Book Reviews

Mathematica Bohemica, Vol. 133 (2008), No. 4, 447–448

Persistent URL: http://dml.cz/dmlcz/140632

BOOK REVIEWS

Michael Reissig, Bert-Wolfgang Schulze (eds.): NEW TRENDS IN THE THEORY OF HYPERBOLIC EQUATIONS. Operator Theory: Advances and Applications. Vol. 159, Birkhäuser, Basel, 2005, xiii+511 pages, hardcover, ISBN 3-7643-7283-4, EUR 148.–.

The volume under review is devoted to modern theory of hyperbolic equations. It consists of six contributions concerning topics such as evolution equations, multiple characteristics, propagation phenomena, global existence, influence of nonlinearities. The following authors contributed to the book:

P. D'Ancona and V. Georgiev: *Wave maps and ill-posedness of their Cauchy problems.* This article presents an introduction to the theory of wave maps, gives an overview of some recent methods and brings two alternative proofs of the ill-posedness of the corresponding Cauchy problem in critical Sobolev spaces.

H. Kubo and M. Ohta: *On the global behavior of classical solutions to coupled systems of semilinear wave equations.* The main topic of this paper is the way how the theory of wave equations is transfered to systems of semilinear and quasilinear wave equations with different propagation speeds.

M. Nakao: *Decay and global existence for nonlinear wave equations with localized dissipations in general exterior domains.* Local and total energy decays for the linear wave equation with the homogeneous Dirichlet boundary condition in an exterior domain are derived and applied to an existence problem of global decaying solutions of nonlinear wave equations. The localized dissipation is intended to be as weak as possible.

K. Yagdian: *Global existence in the Cauchy problem for nonlinear wave equations with variable speed of propagation.* A collection of some results for the existence and nonexistence of global solutions to the Cauchy problem for hyperbolic equations with variable coefficients is given. Special attention is paid to the parametric resonance phenomena.

M. Cicognani and L. Zanghirati: *On the nonlinear Cauchy problem.* The aim of this paper is to obtain, by the same procedure, several results of well-posedness and propagation of regularity for a solution of a quasilinear hyperbolic Cauchy problem.

M. Dreher and I. Witt: *Sharp energy estimates for a class of weakly hyperbolic operators.* The authors give a survey of their results about energy estimates for the Cauchy problem for weakly hyperbolic operators with finite time degeneracy and show that these estimates are sharp for a wide range of examples.

The book is addressed to beginers as well as specialists in the field. The contributions are to a large extent self-contained.

Hana Petzeltová, Praha

K. Reich, A. Kreuzer (eds.): EMIL ARTIN (1898–1962). BEITRÄGE ZUR LEBEN, WERK UND PERSÖNLICHKEIT. Algorismus, Studien zur Geschichte der Mathematik und der Naturwissenschaften herausgegeben von Menso Folkerts. Vol. 61, Erwin Rauner Verlag, Augsburg, 2007, 231 pages, ISBN 978-3-936905-24-3, ISSN 1863-4982.

Emil Artin was one of the leading algebraists of the 20th century. He worked in algebraic number theory, contributing largely to class field theory and a new construction of L-functions. He also contributed to the pure theories of rings, groups, and fields. He developed the theory of braids as a branch of algebraic topology.

The collection of nine papers by eight authors (K. Mačák, J. Mumm, R. Thiele, K. Reich, D. Fenster, A. Thedy, H.-J. Höppner, A. Odefey) presents Artin's life and work in detail. Born in Vienna, he attended secondary school in Liberec, and universities in Vienna, Leipzig and Göttingen. He started his professional career at the University of Hamburg in 1922.

He emigrated to the United States in 1937 and spent most of his fruitful time at the Indiana University and Princeton University. Finally he returned to Hamburg in 1958.

The book describes thoroughly all these Artin's periods of life. It is equipped with quotations of historical sources and a lot of photographs. Special contributions are devoted to Artin's cooperation with van der Waerden and to his theory of braids. The last paper of the collection is concerned with Artin's love of music.

The book covers all facts from Artin's life in an excellent way and presents also his most important contributions to mathematics.

Karel Segeth, Praha

Jean-Yves Beziau (ed.): LOGICA UNIVERSALIS. 2nd edition, Birkhäuser, Basel, 2007, 246 pages, EUR 50.–.

The first edition of the book under review was published in 2005, see Math. Bohem. 132 (2007), 333. It apparently found its readership very quickly and the editor prepared its 2nd edition, giving the authors the opportunity to substantially revise—and often expand—their original papers.

Jan Krajíček, Praha

P. Pucci, J. Serrin: THE MAXIMUM PRINCIPLE. Birkhäuser, Basel, 2007, x+232 pages, ISBN 978-3-7643-8144-8, EUR 50.–.

This book is intended for experts in partial differential equations. It gives a comprehensive explanation of various maximum principles available in elliptic theory, from their beginning for linear equations to recent work on nonlinear and singular equations. Chapter 2 concerns tangency and comparison theorems for classical solutions of the differential inequality $\operatorname{div} A(x,u,Du)+B(x,u,Du) \geqslant 0$. The boundary point lemma is also proved here. Chapter 3 and Chapter 6 study maximum principles for weak solutions of the differential inequality $\operatorname{div} A(x,u,Du) + B(x,u,Du) \geqslant 0$ in the Sobolev spaces $W^{1,p}$. Chapter 4 is devoted to the study of boundary value problems for nonlinear ordinary differential equations. Chapter 5 is concerned with the strong maximum principle and the compact support principle for singular quasilinear differential inequalities. Local boundedness, Harnack inequality, Liouville theorem and Hölder continuity are proved in Chapter 7. In the last chapter the Cauchy-Liouville theorem is presented. Further, is established a condition for the solution of the differential equation to be radially symmetric. In the end the phenomenon of dead cores is studied.

Dagmar Medková, Praha