide a framework for applications of linear algebra to many problems in mathematics, the natural sciences, economics, and computer science. This book is the revised fourth edition of a textbook designed for upper division courses in linear algebra. While it does not presuppose an earlier course, many connections between linear algebra and undergraduate analysis are worked into the discussion, making it best suited for students who have completed the calculus sequence. For many students, this may be the first course in which proofs of the main results are presented on an equal footing with methods for solving numerical problems. The concepts needed to understand the proofs are shown to emerge naturally from attempts to solve concrete problems. This connection is illustrated by worked examples in almost every section. Many numerical exercises are included, which use all the ideas, and develop important techniques for problem-solving. There are also theoretical exercises, which provide opportunities for students to discover interesting things for themselves, and to write mathematical explanations in a convincing way. Answers and hints for many of the problems are given in the back. Not all answers are given, however, to encourage students to learn how to check their work.

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