

SCHAEFER, H. H., *Banach Lattices and Positive Operators* (Springer-Verlag, 1974), xi + 376 pp., DM 98.00, \$42.70.

This book gives the first systematic account of positive linear operators acting on Banach lattices.

Chapter 1 is devoted to positive square matrices and provides valuable motivation to the remainder of the book. The ideal structure of finite-dimensional vector lattices is used extensively throughout this chapter, in which the Perron-Frobenius theory is presented. The examples of stochastic and doubly stochastic matrices and the applications of the theory to homogeneous Markov chains with finite state space illustrate the material very successfully.

Chapter 2 deals with the basic general theory of Banach lattices. The algebraic theory of vector lattices is developed in this chapter, with due emphasis being placed on duality. The special cases of *AL*-spaces and *AM*-spaces are discussed in detail; in particular their duality properties and their representation theorems are fully treated. Complexifications of vector lattices are also introduced here.

Chapter 3 begins with properties of closed ideals in Banach lattices and with valuations of vector lattices. This leads to representation theorems for a class of Banach lattices which contains all separable Banach lattices as well as all Banach lattices having an order-continuous norm. The second part of this chapter deals, amongst other things, with mean ergodic theory of semigroups of positive operators and with the representation of compact groups of positive operators on a Banach lattice.

Vector lattices of linear operators between Banach lattices are the subject of Chapter 4. Various types of tensor products of Banach lattices are introduced and relationships with the theory of integral maps and absolutely summing maps are shown. Special classes of operators are studied in detail, such as Hilbert-Schmidt operators, nuclear operators, compact operators, and kernel operators between Banach function lattices.

The final chapter of the book deals with applications of the earlier material to approximation theory, spectral theory and ergodic theory.

The book is written throughout in a clear and attractive style. It has many well-chosen examples, as well as an ample provision of exercises which should prove invaluable to the serious reader. The book is likely to become, and deserves to be, a standard reference work for both the research student and the experienced worker in this field.

A. J. ELLIS

STENSTRÖM, B., *Rings of Quotients* (Springer-Verlag, 1975), vii + 309 pp., DM 92.00, \$39.60.

The author states in the introduction that "the purpose of this book is not only to describe the theory of rings of quotients but also to give an introduction to the basic methods and results of ring theory at large". He certainly succeeds in touching on an impressive number of topics in the theory of rings, some more fully than others, in the course of developing the theory of rings and modules of quotients. Rings of quotients are dealt with in a very comprehensive way and the abstract treatment is elucidated by numerous examples and exercises. The book begins with the definitions and elementary properties of modules and categories and this might seem to justify the author's claim that "the only prerequisites for a reading of this book are a knowledge of abstract algebra and the basic notions of set theory and general topology". Although the theory is developed from the beginning I suspect that any with such flimsy apparatus would find themselves in some difficulty, and there are certainly much easier books