functional analysis. Nevertheless, the book is intended to be introductory, so that only the real and the complex fields come into consideration.

The author endeavors to lead the reader by the hand and assist him over every possible rough spot. Thus, proofs and explanations are made at length and, in addition, several appendices are added, explaining what is meant by equations and identities, by a function, by a set, by a proof, etc. Unfortunately, the first chapter, which could be omitted, may very possibly frighten away a number of prospective readers. The chapter is intended to illustrate the power of analytical methods by proving that a triangle is isosceles if the bisectors of two of its angles are equal. After stating the theorem and commenting on its difficulty, the author promises to "use new concepts to abbreviate the dreadful computations a little".

The chapter headings indicate the extent of the coverage: Introduction; The Plane; Linear Dependence, Span, Dimension, Bases, Subspaces; Linear Transformations; The Dual Space, Multilinear Forms, Determinants; Determinants: A Traditional Treatment; Inner Product Spaces. In the final chapter there appear three versions of the Spectral Theorem for symmetric transformations, and the first version is stated for unitary transformations in one of the exercises.

For self-instruction the book should do very well; for class use, the instructor can be free to provide supplementary material, and to give attention to the rather long list of problems.

A. S. H.

70[G, H, J, L, X].—A. N. KHOVANSKII, *The Application of Continued Fractions and their Generalizations to Problems in Approximation Theory*, Noordhoff, Groningen, 1963, xii + 212 p., 22 cm. Translated by PETER WYNN. Price $7.85.

This book confines itself to analytic continued fractions and, as implied in the title, the orientation is toward practical computation.

The long Chapter I is concerned first with transformations from one continued fraction to another (including such operations as contraction), and between continued fractions and series. Next are presented several sections on convergence theory and tests.

The equally long second chapter develops many known analytic continued fractions (binomials, logarithm, tangent, hypergeometric, exponential integral, etc.) primarily by the use of Lagrange's method as applied to Riccati equations.

Chapter III presents some miscellaneous methods including a use of Obreschkoff's Formula to obtain certain rational approximations directly in closed form, and the application of the elegant Viskovatoff Algorithm to the difficult cases sin x, cosh x, Stirling's series, etc.

Finally the last chapter evaluates the roots of algebraic equations by matrix methods. Since these linear transformations are analogous to the recursion formulas for continued fraction convergents, these sequences are called *generalized* continued fractions.

The book is a useful compendium of these techniques and is especially valuable, since relatively little is available in English on the subject. A nice feature is the frequent inclusion of historical references, from which one learns the origin of names, notation, and formulas.

There are a fair number of typographical errors, and the reader must therefore proceed with some caution, especially where misplaced minus signs change the meaning entirely. Also to be guarded against is a terminological discrepancy. For

$$b_0 + \frac{1}{b_1 +} \frac{1}{b_2 +} \frac{1}{b_3 +} \cdots$$

most books refer to the b_i as *partial quotients*, while here (page 2) this is the name for the quantities $1/b_i$.

The forthcoming translation of Khintchine's *Continued Fractions* is also by Wynn and should complement the present volume for the arithmetical and theoretical aspects of continued fractions.

D. S.

71[G, X].—D. K. Faddeev & V. N. Faddeeva, *Computational Methods of Linear Algebra*, W. H. Freeman & Company, San Francisco, California, 1963, xi + 621 p., 24 cm. Price $11.50.

This volume should not be confused with an earlier one having the same title, and written by the second of the present authors. The earlier volume appeared in the USSR in 1950, and a translation, published by Dover, appeared in 1959 and was reviewed briefly in this periodical [v. 15, 1961, p. 201, RMT **36**].

The Russian edition of the volume here translated appeared in 1960, and bears little resemblance to the earlier one. It is nearly three times as large; it contains an extensive bibliography (40 pages as compared with two in the earlier one); and the original printing of 10,150 copies was evidently soon exhausted, since a second edition, somewhat larger (734 pages as compared with 656) appeared in 1963 in a printing of 12,000 copies. Each edition was, at the time of its appearance, by far the most complete and up-to-date treatment of the subject in print. Perhaps the most serious criticism that could be made of either is, curiously, the scant use of norms, in spite of the fact that the 1950 volume had already called attention to their usefulness. Since that time this reviewer, A. M. Ostrowski, F. L. Bauer, J. H. Wilkinson, and others, have developed the theory extensively and made numerous applications, but little or no account of this work is taken in the present volume or its successor. Otherwise, however, the first chapter gives a fairly complete and self-contained development of the theory of matrices so far as it is relevant to computational problems. Thereafter, there is discussion with numerical illustrations of virtually every known method of solving the standard problems of finding inverses, solutions, and characteristic roots and vectors.

Regretfully, though, it must be said that the translation by no means does justice to the original. A first glance at the bibliography arouses apprehensions that are, alas, fulfilled by an examination of the text proper. In the original, names are listed alphabetically according to the Russian spellings. In the translation, Aitken is properly transported from the end of the alphabet to the beginning, but the first four names on the first page of references in the translation are Abramov, Azbelev, Albert, and Aitken, in that order. Curiously, starting with Rushton, who follows Růžička, the ordering is nearly correct (there is one inversion, and the misspelled Scherman is placed properly for that spelling). For several pages at the start diacritical marks are completely omitted from French and German titles, then sud-