Analysis and Applications – ISAAC 2001

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Analysis and Applications – ISAAC 2001

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Preface

The 3rd International ISAAC Congress took place from August 20 to 25, 2001 in Berlin, Germany, supported by the German Research Foundation (DFG), the city of Berlin through Investitionsbank Berlin and the Freie Universität Berlin. 10 ISAAC Awards were presented to young researchers in analysis its applications and computation from all over the world on the basis of financial support from Siemens, Daimler Chrysler, Motorola and the Berlin Mathematical Society and book gifts from Birkhäuser Verlag, Elsevier, Kluwer Academic Publisher, Springer Verlag and World Scientific.

The ISAAC is grateful to all these institutions, firms and publishers for their support. Due to the support from DFG and from Investitionsbank Berlin many of the 362 registered participants could be financially supported. Unfortunately the financial supports were granted too late to reach more people from former SU as the procedure for visa is still more than cumbersome and embassies are not at all flexible. Hence, a big part of the financial support could not be used and had to be returned.

The 10 plenary lectures were

- I. Antoniou, I. Prigogine (Intern. Solvay Inst. Phys. Chem., Brussels): Irreversibility and the probabilistic description of unstable evolutions beyond the Hilbert space framework (read by I. Antoniou),
- N.S. Bakhvalov, M.E. Eglit (Math. Mech. Dept., Lomonosov State Univ. Moscow): Homogenization of some multiparametric problems (read by M.E. Eglit),
- A.D. Bruno (Keldysh Inst. Appl. Math., Moscow): Power geometry as a new calculus,
- M. Essén (Dept. Math., Uppsala Univ.): Some results on Q spaces,
- P. Kuchment (Texas A & M Univ., College Station): Differential and pseudo-differential operators and graphs as models of mesoscopic systems,
- V. Maz'ya (Dept. Math., Linköping Univ.): The Schrödinger and the relativistic Schrödinger operators on the energy space: boundedness and compactness criteria,
- S. Nikolskii (Steklov Inst. Math., RAS Moscow): Boundary problems

and algebraic polynomials,

T. Nishitani (Dept. Math., Osaka Univ): Hyperbolicity for systems

S. Saitoh (Dept. Math., Gunma Univ.): Theory of reproducing kernels,

M. Singer (Dept. Math., North Carolina State Univ., Raleigh, NC):

Galois theory of linear differential equations with applications to Hamiltonian mechanics,

D. Tataru (Dept. Math., Univ. Cal., Berkely): The nonlinear wave equation.

In 38 sessions from real, complex and hypercomplex analysis, from potential theory, differential geometry, differential equations and operator theory, from mathematical physics, engineering and life sciences, and from numerical analysis and computation nearly 400 scientists from altogether 41 countries participated in the congress.

The abstracts of the plenary, the main and the regular talks can be found at the webpage of the “Atlas Mathematical Conference Abstracts” under

<http://at.yorku.ca/cgi-bin/amca/cahk-01>

ISAAC and the local organizers highly appreciated this service, on the basis of which the abstract booklet was easily produced. Thanks are due to Elliott Pearl from York University for his perfect arrangement of the abstracts.

The ISAAC Awards for young scientists in analysis its applications and computation were given to

Dr. Jin Chen, Professor at Fudan University in Shanghai, China: Inverse Problems,

Dr. Young-Bok Chung, Professor at the Chonnam National University in Kwangju, Korea: Complex Analysis of Several Variables,

Dr. Michael Dreher, Research Associate at the University of Tsukuba, Japan: Weakly Hyperbolic and Degenerate Parabolic Differential Equations,

Dr. Misolav Engliš, Researcher at the Academy of Sciences in Prague, Czech Republic: Quantization Methods on Manifolds and Invariant Differential Operators on Hermitean Spaces,

Dr. Vassili G. Gelfreich, Researcher at the Freie Universität Berlin, Germany: Dynamical Systems,

Dr. Maarten de Hoop, Professor at Colorado School of Mines in Golden, Colorado, USA: Wave Propagation and Scattering,

Dr. Frank Jochmann, Postdoc at the University of Leipzig, Germany: Partial Differential Equations of Mathematical Physics,

Dr. Alexey Karapetyants, Professor at the Autonomous University of Mexico D.F.: Bergman Spaces, Toeplitz Operators, and Singular Integral Operators,

Dr. Vladislav V. Kravchenko, Professor at the National Polytechnic Institute in Mexico D.F.: Quaternionic Analysis and Partial Differential Equations of Mathematical Physics,

Dr. Ya-Yuang Wang, Professor at the Jiao Tong University in Shanghai, China: Nonlinear Partial Differential Equations, Shock Waves, and Geometric Optics.

The prizes were equipped with DM 800 each and with several books. Two awardees not participating on the congress did only get the certificates. These can be viewed on the ISAAC homepage at FU Berlin under

<http://www.math.fu-berlin.de/rd/ag/isaac/publication.html>

The award committee consisted of H. Begehr, E. Brüning, Ju. Dubinskii, M. Essén, R.P. Gilbert, J. Kajiwara, I. Laine, I. Netuka, D.A. Tarzia, M.W. Wong, C.C. Yang. The ISAAC society will continue in encouraging young researchers in analysis, its applications and computation by awarding prizes for high quality research at its international congresses.

The proceedings of the congress will be published in several volumes. This present volume contains some of the plenary (1 hour) and main (45 minutes) lectures. Nonlinear problems are the main target of mathematical analysis and its applications today. Survey articles report on new methods either for quite general problems as e.g. the power geometry for as well algebraic as differential equations or homogenization methods to describe inhomogeneous material or for special involved physical processes like electromagnetic wave propagation in thin (molecular) structures the theory of differential equations in graph-structures. Decomposition of the Hilbert space of an arbitrary Hamiltonian into subspaces of decaying and of non decaying states is explained. There are two main areas within the contributions : complex analysis and hyperbolic partial differential equations. In complex analysis Q -spaces and $Q^\#$ -spaces are reported on, hyperbolically convex functions forming a non-linear space are studied, applying value distribution methods the proximity of preimages of polygons are investigated. Moreover, value distribution is generalized to algebraically closed fields of characteristic p . Necessary and sufficient conditions for the validity of Riemann's hypothesis are given and the important theory of reproducing kernels are shown to be widely applicable. Analytic functions and functionals in several complex variable are investigated on the basis of a series of new norms.

Hyperbolicity and strong hyperbolicity is surveyed on for first order systems together with their Cauchy problem. This is also in the center of research on second order strictly hyperbolic operators, on the Schrödinger equation and the wave equation in different situations even without boundary conditions. Also inverse scattering problems are con-

sidered. Other problems come from potential theory, harmonic analysis and dynamical systems.

The camera-ready manuscript of the volume in the Kluwer style was prepared by Barbara G. Wengel. She together with Daria Schymura, Astrid Begehr and Andreas Krausz were heavily involved with the congress organization. Thanks are due to them and to all the other helpers from both mathematical institutes of the FU Berlin among them in particular the dynamical systems group around Professor B. Fiedler (FU) and Dr. K.R. Schneider (WIAS).

The next international ISAAC Congress will take place at York University in Toronto from August 11 to 16, 2003.