Complex Analysis and Dynamical Systems V

Fifth International Conference on
Complex Analysis and Dynamical Systems
May 22–27, 2011
Akko (Acre), Israel

Mark L. Agranovsky, Matania Ben-Artzi, Greg Galloway,
Lavi Karp, Vladimir Maz’ya, Simeon Reich, David Shoikhet,
Gilbert Weinstein, Lawrence Zalcman
Editors

American Mathematical Society
Providence, Rhode Island
Bar-Ilan University
Ramat-Gan, Israel
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Preface

The Fifth International Conference on Complex Analysis and Dynamical Systems (CA&DS V), sponsored by ORT Braude College (Karmiel, Israel), Bar-Ilan University (Ramat-Gan, Israel) and the University of Miami (Miami, FL, USA), took place at the Palm Beach Hotel, Akko (Acre), Israel, during May 22-27, 2011. The conference was devoted to the interaction between various branches of Mathematical Analysis and was organized into three main parallel sessions: Complex Analysis, Partial Differential Equations and General Relativity. Altogether, 125 participants from 18 countries attended the Conference. The Conference was held in conjunction with the ISF (Israel Science Foundation) Workshop on Normal Families, Meromorphic Functions, and Value Distribution Theory.

These proceedings are the tangible record of the Conference. Most of the papers collected here have been contributed by participants in the Conference. In some cases, they have chosen to submit manuscripts which depart from the texts of their lectures. Several invited speakers who were unable to attend the Conference also contributed papers to these proceedings. All submissions have been carefully refereed. We acknowledge with thanks the support provided for the Conference by the Galilee Research Center for Applied Mathematics of ORT Braude College, the Gelbart Research Institute for Mathematical Sciences of Bar-Ilan University, the ESF Networking Programme “Harmonic and Complex Analysis and Applications,” the Emmy Noether Research Institute for Mathematics of Bar-Ilan University, the US National Science Foundation and the University of Miami. Finally, we thank Miriam Beller, who (as in previous volumes) served as technical editor.

The Editors
Conference Program

May 23 – May 27, 2011

Monday - May 23, 2011

10:50 - 11:40 Plenary Lecture 1
G. Huisken, Mean curvature flow with surgeries

12:10 - 13:00 Plenary Lecture 2
W. Bergweiler, Fatou-Julia Theory for non-uniformly quasiregular maps

Session 1: Normal Families and Meromorphic Functions
14:45 - 15:35 M. Sodin, Random complex zeroes
15:55 - 16:45 A. Nishry, The hole probability for Gaussian entire functions
17:25 - 18:15 P. Fenton, Subharmonic functions that are convex between two curves

Session 2: Complex Analysis
14:45 - 15:15 J. Zemánek, Operator theory for holomorphic mappings
15:15 - 15:45 T. Kuczumow, Theorems of Denjoy–Wolff type
15:55 - 16:25 P. Domański, Dynamical behaviour of composition operators on spaces of real analytic functions
16:25 - 16:55 C. Beneteau, A minimal area problem for Bergman space – recent developments
17:25 - 17:55 S. Gryshchuk, Monogenic functions in a biharmonic plane
17:55 - 18:25 A. Danielyan, Approximation and interpolation on compact sets

Session 3: Functional Analysis and Differential Equations
14:45 - 15:15 M. Demuth, On the comparison function in spectral theory
15:15 - 15:45 B. Paneah, Dynamical approach to the identifying problem for the general linear functional operators
15:55 - 16:25 E. Liflyand, Multidimensional variations in Fourier Analysis
16:25 - 16:55 A. Skubachevskii, The Vlasov–Poisson equation in a half-space
17:25 - 17:55 A. Zaslavski, On the structure of extremals of infinite horizon variational problems
17:55 - 18:25 R. Hurri-Syrjanen, On $(1,p)$-Poincare inequalities

Session 4: General Relativity
14:45 - 15:15 M. Wang, Total energy-momentum in General Relativity revisited
15:15 - 15:45 L. Huang, Positive mass theorem for hypersurfaces in Euclidean space for all dimensions
15:55 - 16:25 J. Corvino, *Deformation of scalar curvature and volume*
16:25 - 16:55 M. Khuri, *The positive mass theorem with charge revisited*
17:25 - 17:55 F. Schwartz, *A volumetric Penrose inequality*
17:55 - 18:25 S. Yamada, *Penrose inequality and topology of horizons*

**Tuesday - May 24, 2011**

09:00 - 09:50 Plenary Lecture 3
D. Christodoulou, *Acoustical geometry and shock formation*
10:00 - 10:50 Plenary Lecture 4
J. Noguchi, *Second Main Theorem and degeneracy for entire curves, and applications*

