Throughout, the authors aim to supply as much motivation as possible and each chapter begins with a chatty introduction. The background to the Spectral Theorem (§9.3) and the preamble to the definition of degree (§13.1) are two particularly successful instances. Thus, although such material is available elsewhere, the authors produce, for the most part, a text which is more lucid and less indigestible than others. As already indicated, there is a good supply of worked examples and each chapter also contains a good selection of exercises. As regards the applications in the later chapters, it is perhaps a pity that they are not taken further, while space might have been found for a chapter on semigroups of operators and evolution equations, which receive only very brief mention. Thus the reader's appetite is whetted but not sated and those who are big eaters must look elsewhere. Fortunately, there is a list of over 100 references including a number of recent papers as well as a lot of old faithfuls, such as the "voluminous" Dunford and Schwartz, which contain some of the more complicated proofs (for instance, the proof of the Open Mapping Theorem) which the present authors purposely omit.

No text is perfect and the present is no exception. There are a number of mathematical slips, many of which are obvious and trivial but occasionally things go slightly haywire, the worst instance being Example 13.2.14 where there are several slips in quick succession. Grammatical pedants might have cause to complain. There seems to be inconsistency in the use of hyphens in phrases such as "infinite-dimensional" and "real-valued" and, likewise, in the use of commas, while there is at least one rather unfortunate spelling error at an early stage. There are also typographical errors and the quality of reproduction is sometimes imperfect. There are places where the type is broken, while the process used is such that corrections to the original typescript are easily visible. In a book costing so much, one perhaps expects better.

In summary, the authors succeed in their aim of presenting the essential tools of the trade and the book could be used for an introduction to operator theory. Indications of several areas of application are given although these do not cover the whole spectrum. The book can thus be recommended to someone who knows the areas of application but does not know the functional analysis, whereas a functional analyst wishing to learn in depth about applications should regard this book merely as a tasty apéritif.

ADAM C. MCBRIDE

JONES, W. B. and THRON, W. J. *Continued Fractions: Analytic Theory and Applications* (Encyclopedia of Mathematics Vol. 11, Addison-Wesley, 1980), 428 pp. £20.65.

As the General Editor of the Section on Analysis of the Encyclopedia of Mathematics and its Applications states in his Foreword, the volume under review is the first systematic treatment of the theory of continued fractions for over two decades, and forms a worthy successor to the well-known treatise by Oskar Perron whose first edition appeared in 1929. Continued fractions have for long played an important role in number theory. In the nineteenth century, however, the theory began to develop in a new direction, with important applications in analysis, and it is this aspect of the subject that is the concern of the present volume. The central theme is the expansion and convergence theory of continued fractions whose terms are linear functions of a complex variable.

In several applications of the analytical theory continued fractions can be used to give more computational accuracy than other methods. This arises in control theory where it is often necessary to decide whether a given polynomial with real coefficients is stable, i.e., whether all its zeros have negative real parts, and continued fractions may also, in certain cases, increase the range of use of asymptotic series. They can also provide representations for transcendental functions that are more widely valid than those using power series.

The longest and most basic chapter in the book is Chapter 4, which deals with the convergence of continued fractions and presents the most useful convergence criteria. This is followed by chapters on the representation of analytic functions, including hypergeometric and confluent hypergeometric functions. Various classes of continued fractions, such as C-, J- and T-fractions are introduced and the concluding chapters contain applications to a variety of topics, such as control theory, truncation-error analysis, moment problems, birth-death processes, etc. There is a 16-page bibliography and a subject index. The volume is beautifully produced and is sure to become the major textbook in its field.

R. A. RANKIN

BRYANT, V. and PERFECT H., *Independence Theory in Combinatorics* (Chapman and Hall, 1980), £5.50 (soft cover).

Although there are a great many books on practically every aspect of combinatorial theory, few of these are sufficiently elementary (or sufficiently inexpensive) to be of much use to undergraduate students. The book under review, however, should do well on both counts, being a reasonably-priced introduction to the study of independence spaces (or matroids). The only pre-requisites for the book are a little knowledge of vector spaces and (perhaps) graph theory.

The first chapter deals with notation and mentions some of the results to be assumed. The second chapter gives the main definitions and some basic results about independence spaces. In Chapter 3 (Graphic Spaces) various connections between graphs and independence spaces are exhibited and in Chapter 4 (Transversal Spaces) Hall's Theorem and some of its consequences and generalisations are discussed.

In these four chapters there are many exercises (with solutions) and all results stated are rigorously proved. There is also a fifth chapter, different in character from the previous chapters, in which the authors discuss the representation of independence spaces. Here, though, only some of the results are proved.

As already mentioned, the book is of an elementary nature, but nowhere is it of a trivial nature. It is a very good introduction to quite a difficult subject and in many places it illustrates superbly the links between various combinatorial disciplines.

MICHAEL J. GANLEY

BOOKS RECEIVED

Reviews of some of the books listed below will appear in future issues.

C. CLARK, *Elementary mathematical analysis*, 2nd ed. (Wadsworth), pp. 259, $19.95

P. J. GIBLIN, *Graphs, surfaces and homology*, 2nd ed. (Chapman and Hall), pp. 329, £6.95

G. P. BEAUMONT, *Intermediate mathematical statistics* (Chapman and Hall), pp. 248, £5.95

G. A. BAKER and P. GRAVES-MORRIS, *Padé approximants*, 2 vols. (Encyclopedia of mathematics and its applications, vols. 13 and 14, Addison-Wesley Advanced Book Programme), pp. 325 and 215, $32.50 and $29.50

G. JAMES and A. KERBER, *The representation theory of the symmetric group* (Encyclopedia of mathematics and its applications, vol. 16, Addison-Wesley Advanced Book Programme), $44.50

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