PREFACE

The current volume is intended to summarize ideas and discussions surrounding the topics of the workshop "**Evolution Equations — propagation phenomena - global existence - influence of non-linearities**" held at the Banach Center of the Institute of Mathematics of the Polish Academy of Sciences from July 1 to July 7, 2001. In contrast to earlier conferences on mathematical topics the conference did not take place at the charming old city villa on Mokotowska street. This workshop was indeed the first mathematical meeting being held at the new, modern and functional Banach Center conference facility of the Polish Academy of Sciences on the top floors of the Institute of Mathematics, Śniadeckich 8, Warsaw.

The papers presented in this volume do not constitute conference proceedings in the strict sense, since we have chosen to include in our call for contributions all originally invited speakers at the conference, who intended to participate. This way we hope in particular to avoid any circumstantial bias with regards to the originally planned conference program caused by problems lying beyond the control of the prospective participants. Moreover, some contributors have opted to present their topic from a slightly different angle than in their conference talk. Thus, beyond providing a representative sample of the topics discussed at the meeting the present volume of the Banach Center Publications also documents the current state of affairs in a wide variety of topics linked to the conference program. Since the actual scientific program is not identical with the specific contributions of this volume, we have included a list of participants and the final scientific program listing as a separate document to record the activities of the workshop. The contributions of this volume are arranged essentially according to the grouping of the scientific program.

The organization of the workshop was a joint Polish-German venture with Wojciech Zajączkowski, Polish Academy of Sciences, Warsaw, representing the Polish side and Rainer Picard, Technische Universität Dresden and Michael Reissig, Technische Universität Bergakademie Freiberg representing the German side.

Funding of the conference was provided by the Polish Academy of Sciences and the German Volkswagen Foundation, whose generous support is gratefully acknowledged.

We consider ourselves lucky to have had the opportunity to hold our workshop in the new facility and we wish to acknowledge, in particular, the warm hospitality of the

Banach Center and the professional support of its administrational team.

Last not least, we wish to thank all participants of the workshop and contributors to this volume for their support in making the workshop a fruitful, enjoyable event and this collection of articles a valuable resource.

Rainer Picard, Michael Reissig, Wojciech Zajączkowski

PARTICIPANTS AND SCIENTIFIC PROGRAM

List of participants

Apart from the organizing committee consisting of R. Picard (Dresden, Germany), M. Reissig (Freiberg, Germany) and W. Zajączkowski (Warsaw, Poland), the following have participated in the workshop:

H. D. Alber (Darmstadt, Germany), S. Alinhac (Paris, France), P. Biler (Wrocław, Poland), Ph. Brenner (Göteborg, Sweden), D. Calvo (Torino, Italy), J. Cholewa (Katowice, Poland), W. Domański (Warsaw, Poland), M. Dreher (Tsukuba, Japan), St. Ebenfeld (Darmstadt, Germany), J. Gawinecki (Warsaw, Poland), J. Goncerzewicz (Wrocław, Poland), T. Gramchev (Cagliari, Italy), F. Hirosawa (Tsukuba, Japan), G. Karch (Wrocław, Poland), N. Koksch (Dresden, Germany), H. Kołakowski (Warsaw, Poland), A. Kubo (Fujita, Japan), R. Liapine (Ufa, Russia), P. Mucha (Warsaw, Poland), T. Nadzieja (Zielona Góra, Poland), I. Pawłow (Warsaw, Poland), P. Popivanov (Sofia, Bulgaria), D. Portnyahin (Kharkov, Ukraine), R. Racke (Konstanz, Germany), J. Rencławowicz (Warsaw, Poland), L. Rodino (Torino, Italy), M. Ruzhansky (London, England), P. Rybka (Warsaw, Poland), R. Saks (Ufa, Russia), A. Shirikyan (Edinburgh, Scotland), G. Ströhmer (Iowa City, USA), K. Tsutaya (Sapporo, Japan), H. Vogt (Dresden, Germany), J. Voigt (Dresden, Germany), M. Wiegner (Aachen, Germany), J. Wirth (Freiberg, Germany), I. Witt (Potsdam, Germany), K. Yagdjian (Erevan, Armenia), R. Young (Massachusetts, USA), E. Zadrzyńska (Warsaw, Poland), A. Żochowski (Warsaw, Poland).

