# BOOK REVIEWS

DUNCAN, J., *The Elements of Complex Analysis* (Wiley, 1968), 313 pp., £4·25; paper, £2·25.

The aim of this book is to provide a first course on complex analysis that is completely rigorous but yet suitable for undergraduate students of Mathematics in the last two years of their honours course. The book is very modern in style and, because of the preponderance of set-theoretic symbolism, it at first sight looks arid and dry and, in this sense, may remind one of the book by Thron on the same subject. However, a more careful reading shows that this first impression is wrong. The book is perfectly readable (although an older reader may find it troublesome in places because of the modern style), there is adequate motivation and there are plenty of worked examples. There is also an adequate supply of unworked examples, many of which are new to the reviewer although he has taught complex variable theory for many years. The chapter headings are as follows:

1. Metric Space Preliminaries. 2. Complex Numbers. 3. Continuous and Differentiable Complex Functions. 4. Power Series Functions. 5. Arcs, Contours and Complex Integration. 6. Cauchy's Theorem for Starlike Domains. 7. Local Analysis. 8. Global Analysis. 9. Conformal Mapping. 10. Analytic Continuation.

As mentioned above, the book is very modern in style and emphasis. Thus, while topics such as contour integration and special conformal mappings are given minimal treatments, the Jordan curve theorem is proved for a starlike simple closed curve and problems involving Banach spaces or Banach algebras appear here and there in the book. A virtue of the book is that it makes it abundantly clear that the main difficulties in the general theory of complex analysis are topological in character. The book is distinctive in several ways and is worthy of sustained study by the serious student.

D. MARTIN

FULLERTON, G. H., *Mathematical Analysis* (Oliver and Boyd, 1972), 152 pp., £1·75.

This book assumes a standard first course in analysis and gives a unified treatment of several topics taught in the last two years of an honours degree course. In the first chapter the standard topological notions are introduced in a metric space setting; complete metric spaces are defined and the contraction mapping theorem and Baire's theorem proved. The second chapter gives the standard properties of continuous functions between metric spaces; pointwise convergence of functions is studied and its shortcomings motivate a discussion of uniform convergence; among the theorems proved are Dini's, the Stone-Weierstrass and the Ascoli-Arzela. Chapter 3 gives further results on uniform convergence, in particular its relationship to the preservation of Riemann integrability and differentiability; the former, establishing the need for a more general integral, leads naturally to Chapter 4. Here the Daniell extension procedure is applied to the lattice of continuous functions of compact support and the Riemann integral; the use of Dini's theorem makes this particularly neat. The relationship to the measure-theoretic approach is clearly explained. Finally double integrals are introduced and the Fubini and Tonelli theorems proved; here the extension procedure is applied to a lattice of step functions to avoid assuming knowledge of Riemann integration on the plane; in the reviewer's opinion it would

have been preferable to take the continuous functions of compact support and the repeated integral, obtaining the equality of the two repeated integrals as an application of the Stone-Weierstrass theorem. The last chapter gives the $L_1$ and $L_2$ theories of the Fourier transform.

This book is very attractive: the treatment is leisurely and while it is consistently rigorous many of the harder theorems have their proofs supplemented by informal explanations and graphical illustrations; also a number of interesting applications are given. Each chapter has a large number of interesting exercises some of which extend the theory while others give relevant counter-examples. Although the reluctance of undergraduates to buy books is to be deplored it must be reckoned with. The low price of this book, its suitability for several courses and the high standard of its presentation combine to make it ideal as a course book. FREDA E. ALEXANDER

MEADOWS, R. G. AND DELBOURGO, R., *Advanced Pure Mathematics* (Penguin, 1971), 128 pp., £2.

This is a school text for pupils who are revising for an Advanced level examination in a traditional syllabus of Pure Mathematics. Each chapter follows the same pattern: summary of theory and rules for carrying out routine processes with no proofs, worked examples, questions to be worked by the pupils, followed by outline solutions and answers. The questions are taken from recent (1966-1969) papers of various boards, many of them at the scholarship level.

There are some mathematical inaccuracies, for example:

page 47. If $\Sigma a_n$ converges, then $a_n \to 0$. (N.B. The converse is not necessarily true.)

page 85.

$$\frac{d}{dx}[f_1\{f_2(x)\}] = \frac{df_1}{df_2}\frac{df_2}{dx}.$$

The notations used and the syllabus covered are not in line with the work now done in the 6th grade for the Scottish Certificate of 6th Year Studies; but a harassed teacher of A-level pupils might find the book useful.

G. BONSALL

PURI, M. L. (Editor), *Non-Parametric Techniques in Statistical Inference* (Cambridge University Press, 1970), xiv + 623 pp., £10·20.

This volume contains the Proceedings of the First International Symposium on Non-Parametric Techniques in Statistical Inference, held at Indiana University in June 1969, and includes a cross-section of up-to-date work in this field from many of its leading practitioners. The thirty-five papers are divided into sections devoted to Testing and Estimation, Order Statistics and Allied Problems, General Theory, Ranking and Selection Procedures, Decision Theory and Empirical Bayes Procedures, and Teaching of Non-Parametric Statistics.

The level of presentation of the papers makes this very much a book for the specialist, and a solid mathematical background not only in general statistical theory but in non-parametric inference is assumed by most of the authors. The vast majority of the papers are concerned exclusively with theory, and the use of the word " Techniques " in the title is perhaps misleading: this is in no sense a textbook or a practical aid to those wishing to apply rank procedures, and the contents make few concessions to a readership unfamiliar with the immediate subjects at hand.