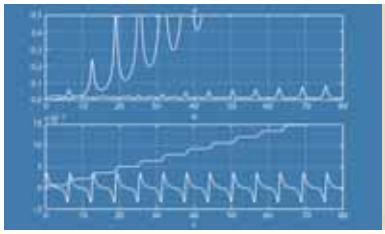
NEWSLETTER

OF THE EUROPEAN MATHEMATICAL SOCIETY



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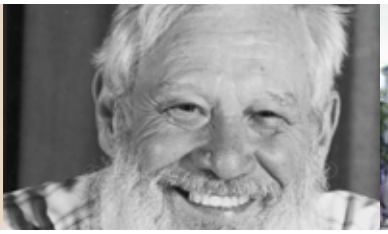

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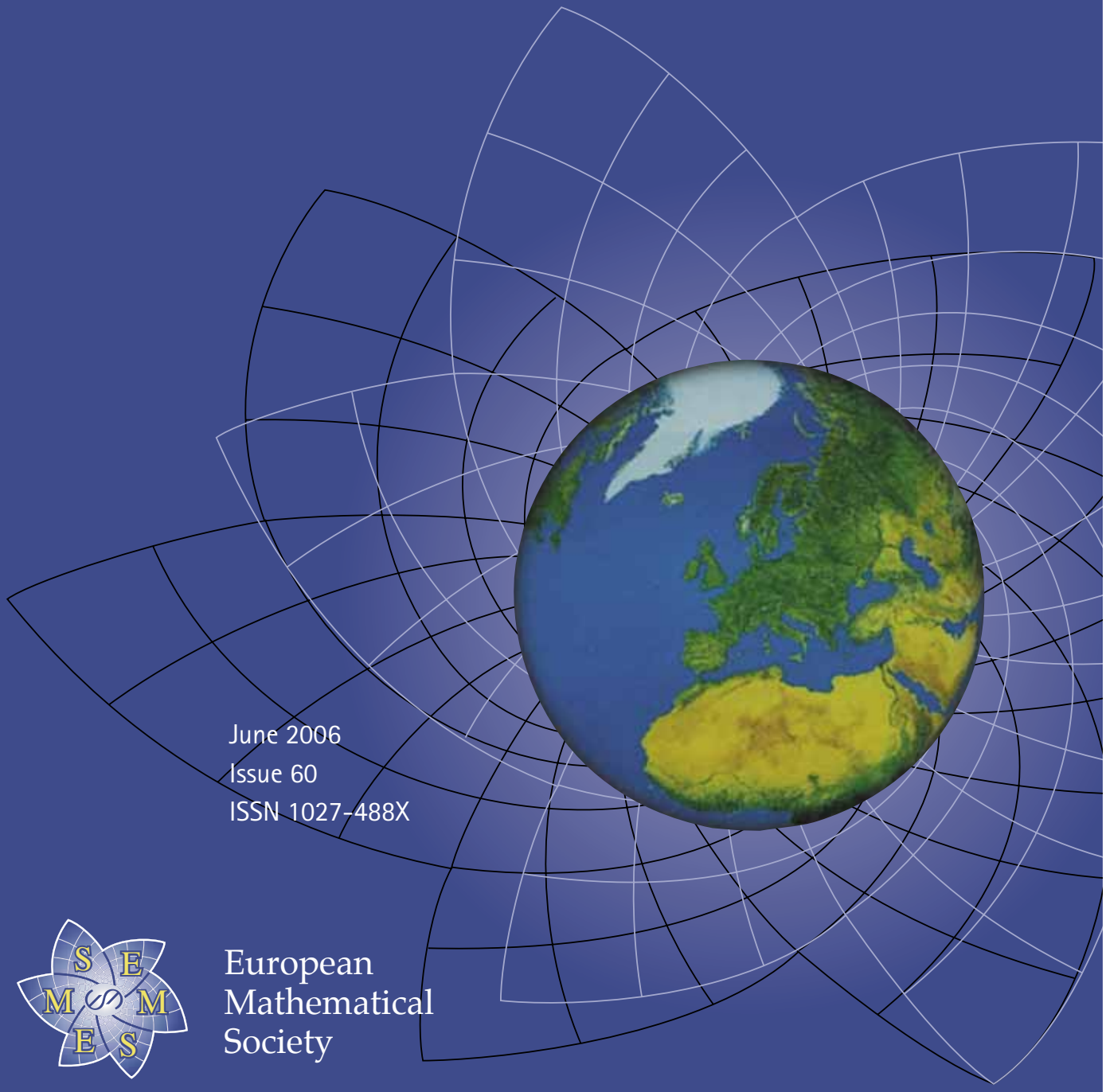

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Recent books

edited by Ivan Netuka and Vladimir Souček (Prague)

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***M. J. Ablowitz, B. Prinari, A. D. Trubatch: Discrete and Continuous Nonlinear Schrödinger Systems**, London Mathematical Society Lecture Note Series 302, Cambridge University Press, Cambridge, 2004, 269 pp., GBP 37,50, ISBN 0-521-53437-2*

Solitons (localized and stable waves interacting almost like elastic objects) in nonlinear systems are a fascinating theme. They were initially studied (over a century ago) in relation to water waves, where they appear as solutions of the corresponding nonlinear differential equations (the Korteweg-de Vries equation). These phenomena have been intensively studied over the last thirty years. This book is devoted to the study of solitons for nonlinear Schrödinger systems in nonlinear optics. Such systems describe, among others, wave transmission in optical fibers, which have technological applications of critical importance.

