CONTEMPORARY MATHEMATICS

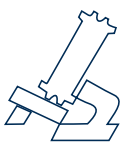
653

Israel Mathematical Conference Proceedings

Complex Analysis and Dynamical Systems VI
Part 1: PDE, Differential Geometry, Radon Transform

Sixth International Conference on
Complex Analysis and Dynamical Systems
in Honor of David Shoikhet on the Occasion of His Sixtieth Birthday
May 19–24, 2013
Nahariya, Israel

Mark L. Agranovsky
Matania Ben-Artzi
Greg Galloway
Lavi Karp
Dmitry Khavinson
Simeon Reich
Gilbert Weinstein
Lawrence Zalcman
Editors



American Mathematical Society
Providence, Rhode Island

Bar-Ilan University
Ramat-Gan, Israel

Complex Analysis and Dynamical Systems VI
Part 1: PDE, Differential Geometry, Radon Transform

Avi Hirschfield Photography

David Shoikhet

CONTEMPORARY MATHEMATICS

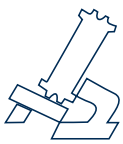
653

Israel Mathematical Conference Proceedings

Complex Analysis and Dynamical Systems VI
Part 1: PDE, Differential Geometry, Radon Transform

Sixth International Conference on
Complex Analysis and Dynamical Systems
in Honor of David Shoikhet on the Occasion of His Sixtieth Birthday
May 19–24, 2013
Nahariya, Israel

Mark L. Agranovsky
Matania Ben-Artzi
Greg Galloway
Lavi Karp
Dmitry Khavinson
Simeon Reich
Gilbert Weinstein
Lawrence Zalcman
Editors



American Mathematical Society
Providence, Rhode Island

Bar-Ilan University
Ramat-Gan, Israel

2010 *Mathematics Subject Classification.* Primary 35-XX, 44-XX, 47-XX, 53XX, 83XX.

Library of Congress Cataloging-in-Publication Data

International Conference on Complex Analysis and Dynamical Systems (6th : 2013 : Nahariya, Israel): Israel mathematical conference proceedings : complex analysis and dynamical systems VI, sixth international conference, in honor of David Shoikhet's 60th birthday : May 19–24, 2013, Nahariya, Israel / Mark L. Agranovsky [and seven others], editors.

volumes cm. – (Contemporary mathematics ; volumes 653, 667)

The Sixth International Conference on Complex Analysis and Dynamical Systems took place at the Carlton Hotel, Nahariya, Israel, May 19–24, 2013–Preface.

Includes bibliographical references.

Contents: Part 1. PDE, differential geometry, radon transform – Part 2. Complex analysis.

ISBN 978-1-4704-1653-9 (part 1 : alk. paper) – ISBN 978-1-4704-1703-1 (part 2 : alk. paper)

1. Functions of complex variables–Congresses. 2. Calculus of variations–Congresses. 3. Numerical analysis–Congresses. 4. Differential equations–Congresses. I. Agranovskii, M. L. (Mark L'vovich), editor. II. Shoiykhet, David, 1953– III. Title. IV. Title: Complex analysis and dynamical systems VI.

QA331.7.I58 2013

515'.9–dc23 2015020099

Contemporary Mathematics ISSN: 0271-4132 (print); ISSN: 1098-3627 (online)

DOI: http://dx.doi.org/10.1090/conm/653

Contents
I: PDE, Differential Geometry, Radon Transform

Contents
II: Complex Analysis, Quasiconformal Mappings, Complex Dynamics

Preface

The Sixth International Conference on Complex Analysis and Dynamical Systems (CA&DS VI), 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 Carlton Hotel, Nahariya, Israel, during May 19-24, 2013. 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, 154 participants from 21 countries attended the Conference, which was held in honor of Professor David Shoikhet's sixtieth birthday. The Conference was held in conjunction with the ISF (Israel Science Foundation) Workshop on Integral Transforms and Spectral Theory in Analysis and Geometry.

These proceedings, which comprise two volumes, 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. The papers in this first volume are mainly devoted to Partial Differential Equations, Differential Geometry, and the Radon Transform while the papers in the second volume deal with Complex Analysis, Quasiconformal Mappings, and Complex Dynamics. They testify to the continued vitality of the interplay between classical and modern analysis.

