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Holomorphic automorphism groups in Banach spaces: an elementary introduction. (English)

North-Holland Mathematics Studies, 105. Notas de Matemática, 97. Amsterdam - New York - Oxford: North-Holland. XII, 291 p. \$ 44.50; Dfl. 120.00 (1985).

In the past 25 years or so, there has been an intensive development of holomorphy in infinite dimensions. This is represented in a sense by the following books: 1) *L. Nachbin*, Topology on spaces of holomorphic mappings (1969; Zbl 0172.399); 2) *J. P. Ramis*, Sous-ensembles analytiques d'une variété banachique complexe (1970; Zbl 0212.428); 3) *P. Noverraz*, Pseudo-convexité, convexité polynomiale et domaines d'holomorphie en dimension infinie (1973; Zbl 0259.46049); *G. Coeuré*, Analytic functions and manifolds in infinite dimensional spaces (1974; Zbl 0282.32015); 5) *T. Franzoni* and *E. Vesentini*, Holomorphic maps and invariant distances (1980; Zbl 0447.46040); 6) *S. Dineen*, Complex Analysis in locally convex spaces (1981; Zbl 0484.46044); 7) *J. F. Colombeau*, Differential calculus and holomorphy (1982; Zbl 0506.46001); 8) *P. Mazet*, Analytic sets in locally convex spaces (1984); 9) *H. Upmeier*, Symmetric Banach manifolds and Jordan C^*-algebras (1985; reviewed below). They are of a more or less advanced level. The following ones are of an introductory nature: 10) the book under review; 11) *J. A. Barroso*, Introduction to Holomorphy (1985); 12) *S. B. Chae*, Holomorphy and calculus in normed spaces (1985); 13) *J. Mujica*, Complex analysis in Banach spaces (1985). One of the important advances occured in connection with the problem of the determination of the holomorphic automorphisms of complex manifolds, to which the book under review is primarily devoted. By combining the methods of the theories developed independently by W. Kaup and J. P. Vigué, the authors derive some of the main theorems of this area.

The text is subdivided into Chapters 1 (uniformly bounded families of holomorphic maps and locally uniform convergence), 2 (topological consequences of the group structure of the set of automorphisms), 3 (the Carathéodory distance and completeness properties of the group of automorphisms), 4 (the Lie algebra of complete vector fields), 5 (the natural topology on the Lie algebra of complete vector fields), 6 (the Banach-Lie group structure of the set of automorphisms), 7 (bounded circular domains), 8 (automorphisms of the unit ball of some classical Banach spaces), 9 (bounded symmetric domains), and 10 (the Jordan theory of bounded symmetric domains).

Among the main features dealt with, we quote the following ones: holomorphic maps in Banach spaces, Cartan's uniqueness theorem, the Poincaré distance, the Carathéodory pseudometric, Banach manifolds, Banach-Lie groups, J^*-algebras of operators, and Jordan triple product star algebras. The book ends with an extensive list of references and supplementary reading adequate for its level.

L.Nachbin

Keywords : holomorphy in infinite dimensions; determination of the holomorphic automorphisms of complex manifolds; uniformly bounded families of holomorphic maps; locally uniform convergence; group structure of the set of automorphisms; Carathéodory

distance; Lie algebra of complete vector fields; Banach-Lie group structure of the set of automorphisms; Jordan theory of bounded symmetric domains; Cartan's uniqueness theorem; Poincaré distance; Carathéodory pseudometric; Banach manifolds; Banach-Lie groups; J^*-algebras of operators; Jordan triple product star algebras

Classification :

     ∗46G20 Infinite dimensional holomorphy

     46-01 Textbooks (functional analysis)

     46H25 Topological modules

     17C65 Jordan structures on Banach spaces and algebras

     46L99 Selfadjoint operator algebras