ZMATH 2010c.00362
Ricardo, Henry
A modern introduction to linear algebra.
Boca Raton, FL: CRC Press (ISBN 978-1-4398-0040-9/hbk). xvi, 654 p. (2010).

This book is intended for a wide variety of students. Its writing style is informal, but all definitions and results are stated precisely, the latter with formal proofs. Concepts and results are motivated and introduced by explanations and worked examples and, in fact, one of the strong points of this book is the number of worked examples. The approach is via vectors in $\mathbb{R}^n$ and matrices; these are treated in Chapter 1, along with linear independence, bases and subspaces. Chapter 2 deals thoroughly with systems of equations and Gaussian elimination. Chapter 3 is on matrix algebra, matrix-vector multiplication and the inverse matrix. Chapter 4 deals with eigenvalues, eigenvectors and diagonalization. The determinant of a square matrix A is defined in terms of the $PA = LU$ factorization. The Cayley-Hamilton theorem is proved for diagonalizable matrices and the minimal polynomial is introduced. Chapter 5 treats vector spaces abstractly, Chapter 6 covers linear transformations, Chapter 7 treats real and complex inner product spaces, the Gram-Schmidt process, and the Schur and QR factorizations. Finally, Chapter 8 deals with hermitian and normal matrices and quadratic forms, and concludes with the singular value and polar decompositions. Many applications of linear algebra are introduced in the text and in examples and the many exercises. There are over 1200 of the latter, and they are classified according to difficulty. Attention is also drawn to the use of calculators and computers where relevant. A very useful feature of the book is that each chapter ends with a summary of key definitions and results. The book contains answers or hints to the odd-numbered exercises and an instructor's solutions manual is forthcoming.   *Rabe von Randow (Bonn)*

Classification: H65
Keywords: linear algebra; textbook