The book follows an earlier monograph by Ablowitz and Clarkson (Solitons, Nonlinear Evolutions Equations and Inverse Scattering, LMS Lecture Notes Series 149, Cambridge University Press, 1991). The central tool used in the study of these systems, which is thoroughly explained in the book, is the inverse scattering transform (IST): a method that can be viewed as a nonlinear version of the Fourier transform and which allows one to linearize certain classes of nonlinear evolution equations. This method is applied to four different types of nonlinear Schrödinger systems in 1+1 and 1+2 dimensions: Nonlinear Schrödinger equations (NLS), integrable discrete NLS, matrix NLS and integrable discrete matrix NLS. To summarize, this valuable book provides a detailed and self-contained presentation of an extremely important tool used in the study of NLS systems. (mzahr)

***S. Altmann, E. L. Ortiz, Eds.: Mathematics and Social Utopias in France: Olinde Rodriques and His Times, History of Mathematics**, vol. 28, American Mathematical Society, Providence, 2005, 168 pp., USD 49, ISBN 0-8218-3860-1*

This book is written by a team of mathematicians, historians of mathematics, and historians of culture and society and it deals with the life and work of B. O. Rodrigues (1794-1851) who was a fascinating figure in Paris in the first half of the nineteenth century. He was born to a Jewish family, which was almost certainly of Portuguese and Spanish origin. Rodrigues studied at the École Normale, where he obtained a doctorate in mathematics in 1816. Then he became a prosperous banker and supported the development of the French railway system. But he was also a social reformer within the Saint-Simon utopian socialist movement. His interests were wide; he wrote on mathematics, politics, banking, social reforms and he discussed moral questions such as the position of women in society, the treatment of workers, etc.

The authors have put together, for the first time, archival resources and documents on B. O. Rodrigues, which are scattered throughout a variety of archives, to show different aspects of Rodrigues' fascinating life and to describe his interesting mathematical works and his influence on mathematics in France. The authors corrected some inaccurate references and mistakes that have been repeatedly made about Rodrigues' life. After a description of his scientific, cultural and social backgrounds, Rodrigues' life and career, including his contributions to orthogonal polynomials, combinatorics, groups of transformations, rotations, and applications of quaternions, are discussed from both a mathematical and an historical point of view. The book draws attention to the first half of the 19th century, to a period of French history that was very creative and influential on European intellectual and social development. The reader can find here many roots of modern mathematics as well as foundations of utopian ideas, including the beginning of an understanding of housing and banking transport. The book is recommended for people interested in the roots of modern mathematics and modern society. (mbec)

***W. O. Amrein, A. M. Hinz, D. B. Pearson, Eds.: Sturm-Liouville Theory: Past and Present**, Birkhäuser, Basel, 2005, 335 pp., EUR 68, ISBN 3-7643-7066-1*

The conference commemorating the 200th anniversary of the birth of C. F. Sturm took place at Geneva in September 2003. This book contains twelve survey articles, which are expanded versions of contributions to the conference. They show how Sturm's ideas have been developing up to the present day.

Three articles were written by N. Everitt. The first one describes improvements of the classical Sturm and Liouville (S-L) results made by H. Weyl, M. Stone and E. Titchmarsh. The second one presents a catalogue of more than fifty examples of differential equations of S-L type and their properties. The third paper (written jointly with C. Benewitz) refers to the eigenfunction expansion problem and methods based on function theory.

D. Hinton and B. Simon describe various aspects and generalizations of the Sturm oscillation theorem. Investigations of spectral properties of S-L operators have stimulated a great deal of research in operator theory and vice versa. This fact can be followed in the contributions written by D. Gilbert (the link between asymptotics of solutions and spectral properties and, in particular, the concept of subordinacy), Y. Last (discrete and continuous Schrödinger operators), R. del Rio (influence of boundary conditions upon spectral properties) and J. Weidmann (approximation of singular problems by regular ones). Results on the inverse spectral theory for systems of S-L equations are described by M. Malamud. There are also two contributions devoted to nonlinear equations; bifurcation phenomena are presented by C-N. Chen and the overview on evolution of zero sets for solutions of nonlinear parabolic equations is written by V. Galaktionov and P. Harwin.

The level of presentation of all the surveys is accessible to graduate students. They will find here comments on the current state of research and information about the most important ordinary differential equations. Since the articles are also accompanied by many references, reading of the book is a good starting point for research in differential equations and/or functional analysis. Any mathematician will find the historical contextual information useful. (jmil)