

# CONTEMPORARY MATHEMATICS

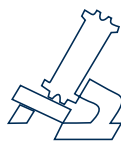
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**Israel Mathematical Conference Proceedings**

## 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

# Complex Analysis and Dynamical Systems V



# CONTEMPORARY MATHEMATICS

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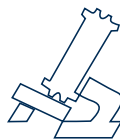
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Providence, Rhode Island

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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. Lifyand, *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  $(1, p)$ -Poincaré 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*  
 16:25 - 16:55 I. Shestakov, *On Zaremba problem for the  $p$ -Laplace operator*  
 17:25 - 17:55 E.K. Narayanan, *Wiener-Tauberian theorems for  $L^1(K\backslash G/K)$*   
 17:55 - 18:25 P. Musolino, *A singularly perturbed nonlinear Robin problem in a periodically perforated domain*

**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 Schwarzschild 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*  
 15:55 - 16:25 M. Anderson, *On quasi-local Hamiltonians in General Relativity*  
 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

- 11:20 - 11:50 S. Krushkal, *The Grunsky operator, Ahlfors' question and geometry of Teichmüller spaces*  
 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 starlikeness*
- 17:25 - 17:55 F. Vlacci, *A new approach to quaternionic dynamics for slice-regular quaternionic functions*

### Session 3: Functional Analysis and Differential Equations

- 11:20 - 11:50 J. Kozicki, *Kawasaki dynamics of interacting particles in continuum: micro- and mesoscopic description*
- 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*
- 16:25 - 16:55 E. Ournicheva, *On Y. Nievergelt's inversion formula for the Radon transform*
- 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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