The 22 chapters of the book are grouped in four Parts entitled respectively General theory ; Complex multiplication ; Elliptic curves with singular invariants ; Elliptic curves with non-integral invariant ; Theta functions and Kronecker limit formulas.

The author has performed a notable service by summarising modern developments in the field covered by his book and achieving some simplification in the process.

A. ERDÉLYI

JAMESON, G. J. O., *Topology and Normed Spaces* (Chapman and Hall, London, 1974), xv+408 pp., £3·80 (soft cover), £5·80 (hardback).

This book has developed out of lectures given by the author at the universities of Warwick and Innsbruck. The only formal prerequisities are elementary analysis and some linear algebra. As the title indicates the book is divided into two main sections, Part I on Topology and Part II on Normed linear spaces. Part I contains subsections on basic concepts, metric and normed spaces, separation properties, connected sets, bases of open sets and countability axioms, complete metric spaces, compactness, Urysohn's lemma and the Tietze extension theorem, product spaces and Cantor spaces. Part II contains subsections on linear mappings and functionals, dual spaces, finite-dimensional spaces, convexity, Hahn-Banach theorem, uniform boundedness theorem, open mapping theorem and closed graph theorem, spaces of continuous functions, weak topologies, Tychonoff's theorem, Hilbert spaces and compact linear mappings. There are also five subsections of Part II which reflect the author's personal interests. These are entitled Complemented subspaces, Bases, Unconditional convergence, Linear lattices, and The duality of pairs of subspaces. There are short appendices on Countability and Zorn's lemma, a comphrehensive bibliography and an index. Each subsection contains a set of exercises of varying degree of difficulty. The book is very well written and should prove extremely valuable both to undergraduates and to those teaching undergraduate courses in topology or functional analysis.

H. R. DOWSON

RILEY, K. F., *Mathematical Methods for the Physical Sciences* (Cambridge University Press, 1974), xvi+533 pp., £8·75 (cloth), £3·95 (soft cover).

This book, subtitled " An informal treatment for students of physics and engineering ", covers preliminary calculus (revisionary), vector algebra and calculus, ordinary differential equations, Fourier series and transforms, partial differential equations, numerical methods, calculus of variations, eigenvalue problems, matrices, tensors, and complex variable theory.

The author acknowledges that he is aiming at the " average student ", and so he prefers descriptions in words to compact symbolism, and for the same reason avoids notation like u_{xy}, preferring to write the expression out in full. The plan for each section is to motivate the problem and explain the solution idea in words, present the formal mathematics, and then illustrate the method by means of an example, often a physical one. The reader is expected to help in the development by performing part of the routine manipulation himself (hints are provided at the end of the book). There is also a large collection of exercises at the end of each chapter, with solutions to all of them.

On the whole this scheme seems a most successful way of getting across the concepts and the techniques involved. The only drawback is that in some of the explanations difficulties are skated over in a way which could cause misunderstanding, for example, the rôle of boundary values in superposition methods for solving differential equations, the completeness of the orthogonal trigonometric functions, and the eigenspace corresponding to multiple matrix eigenvalues.

Some parts of the subject matter, however, appear to be rather old-fashioned. This is particularly so in the chapter on ordinary differential equations, where some of the material could have been more profitably replaced by an introduction to phase plane methods and stability ; and in the chapter on matrices, where no mention is made of linear independence. Other, more minor criticisms, are the use of $\wedge$ for vector products, the use of " boundary conditions " to include initial conditions, and the omission of a description of characteristics for hyperbolic equations (on the grounds of difficulty).

The text and diagrams are very clearly printed, and fairly free of misprints—I only found ones on pp. 196, 476 and 489. On p. 259 there is an erroneous statement, which may be typographical in origin.

It should be noted by prospective purchasers that some knowledge of physics is helpful for some of the examples and exercises, and for the chapter on tensors. A point which should be observed, since this Journal is a Scottish publication, is that the preliminary knowledge assumed is that for the Advanced Level examination in Mathematics for Natural Science, the syllabus for which few Scottish school-leavers have studied. Consequently it may not be possible for this book to fit into the curricula at Scottish universities. Should its material mirror the content of any particular course, I feel it would be a helpful text for the students involved.

D. W. ARTHUR

SEGAL, G. (Editor), *New developments in Topology* (London Mathematical Society Lecture Note Series 11, Cambridge University Press, 1974), 128 pp., £2·60.

The Proceedings of the Symposium on Algebraic Topology held in Oxford in June 1972 have been revised and collected for publication as this book. Not every speaker at the conference has contributed a paper but the main themes are well covered.

Infinite loop spaces and their relation to generalised cohomology theories are studied from varied points of view. Solutions to the problems of detecting and approximating infinite loop spaces are given here by May for the non-connected case. By studying certain maps between the infinite loop spaces of projective space and the O-sphere, Segal obtains results on operations in stable homotopy theory. Hodgkin looks at Dyer-Lashof operations in K-theory with a view to axiomatising operations in a generalised homology theory.

K-theory appears again in the paper by Adams in which it is shown that no new information can be gained by using tertiary or higher order K-theory operations. The second part of this paper indicates some unsolved problems about projective spaces. Brown and Comenetz set up Pontryagin duality between the generalised homology and cohomology theories which arise from a spectrum.

The emphasis of the book is on algebra, with very little mention of the underlying geometry. In one of the more geometrical papers Zabrodsky characterises, up to mod p homotopy equivalence, H-spaces X for which $H^*(X ; \mathbf{Z}p)$ is an exterior algebra on two generators. Maps between the classifying spaces of Lie groups are studied by Hubbuck while Madsen and Milgram fill in some more detail about the classifying spaces B_{PL}, B_{TOP} and B_G and the relations between them.

The remaining three papers are concerned with algebraic K-theory. Dold considers the function induced in K-theory by a functor F between two categories of finitely generated projective modules in the case where F is non-additive but of finite degree. Wall obtains results in equivariant K-theory and Quillen outlines a higher K-theory, defined on a category with exact sequences, in which there is a long exact K-sequence.