# 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

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