We acknowledge with thanks the support provided for the Conference by the US National Science Foundation, the Galilee Research Center for Applied Mathematics of ORT Braude College, the University of Miami, the Gelbart Research Institute for Mathematical Sciences of Bar-Ilan University, the Emmy Noether Research Institute for Mathematics of Bar-Ilan University, and the ISAAC– International Society for Analysis, its Applications and Computations. Finally, we thank Miriam Beller, who (as in previous volumes) served as Technical Editor.

The Editors

David Shoikhet at Sixty

Mark Agranovsky, Mark Elin, and Lawrence Zalcman

David Shoikhet was born on April 26, 1953 in Odessa and attended the public schools in that city. In 1970, having completed his secondary education at a school specializing in mathematics and physics, David entered Krasnoyarsk State University (KSU), where just a few years earlier, Lev Aizenberg had founded the Department of Mathematical Analysis. In 1976, he graduated KSU with an M.Sc. thesis entitled "On Univalent Functions in Complex Spaces," written under the supervision of A.P. Yuzhakov.

For the next fourteen years, David held simultaneously a teaching position in the Department of Higher Mathematics at the Krasnoyarsk Institute of Non-Ferrous Metals (KINM) and a research position at the Institute of Physics of the Siberian Branch of the Academy of Sciences of the USSR, from which he received his Ph.D. in 1983, with a thesis entitled "On the Solvability of Operator Equations with Analytic Non-linearities," written under the direction of Yuzhakov and Victor Khatskevich. At KINM, he was promoted to the rank of Senior Lecturer in 1983 and to Associate Professor in 1985, and at the Institute of Physics to Senior Research Fellow in 1985 and Senior Research Associate in 1988.

In 1990, the Shoikhets moved to Israel. Shortly thereafter, David joined the faculty of the recently established ORT Braude College in Karmiel. From the very beginning, David took the lead in raising the academic level of the nascent institution, founding the Department of Mathematics and serving as its first Chairman from 1992 to 2008. During this period, he played a pivotal role in the development of new courses and syllabi and the recruitment of strong researchers to the Department. At the same time, he became actively associated with the Technion, first as an Adjunct Senior Teaching Associate (1991-1996) and then as an Adjunct Professor (1996-2008) and Visiting Professor (1999-2003). In 2002, David became the first regular faculty member to be promoted to the rank of (Full) Professor at ORT Braude; and in 2008, he was appointed Vice President for Academic Affairs at ORT Braude, a position he filled with great distinction until 2014.

Shoikhet's research, contained in over a hundred published papers and five research monographs, focusses on the interaction of nonlinear analysis and complex analysis, dynamical systems and operator theory. In view of its sheer volume, a detailed account of this work is obviously out of the question. Accordingly, we content ourselves with simply mentioning a few of the high points.

Together with his long-time collaborators, Victor Khatskevich and Simeon Reich, David initiated the systematic study and development of the theory of nonlinear semigroups of holomorphic mappings in infinite dimensional Banach

spaces [**32**], [**34**], [**35**], [**36**], [**41**].[1] A lucky idea was to synthesize tools of infinite dimensional holomorphy and hyperbolic geometry with the spectral theory of linear operators. In particular, Reich and Shoikhet showed [**41**] the differentiability (with respect to the parameter t) of a uniformly continuous semigroup $\{F_t\}_{t\geq 0}$ of holomorphic self-mappings of a domain D in a complex Banach space. It follows that the infinitesimal generator f, defined by

$$f(x) = \lim_{t\to\infty} \frac{x - F_t(x)}{t},$$

exists and is a holomorphic semi-complete vector field in D. This extends finite-dimensional results of Berkson-Porta [**BP**] and Abate [**A**] (which used compactness arguments unavailable in the infinite dimensional context), as well as the classical results on linear operators due to Hille and Dunford.