Scientific program

The scientific program started on Monday, July 2, 2001 at 8:30 with a brief opening address. The program was scheduled as follows:

Monday

M. Wiegner (Aachen): *The Stokes problem in an infinite layer*

J. Voigt (Dresden): *Gaussian bounds for evolution systems perturbed by Kato class absorption-excitation rates*

P. Biler (Wrocław): *Multifractal and Levy conservation laws*

H. Vogt (Dresden): *L_p-analyticity of the Schrödinger semigroup on Riemannian manifolds*

J. Goncerzewicz (Wrocław): *Localization and blow-up in finite time of solutions of the porous media equation. The influence of boundary data*

J. Cholewa (Katowice): *Global solutions of reaction diffusion equations in unbounded domains*

N. Koksch (Dresden): *Inertial manifolds for nonautonomous dynamical systems*

J. Gawinecki (Warsaw): *Initial boundary value problems in non-linear thermoelasticity theory*

Tuesday

R. Racke (Konstanz): *Stability for dissipative magneto-elastic systems*

I. Pawłow (Warsaw): *Global existence for nonlinear thermoelasticity in 3D*

J. Renclawowicz (Warsaw): *Asymptotical self-similarity for nonlinear parabolic systems*

T. Gramchev (Cagliari): *Propagation of analytic regularity for uncoupled hyperbolic-parabolic systems*

St. Ebenfeld (Darmstadt): *A general investigation of admissible couplings between systems of higher order and different type*

L. Rodino (Torino): *Solvability for semi-linear p.d.e. with multiple characteristics*

D. Calvo (Torino): *Generalized Gevrey classes and multi-quasi hyperbolic operators*

A. Shirikyan (Edinburgh): *Qualitative theory for linear and nonlinear hyperbolic PDEs*

Wednesday

S. Alinhac (Paris): *The null condition for quasilinear hyperbolic equations in two space dimensions*

K. Yagdjian (Erevan): *One application of Floquet's theory to blow-up phenomena*

J. Wirth (Freiberg): *About the solvability behavior for special classes of nonlinear hyperbolic equations*

K. Tsutaya (Sapporo): *Blow-up for a system of nonlinear wave equations*

P. Popivanov (Sofia): *Singularities of the solutions of the Goursat problem and some applications to semilinear hyperbolic equations*

Thursday

Ph. Brenner (Göteborg): *On maximal decay of solutions to nonlinear Klein-Gordon equations*

F. Hirosawa (Tsukuba, Japan): *From wave- to Klein-Gordon decay rates*

M. Ruzhansky (London): *Fourier integral operators, hyperbolic and non-hyperbolic PDEs*

M. Dreher (Tsukuba): *Edge Sobolev spaces and weakly hyperbolic equations*

J. Witt (Potsdam): *A pseudodifferential calculus for treating weakly hyperbolic equations with finite time degeneracy*

A. Kubo (Fujita): *Asymptotic behavior of the solution for a weakly hyperbolic equation of second order*

R. Young (Massachusetts): *The p-system in hyperbolic systems*

G. Karch (Wrocław): *On zero mass solutions of viscous conservation laws*

Friday

P. Rybka (Warsaw): *Evolution in changing environment*

P. Mucha (Warsaw): *On a generalized energy estimate for a free boundary problem*

T. Nadzieja (Zielona Góra): *Structure of steady states for Streater's energy-transport models of gravitating particles*

E. Zadrzyńska (Warsaw): *On global motion of general compressible heat-conducting fluid in a domain bounded by a free surface*

R. Saks (Ufa): *About the spectrum of the operator curl in some regions*

R. Liapine (Ufa): *Most probable evolution as a basic principle of non-equilibrium statistical physics*

G. Ströhmer (Iowa City): *About the long-term behavior of surface waves on viscous fluids*

H.-D. Alber (Darmstadt): *A mathematical model for evolving phase changes*

The scientific program was concluded on Friday, July 6, 2001 at 17:30 with a brief closing address.