

Book Reviews

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BOOK REVIEWS

L. Di Martino, W. M. Kantor, G. Lunardon, M. C. Tamburini (eds.): GROUPS AND GEOMETRIES. Birkhäuser, Basel, 1998, xii + 262 pages. ISBN 3-7643-5881-3 (Basel), ISBN 0-8176-5881-5 (Boston), DM 148,-.

The book collects extended and carefully edited versions of selected (21 from the total 40) talks presented at the Conference on Groups and Geometries held in Siena in 1996.

The editors of the volume specify the main aspects of the conference and proceedings as follows: the classification of finite simple groups, the structure and properties of Lie groups over finite and algebraically closed fields of finite characteristics, buildings, geometries of projective and polar spaces and of sporadic simple groups. However, any strict division of this kind in individual papers is rather difficult because of the deep interplay between group-theoretic and geometric (including combinatorial) approaches, the demonstration of which was the main target of the conference. At least two papers may be mentioned as examples. The topic of the paper "On Flag-transitive Incidence Geometries of Rank 6 for the Mathieu Group M_{12} " by Buckenhout et al. is the geometric interpretation of finite simple groups and their automorphism groups on the basis of suitable diagrams (by considering all geometries in them). The second approach of the diagram geometry, namely the classification of coset geometries for a given group, is used in the paper "The Residually Weakly Primitive Geometries of the Janko Group J_1 " by Gottschalk and Leemans.

Many papers include besides new results also an overview of the present state of art. Such are, in particular, the paper by Aschbacher & Smith on the recent progress in classification of quasisimple groups, the contribution by Huybrecht & Pasini on a characterization of the Hall-Janko group J_2 by a c.L*-geometry, Johnson's paper concerned with the concept of "derivation" (an order preserving procedure of producing another affine plane from a finite affine plane), Shalev's study on the impact of ideas from fractal geometry on the examination of the subgroup structure of profinite groups. Further, perhaps Shult's "Aspects of Building", Thas' "Embedding of Geometries in Finite Projective Spaces", Steinbach's paper on generalized quadrangles and "Affine Extensions of Near Hexagons" by Bon and Cuypers should be named besides the "Non-Canonical Gluing of Two Affine Spaces" by Baumeister and "Classification of Affine Extended Dual Polar Spaces" by Stroh and Ivanov.

The book is a lively reflection of recent results as well as of open problems and will certainly be of great interest to a broad range of algebraists and geometers working or being interested in the areas covered by the Siena conference.

Ivan Sazl, Praha

A. Kh. Gel'ig, A. D. Churilov: STABILITY AND OSCILLATIONS OF NONLINEAR PULSE-MODULATED SYSTEMS. Birkhäuser, Basel, 1998, xiii+362 pages, DM 148,-.

The fundamental mathematical methods for studying stability and oscillations in control systems of the form

$$\frac{dx}{dt} = Ax + bf$$

are presented in the book.

The presentation is in a form suitable for engineers.

Štefan Schwabik, Praha

Angelo Favini, Atushi Yagi: DEGENERATE DIFFERENTIAL EQUATIONS IN BANACH SPACES. Pure and Applied Mathematics Vol. 215, Marcel Dekker Inc., New York, 1999, pp. xi+313, ISBN 0-8247-1677-9, USD 155,-.

The book is concerned with the Cauchy problem for degenerate linear differential equations that can be written in an abstract form

$$\frac{d}{dt}Mv = Lv + f(t), \quad Mv(0) = v_0$$

where L, M are closed linear operators in a Banach space X . The equation is reduced to the multivalued differential equation $u_t \in Au + f$ and the theory of linear semigroups is extended to cover the multivalued operators. The emphasis is set to the regular solutions, the weak ones being treated only occasionally.

Generation of a semigroup as well as the notion of the maximal dissipative operator are generalized to multivalued operators, the main difficulty of the treatment being due to the fact that the domains of the operators involved are not necessarily dense in X .

Existence and uniqueness results for the Cauchy problem in hyperbolic and parabolic cases are given. In addition, the maximal regularity properties of solutions to parabolic degenerate equations, both autonomous and nonautonomous, are established, the interpolation theory playing the crucial role.

The general case, covering the intermediate type of equations is also examined as well as equations of higher order in time. Some alternative, more direct approaches which allow to treat cases important in applications where the general theory fails, close the book.

The general theory is explained and applied to a number of concrete equations and examples.

The book provides a self-contained presentation of the theory and its applications and is addressed to researchers and graduate students with interest in operator semigroups and evolution equations.

Hana Petzeltová, Praha

M. Wolff, O. Gloor, Chr. Richard: ANALYSIS ALIVE. Ein interaktiver Mathematik-Kurs. Birkhäuser, Basel, 1998, xiv+373 pages + CD-ROM, DM 68,-.

The book together with the CD-ROM is oriented to students of mathematics, physics and engineering.

Sequences and series, real functions, differential calculus, integral calculus in one variable as well as some analogous parts of the calculus of functions of more variables are presented. The accompanying CD-ROM is based on the software Maple (V R4 or later) and offers a great number of examples and a visualization of the mathematical concepts presented in the book.

Štefan Schwabik, Praha