In their pioneering work on the generation theory of semigroups of holomorphic mappings, Shoikhet & Co. proved the following striking result, which can be viewed as a Global Implicit Function Theorem: *Let D be a bounded convex domain in a reflexive Banach space X, and let Δ be the open unit ball in a Banach space Y. Suppose that $F : \Delta \times D \to D$ is holomorphic and for some $\lambda_0 \in \Delta$ there is a fixed point $x_0 \in D$ of $F(\lambda_0, \cdot)$, i.e., $x_0 = F(\lambda_0, x_0)$. Then there is a holomorphic function $x(= x(\lambda)) : \Delta \to D$ such that $x(\lambda) = F(\lambda, x(\lambda))$ with $x(\lambda_0) = x_0$. Moreover, for each $\lambda \in \Delta$, the set of fixed points of $F(\lambda, \cdot)$ is a holomorphic retract (complex analytic submanifold) of D tangent to* $\operatorname{Ker}(I - D_x F(\lambda_0, x_0))$. *In particular, if x_0 is an isolated fixed point of $F(\lambda_0, \cdot)$, then it is unique, and for each $\lambda \in \Delta$ there is a unique fixed point $z(= z(\lambda)) \in D$ of $F(\lambda, \cdot)$.* This was first proved by Khatskevich and Shoikhet [**21**] for Hilbert spaces, using the Poincaré hyperbolic metric, and was then generalized by Khatskevich, Reich and Shoikhet [**29**] to reflexive Banach spaces, following a remark of Henri Cartan. In fact, they formulated and proved it in a more general setting for null points of semi-complete vector fields.

Another notable result, due to L.A. Harris, Reich and Shoikhet [**47**], is the following extension of the Earle-Hamilton fixed point theorem [**EH**], as well as previous results of Khatskevich and Shoikhet: *If the numerical range of a holomorphic mapping of a bounded convex domain in a (complex) Banach space lies strictly inside the half-plane $\{z : \operatorname{Re} z < 1\}$, then the mapping has a unique fixed point.*

More recently, David has also obtained [**95**] a boundary version of the Earle-Hamilton theorem for the Hilbert ball: *If $F : \mathbb{B} \to \mathbb{B}$ is a fixed point free mapping of the open unit ball $\mathbb{B}$ in (complex) Hilbert space such that $F(\mathbb{B})$ is contained in a horosphere in $\mathbb{B}$, then the iterates F^n converge to a boundary point of $\mathbb{B}$.*

Shoikhet's research employs a contemporary vision of functional analysis and differential equations together with hyperbolic geometry. It illustrates how a deep understanding of the use of semigroup theory may lead to new results even in the one-dimensional case. Here we may cite his contributions to geometric function theory, including the study of starlike and spirallike functions with respect to a boundary point. Perhaps the most interesting result in this direction establishes a one-to-one correspondence between wedges contained in the image of a starlike function, backward flow invariant domains for the associated semigroup, and boundary null points of the semigroup generator [**76**].

[1]Numbered references refer to the papers listed under the rubric "Papers" in the comprehensive bibliography of his publications contained in this volume. All other references are to the bibliography at the end of this article.

David's contributions to the teaching and the communication of mathematics have been no less distinguished than his research. In Russia, he was twice (in 1986 and 1988) a winner in the national competition for Excellence in Teaching and Research run by the Ministry of Higher Education; and in Israel, he received an award for Excellence in Teaching from the Technion in 1997. Testifying to his extraordinary gift for envisioning the possible combined with organizational skills of a very high order is the creation of the Galilee Research Center for Applied Mathematics at ORT Braude. Founded by David in 2005, it has supported an amazingly rich and varied program of visitors, collaborations and conferences on what can only described as a shoestring budget. But the jewel in the crown of David's accomplishments in this area is surely the brilliant series of international conferences on Complex Analysis and Dynamical Systems, which have taken place (almost) every other year since 2001 and have done much to cement Israel's role as an important center of research in complex analysis.

Nor has David's unusual combination of creativity and organizational talent been limited to mathematics. He is surely one of the very few serious research mathematicians to have had a successful career in . . . show business! Having studied music from early childhood, he plays the piano, accordion, clarinet and guitar. For a time, this hobby actually became a kind of second profession for him, parallel to mathematics. In the 1970's, David worked evenings as a musician in a musical theater, where he met his wife Tania, who was employed as a singer there. Together, they decided to create their own "Theater of Song." The group of singers, dancers and actors they brought together gained rapid popularity in the USSR and participated in a number of international festivals in Eastern Europe (Bulgaria, Czechoslovakia, East Germany, Poland, Yugoslavia and Romania), Georgia, and Mexico. David himself wrote 13 musical scenarios for the Theater and 19 musical programs for television and received several awards and prizes as Artistic Director of the Theater of Song. He considers his most important accomplishment in this area his jazz-rock opera "Intermezzo in 1943," based on the book *Notes from the Gallows*, by the Czech journalist and anti-Nazi resistance leader Julius Fučík, for which he received a medal from the Ministry of Sciences and Culture of Czechoslovakia in 1989.

