

WHITELAW, T. A., *An Introduction to Abstract Algebra* (Blackie, 1978), ix+166 pp., £4.95 (paper covers).

This book sets out to provide a first major course in abstract algebra, assuming no previous knowledge, but taking the reader far enough to savour the subject and its ways of thinking, and to prove some interesting results.

The first four chapters provide the essential vocabulary, definitions and results of basic topics including sets, mappings and equivalence relations. The author rightly believes that, without an adequate understanding of these, later parts of the subject become unnecessarily difficult. Most parts of these first four chapters are detailed and straightforward, and should present few problems to the serious reader, but the sections on congruence classes of integers modulo m need careful attention.

The remaining five chapters deal with semigroups, groups and rings. Groups are taken as far as quotient groups and the first isomorphism theorem. The chapter on rings deals with ideals and factor rings, and ends with some results on polynomial rings. These chapters naturally call for closer attention from the reader—and for pencil and paper to check understanding on the way.

Each chapter ends with a set of exercises, and the book includes an appendix to these exercises, giving hints and partial answers. This feature should help the reader who is doubtful about his attempts at the exercises and may need a little help, or a boost to confidence when in doubt about the correctness of his efforts.

The author's style throughout is helpful to the beginner, with outline explanations of the purpose of the work amplifying the definitions and proofs in appropriate cases. The book will be a useful text for students studying abstract algebra at this level, and should whet the appetite for more.

H. G. ANDERSON

CLARKSON, B. L., HOLMES, P. J., and KISTNER, A. (eds.), *Stochastic Problems in Dynamics* (Pitman, 1977), 566 pp., £12.

The IUTAM Symposium on Stochastic Problems in Dynamics (Southampton 1976) brought together some well-known applied mathematicians and engineers for a discussion on those aspects of stochastic processes which engineers find most useful in the study of dynamical systems, in control theory and in time series analysis. The book consists mostly of the thirty contributed papers, but there are brief summaries of the discussions following the papers. The main areas covered which are most likely to interest mathematicians are in the fields of stochastic differential equations (eight papers), first passage or failure problems (four papers), and identification, spectral analysis or time series problems generally (twelve papers). In the first mentioned area, the averaging methods of Stratonovich and Khasminski are very evident, as are Itô differential equations. Here the most lasting memory of the book is the ease with which Professor Ariaratnam was able, in discussion, to apply these methods to obtain the results in other people's papers, as well as in his own paper. Unfortunately our reading of some of the papers in this section was made difficult by the low standard of translation into English. Nevertheless, anyone interested in the stability of dynamical systems subject to stochastic disturbances will find the articles by F. Kozin (on empirical problems), J. L. Willems (on white and coloured noise systems), S. T. Ariaratnam (on coupled linear systems under combined and harmonic excitation), at least of general interest even if the mathematical techniques employed here, and in other related papers, are "well known". Similar remarks apply to the papers in the spectral analysis/system identification section, although from such noted authors as J. S. Bendat, H. Akaike, and S. H. Crandall, we might have expected something a little more novel. Indeed anyone familiar with the recent literature emanating from these and other writers might have been able to predict their respective contributions. From the small section on failure and first passage times, the reviewer found the paper by R. F. Drenick (on non-robust problems in the seismic resistance of structures) to be that mixture of good sense and well tried mathematics which we expect from engineers.

The book is likely to be of limited use to active workers in this area, partly because the subjects are so far ranging, and partly because the material has already appeared or will soon appear in the relevant journals.