**Session 1: Normal Families and Meromorphic Functions**
11:20 - 12:10 M. Ru, *Value distribution theory of the Gauss maps of minimal surfaces in $\mathbb{R}^3$ and $\mathbb{R}^n$*
12:30 - 13:20 W. Cherry, *An effective Schottky-Landau Theorem for holomorphic curves in projective space*
14:45 - 15:35 J. Grahl, *Some results on normal families, shared values and differential polynomials*
15:55 - 16:45 N. Steinmetz, *Normal families and differential equations*
17:25 - 18:15 A. Eremenko, *Spectral loci of one-dimensional Schrödinger operators*

**Session 2: Complex Analysis**
11:20 - 11:50 K. Dyakonov, *A Diophantine equation and zeros of analytic functions*
11:50 - 12:20 G. Kresin, *Sharp pointwise estimates for directional derivatives and Khavinson’s type extremal problems for harmonic functions*
12:30 - 13:00 S. Myslivets, *On some results connecting with holomorphic extension of functions*
13:00 - 13:30 L. Aizenberg, *Duality in the Hardy spaces of functions holomorphic in strictly convex domains of $\mathbb{C}^n$*
14:45 - 15:15 J. Zajac, *Harmonic mappings in the theory of Teichmüller space*
15:15 - 15:45 G. Katriel, *From spectral theory to bounds on zeros of holomorphic functions*
15:55 - 16:25 J. Rättyä, *Results on meromorphic $\varphi$-normal functions*
16:25 - 16:55 A. Golberg, *On bilipschitz homeomorphisms*
17:25 - 17:55 V. Gichev, *Polynomial hulls of orbits of compact groups*
17:55 - 18:25 B. Falda, *A necessary and sufficient condition relating the discrete and continuous dynamical systems with applications*

**Session 3: Functional Analysis and Differential Equations**
11:20 - 11:50 B.W. Schulze, *Operators with asymptotics in the second order corner calculus*
11:50 - 12:20 M. Reissig, *The influence of oscillations on global existence for a class of semi-linear wave equations*
12:30 - 13:00 T. Sjödin, *Two-phase quadrature domains*
13:00 - 13:30 O. Kutovyi, *Markov jump dynamics in continuum: state evolution and Vlasov scaling*
14:45 - 15:45 Y. Kondratiev, *Dynamics of holomorphic functionals and Markov evolutions of complex systems*
15:55 - 16:25  R. Aulaskari, *Inclusion relations for new function spaces on Riemann surfaces*
17:25 - 17:55  E.K. Narayanan, *Wiener-Tauberian theorems for $L^1(K\backslash G/K)$*

**Session 4**: General Relativity

11:20 - 12:20  D. Christodoulou, *Acoustical geometry and shock formation*
12:30 - 13:00  L. Andersson, *The black hole stability problem*
13:00 - 13:30  G. Holzegel, *Ultimately Schwarzschildian spacetimes*
14:45 - 15:15  D. Fajman, *The $2+1$-dimensional Einstein-Vlasov system with massless particles for small initial data*
15:15 - 15:45  H. Friedrich, *On conformal structures of asymptotically flat, static vacuum data*
16:25 - 16:55  M. Reiris, *Static solutions from the point of view of comparison geometry*

**Wednesday - May 25, 2011**

09:00 - 09:50  Plenary Lecture 5
    L. Harris, *Markov inequalities for multivariate and Banach space polynomials*
10:00 - 10:50  Plenary Lecture 6
    D. Khavinson, *Linear extremal problems in Bergman spaces of analytic functions*
11:10 - 12:00  Plenary Lecture 7
    A. Hinkkanen, *Growth of second Painlevé transcendents*

**Thursday - May 26, 2011**

09:00 - 09:50  Plenary Lecture 8
    A. Solynin, *Quadratic differentials and weighted graphs on compact surfaces*
10:00 - 10:50  Plenary Lecture 9
    W. Hayman, *A conjecture of Blumenthal*

**Session 1**: Normal Families and Meromorphic Functions

11:20 - 12:10  I. Laine, *Tropical Nevanlinna Theory*
12:30 - 13:20  I. Markina, *On value distribution theory on polarizable Carnot groups*
14:45 - 15:35  A. G. O’Farrell, *Reversible biholomorphic maps in two variables*
15:55 - 16:45  V. Dubinin, *Some inequalities for the Schwarzian derivative of holomorphic functions via capacity and symmetrization*
17:25 - 18:15  S. Nevo, *$Q_\alpha$-normality and entire functions*

**Session 2**: Complex Analysis

11:50 - 12:20  M. Bekker, *Automorphic invariant non-densely defined Hermitian*
contractive operators

12:30 - 13:00 A. Fernandez Arias, *Dynamical behaviour of composition operators on spaces of real analytic functions*