David and his lovely wife Tania, who continues her flourishing career as a singer and entertainer with appearances throughout Israel, live in the seaside community of Nahariya, as do their son Ofer and two granddaughters. Nahariya is, once again, the venue for the conference Complex Analysis and Dynamical Systems VII (May 10-15, 2015). Just two weeks later, the date June 1, 2015 marks the Silver Anniversary (25 years) of the Shoikhets' arrival in Israel. And so, along with wishing David a Happy Birthday, we take this opportunity also to wish the Shoikhets a Happy Anniversary.

References

[A] Marco Abate, *The infinitesimal generators of semigroups of holomorphic maps*, Ann. Mat. Pura Appl. (4) **161** (1992), 167–180, DOI 10.1007/BF01759637. MR1174816 (93i:32029)

[BP] Earl Berkson and Horacio Porta, *Semigroups of analytic functions and composition operators*, Michigan Math. J. **25** (1978), no. 1, 101–115. MR0480965 (58 #1112)

[EH] Clifford J. Earle and Richard S. Hamilton, *A fixed point theorem for holomorphic mappings*, Global Analysis (Proc. Sympos. Pure Math., Vol. XVI, Berkeley, Calif., (1968), Amer. Math. Soc., Providence, R.I., 1970, pp. 61–65. MR0266009 (42 #918)

Department of Mathematics, Bar-Ilan University, Ramat-Gan 52900, Israel
E-mail address: agranovs@macs.biu.ac.il

Department of Mathematics, ORT Braude College, Karmiel 21101, Israel
E-mail address: mark_elin@braude.ac.il

Department of Mathematics, Bar-Ilan University, Ramat-Gan 52900, Israel
E-mail address: zalcman@macs.biu.ac.il

Bibliography of David Shoikhet

Books, Chapters in Books and Editorships

1. V. Khatskevich, D. Shoikhet, *Differentiable Operators*, Leningrad Financial Economical Inst., 1991, 150 pp.
2. V. Khatskevich, D. Shoikhet, *Differentiable Operators and Nonlinear Equations*, Birkhäuser, Basel, 1994, 270 pp.
3. D. Shoikhet, *Semigroups in Geometrical Function Theory*, Kluwer Academic Publishers, Dordrecht, 2001, 222 pp.
4. T. Kuczumow, S. Reich, D. Shoikhet, Fixed points of holomorphic mappings: a metric approach, in: *Handbook of Metric Fixed Point Theory* (W. A. Kirk and B. Sims, eds.), 437-516, Kluwer Academic Publishers, Dordrecht, 2001.
5. M. Elin, S. Reich, D. Shoikhet, *Complex Dynamical Systems and the Geometry of Domains in Banach Spaces*, Dissertationes Math. (Rozprawy Mat.) **427**, 2004, 62 pp.
6. M. Agranovsky, L. Karp, D. Shoikhet, L. Zalcman (editors), *Complex Analysis and Dynamical Systems*, Contemporary Mathematics, vol. 364, Amer. Math. Soc., Providence, RI, 2004.
7. M. Elin, D. Shoikhet, Semigroups of holomorphic mappings with boundary fixed points and spirallike mappings, in: *Geometric Function Theory in Several Complex Variables*, 82-117, World Sci. Publishing, River Edge, NJ, 2004.
8. M. Agranovsky, L. Karp, D. Shoikhet (editors), *Complex Analysis and Dynamical Systems II*, Contemporary Mathematics, vol. 382, Amer. Math. Soc., Providence, RI, 2005.
9. S. Reich, D. Shoikhet, *Fixed Points, Nonlinear Semigroups, and Geometry of Domains in Banach Spaces*, Imperial College Press, London, 2005, 372 pp.
10. F. Jacobzon, D. Shoikhet, D. Toledano-Kitai, *Calculus in One Variable by Active Learning Approach*, The Hebrew University Magness Press, 2008, 257 pp. (textbook).
11. M. Agranovsky, D. Bshouty, L. Karp, S. Reich, D. Shoikhet, L. Zalcman (editors), *Complex Analysis and Dynamical Systems III*, Contemporary Mathematics, vol. 455, Amer. Math. Soc., Providence, RI, 2008.
12. M. Elin, D. Shoikhet, *Linearization Models for Complex Dynamical Systems, Topics in Univalent Functions, Functional Equations and Semigroup Theory*, Birkhäuser, Basel, 2010, 265 pp.

