
Zbl 0561.46031**Hanche-Olsen, Harald; Størmer, Erling****Jordan operator algebras.** (English)

Monographs and Studies in Mathematics, 21. Boston - London - Melbourne: Pitman Advanced Publishing Program. VIII, 183 p. £27.50 (1984).

This book is the first monograph which is devoted to Jordan algebras of self-adjoint operators on a Hilbert space and their abstract generalizations - Jordan Banach algebras. It aims to develop the theory to a point from which most of the theory of C^* -algebras and von Neumann algebras can be generalized to Jordan algebras in a natural way. This approach was initiated by papers of D. Topping and E. Størmer in the mid of 1960s and was continued later by fruitful investigations of E. M. Alfsen, F. W. Shultz and E. Størmer on Gelfand-Neumark theory for Jordan Banach algebras. At this time the theory of Jordan operator algebras goes on in its development and finds applications to C^* -algebras, mathematical foundations of quantum physics, complex functions in several and infinite number of variables etc. Specialists in all these fields can treat the reviewed book as a good introduction to the theory of Jordan Banach algebras.

The book is divided into seven chapters. The first gives preliminaries from functional analysis and in particular from the theory of C^* - and von Neumann algebras. The second chapter on algebraic aspects of the theory is addressed mostly to non algebraists. However this treatment avoids all complications and abstractions which are not necessary in this book. This makes chapter 2 a useful introduction to Jordan algebras even for algebraists. The remaining chapters 3-7 are devoted to the main topics of the book - JB-algebras and their weakly closed analogues - JBW-algebras, which are non associative real analogues of C^* - and von Neumann algebras respectively. The basic techniques of these algebras are developed in Chapters 3 and 4. Chapter 5 contains technical results on the dimension theory for projection lattices of JBW-algebras, which are used then in chapters 6 and 7. Chapter 6 is devoted to the detailed study of spin factors (JBW-factors of type I_2) which are quite different from other Jordan algebras, studied in chapter 7. In chapter 7 the authors initiate the study of the relationship between JBW-algebras and universal specializations, in particular between JW-algebras and their enveloping von Neumann algebras. Combining the results of chapters 6 and 7 one obtains in particular a complete infinite dimensional extension of the classical result of Jordan, von Neumann and Wigner.

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Keywords : Jordan algebras of self-adjoint operators on a Hilbert space; Jordan Banach algebras; JBW-algebras; projection lattices of JBW-algebras; spin factors; universal specializations; enveloping von Neumann algebras

Classification :

- *46L99 Selfadjoint operator algebras
- 46L05 General theory of C^* -algebras
- 17C65 Jordan structures on Banach spaces and algebras
- 46-02 Research monographs (functional analysis)