standing of, the sort of numerical procedure that is well-suited to automatic processing. Then this insight could have been developed, by examples, throughout the remainder of the text. In this book, the effort made in this direction has been entirely inadequate, and the author would have been justified in omitting this topic altogether from an excellent presentation of manual methods.

In the balance this book is admirably suited to the purpose for which it was written. It is recommended to every scientist and engineering student who seeks a clear, straightforward exposition of the fundamentals of numerical analysis.

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Elements of Linear Algebra, by L. J. Paige and J. D. Swift. Ginn and Co., Boston, 1961. xvi + 348 pages. $ 7.00.

This book is an introduction to the subject of linear algebra, intended for sophomore or junior classes. The contents reflect the authors' opinion of what is most desirable in an initial university course in algebra for majors in mathematics and mathematically inclined students in the sciences and engineering.

Chapter 1 is an introduction dealing with the following topics: set notation; some of the basic properties of the real numbers (including a list of postulates for an ordered field); mappings; and some types of proof which arise in mathematics.

In Chapter 2 the student is introduced to vectors by way of 3-dimensional analytic geometry. Vectors are brought in as triples associated with lines. Some of their basic properties are derived; and the following topics are treated: linear dependence, systems of linear equations, inner product, length, and outer product. All of this is done in 3-dimensional Euclidean space where the student can relate new concepts to geometrical properties which he can visualize.

The algebraic ideas of Chapter 2 are extended to general vector spaces in Chapter 3, and the geometric notions are developed in Chapter 4. All vector spaces are real.

Chapter 5 is devoted to determinants. These are introduced as multilinear functionals; and the standard properties are discussed.

Chapter 6 is concerned with linear transformations. Matrices are introduced as representatives of linear transformations; and their algebra is developed.

Chapter 7 treats certain special kinds of linear transformations and matrices: scalar, diagonal, triangular, symmetric, elementary, and orthogonal.

Chapter 8 includes bilinear forms, quadratic forms, the equivalence of quadratic forms, congruence of matrices, and the geometric interpretation and application of these forms.

Chapter 9 is entitled "Complex Number Field, Polynomial Rings." The authors dispose of complex numbers in one section and then give a proof of the fact that the complex numbers are essentially the only 2-dimensional division algebra over the real field. The remainder of the chapter is concerned with elementary theory of equations. Polynomials are introduced in the first instance as infinite-tuples with a finite number of non-zero entries.

Chapter 10 deals with characteristic fields and vectors. The idea of canonical forms is introduced; and these are derived in the case of linear transformations for which the characteristic vectors generate the whole vector space. The orthogonal reduction of symmetric matrices is given; and quadratic forms are reduced to their standard forms. In the last section of this chapter the authors show how the results for orthogonal and symmetric matrices can be extended to similar results for unitary and Hermitian matrices.

In the last chapter, entitled "Similarity of Matrices," the rational and classical canonical forms of a linear transformation T are derived by writing the vector space as a direct sum of cyclic subspaces relative to T.

The book is carefully written and well motivated. At every turn the authors are concerned to keep the reader informed of what they are doing, what they are planning to do, and why. There is a good selection of exercises which should prove interesting and stimulating to the student. This book should prove to be very satisfactory, both as an introductory classroom text in linear algebra and as a guide for the student who wishes to study the subject on his own.

B.N. Moyls, University of British Columbia

Tables of Weber Functions, Volume 1, by I. Ye Kireyeva and K.A. Karpov. Mathematical Table Series volume 15. Pergamon Press, Oxford, London, New York, Paris, 1961. xxiv + 364 pages. $ 20.00.

Weber's parabolic cylinder function, $D_p(z)$, is a solution of Weber's differential equation

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