13:00 - 13:30 F. Pakovich, *The moment problem on Riemann surfaces and hyperelliptic Abelian integrals*

14:45 - 15:15 A. Jenkins, *An unexpected comparison between complex and non-archimedean dynamics*

15:15 - 15:45 P. Gumenyuk, *Loewner Theory in annulus: evolution families and differential equations*

15:55 - 16:25 C. de Fabritiis, *Beyond the polydisk: examples of one-parameter semigroups in non-strictly convex domains*

16:25 - 16:55 D. Partyka, *A generalized approach to starlikness*

17:25 - 17:55 F. Vlacci, *A new approach to quaternionic dynamics for slice-regular quaternionic functions*

**Session 3: Functional Analysis and Differential Equations**


11:50 - 12:20 V. Rabinovich, *Fredholm property and essential spectrum of pseudodifferential operators with operator-valued symbols*

12:30 - 13:00 I. Witt, *Boundary value problems for Tricomi-type operators*

13:00 - 13:30 F. Hirosawa, *On the global solvability for semilinear wave equations with smooth propagation speeds*

14:45 - 15:15 M. Cwikel, *A simple geometric question with deep consequences for BMO functions*

15:15 - 15:45 N. Tarkhanov, *Singular integral equations with discontinuous coefficients*

15:55 - 16:25 V. Golubyatnikov, *On phase portraits of some odd-dimensional nonlinear dissipative dynamical systems*


17:25 - 17:55 A. Sidi, *Algebraic and analytical study of a class of vector-valued rational interpolation procedures*

**Session 4: General Relativity**

11:20 - 11:50 J. Smulevici, *Self-gravitating Klein-Gordon fields in asymptotically Anti-de-Sitter spacetimes*

11:50 - 12:20 V. Oliker, *A priori estimates of principal curvatures and quasi-umbilicity in de Sitter space*

12:30 - 13:00 L. Nguyen, *Near horizon geometry of degenerate Weinstein metrics*

13:00 - 13:30 D. Maxwell, *Conformal parameterizations of the Einstein constraint equations*

14:45 - 15:15 P. Tod, *On non-existence of asymptotically-flat, time-periodic or non-inheriting solutions of the Einstein equations*

15:15 - 15:45 J. Isenberg, *AVTD behavior in smooth solutions of Einstein’s equations*

15:55 - 16:25 C. Cederbaum, *The Newtonian limit of geometrostatics*

16:25 - 16:55 L. Kapitanski, *Around the Cauchy problem in elastodynamics*
Friday - May 27, 2011

09:00 - 09:50  Plenary Lecture 10
   V. Peller, Functions of perturbed dissipative operators

10:00 - 10:50  Plenary Lecture 11
   A. Vasiliev, Parametrization of the Loewner-Kufarev evolution in
   Sato’s Grassmannian
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568 Simeon Reich and Alexander J. Zaslavski, Editors, Optimization Theory and Related Topics, 2012


514 Arie Leizarowitz, Boris S. Mordukhovich, Itai Shafrir, and Alexander J. Zaslavski, Editors, Nonlinear Analysis and Optimization II, 2010

513 Arie Leizarowitz, Boris S. Mordukhovich, Itai Shafrir, and Alexander J. Zaslavski, Editors, Nonlinear Analysis and Optimization I, 2010

489 David Ginzburg, Erez Lapid, and David Soudry, Editors, Automorphic Forms and $L$-functions II, 2009

488 David Ginzburg, Erez Lapid, and David Soudry, Editors, Automorphic Forms and $L$-functions I, 2009

455 Mark Agranovsky, Daoud Bshouty, Lavi Karp, Simeon Reich, David Shoikhet, and Lawrence Zalcman, Editors, Complex Analysis and Dynamical Systems III, 2008

433 Pavel Etingof, Shlomo Gelaki, and Steven Shnider, Editors, Quantum Groups, 2007


387 Michael Entov, Yehuda Pinchover, and Michah Sageev, Editors, Geometry, Spectral Theory, Groups, and Dynamics, 2005

382 Mark Agranovsky, Lavi Karp, and David Shoikhet, Editors, Complex Analysis and Dynamical Systems II, 2005

364 Mark Agranovsky, Lavi Karp, David Shoikhet, and Lawrence Zalcman, Editors, Complex Analysis and Dynamical Systems, 2004
This volume contains the proceedings of the Fifth International Conference on Complex Analysis and Dynamical Systems, held from May 22–27, 2011, in Akko (Acre), Israel.

The papers cover a wide variety of topics in complex analysis and partial differential equations, including meromorphic functions, one-parameter semigroups, subordination chains, quasilinear hyperbolic systems, and the Euler-Poisson-Darboux equation. In addition, there are several articles dealing with various aspects of fixed point theory, hyperbolic geometry, and optimal control.