13. M. Agranovsky, M. Ben-Artzi, G. Galloway, L. Karp, S. Reich, D. Shoikhet, G. Weinstein, L. Zalcman (editors), *Complex Analysis and Dynamical Systems IV: Part 1. Function Theory and Optimization*, Contemporary Mathematics, vol. 553, Amer. Math. Soc., Providence, RI, 2011.
14. M. Agranovsky, M. Ben-Artzi, G. Galloway, L. Karp, S. Reich, D. Shoikhet, G. Weinstein, L. Zalcman (editors), *Complex Analysis and Dynamical Systems IV: Part 2. General Relativity, Geometry, and PDE*, Contemporary Mathematics, vol. 554, Amer. Math. Soc., Providence, RI, 2011.
15. M. Agranovsky, M. Ben-Artzi, G. Galloway, L. Karp, V. Maz'ya, S. Reich, D. Shoikhet, G. Weinstein, L. Zalcman (editors), *Complex Analysis and Dynamical Systems V*, Contemporary Mathematics, vol. 591, American Mathematical Society, Providence, RI, 2013.
16. M. Elin, F. Jacobzon, M. Levenshtein, D. Shoikhet, The Schwarz lemma. Rigidity and dynamics, in: *Harmonic and Complex Analysis and Applications*, 135-230, Birkhäuser/Springer, Cham, 2014.

Papers

1. D. Shoikhet, On some estimates of the radius of univalence of a holomorphic mapping in $\mathbb{C}^n$ and an analogue of Carathéodory's theorem, *Holomorphic Functions of Many Complex Variables*, Institute of Physics, Siberian Branch, Academy of Sciences of the USSR, 1976, 139-148 (in Russian).
2. V. Bolotov, D. Shoikhet, On some estimate of the remainder term of Taylor's formula for implicit function's systems, *Izv. Vyssh. Uchebn. Zaved. Mat.* **8**, 1980, 3-7 (in Russian).
3. V. Khatskevich, D. Shoikhet, On some analogue of the Montel theorem for the case of analytical operators in Banach spaces, *Functional Analysis Theory of Operators* **15**, 1980, 157-159 (in Russian).
4. V. Khatskevich, D. Shoikhet, On the extension and approximation of the resolvent of an analytic operator, *VINITI (All-Union Institute of Scientific and Technological Information)* **5335**, 1980, 15 pp. (in Russian).
5. D. Shoikhet, On some existence principles of solutions of analytic operator equations, *VINITI (All-Union Institute of Scientific and Technological Information)* **1853**, 1980, 9 pp. (in Russian).
6. D. Shoikhet, Some properties of analytic operators in a Banach space and converse theorems, *VINITI (All-Union Institute of Scientific and Technological Information)* **1654**, 1980, 15 pp. (in Russian).
7. D. Shoikhet, Some analytic isomorphisms in a strictly convex Banach space and Cartan's theorem, *Some Problems of Multi-Dimensional Complex Analysis*, Institute of Physics, Siberian Branch, Academy of Sciences of the USSR, 1980, 253-254 (in Russian).
8. D. Shoikhet, Some estimates for the domain of existence of p-valued inversions of holomorphic mappings in $\mathbb{C}$, *Some Problems of Multidimensional Complex Analysis*, Institute of Physics, Siberian Branch, Academy of Sciences of the USSR, 1980, 257-260 (in Russian).

9. V. Khatskevich, D. Shoikhet, Fixed points of analytic operators in a Banach space and their applications, *Siberian Math. J.* **25**, 1984, 189-200; English translation: *Siberian Math. J.* **25**, 1984, 156-166.

10. D. Shoikhet, On fixed points of analytic operators in a Banach space and some applications, *Theory of Functions and Functional Analysis and Applications* **41**, 1984, 127-131.

11. D. Shoikhet, Some theorems on analytically varying implicit maps, *Multidimensional Analysis*, Institute of Physics, Siberian Branch, Academy of Sciences of the USSR, 1985, 264-267 (in Russian).

12. D. Shoikhet, A fixed point theorem for analytic operators in a Banach space, *VINITI* **11**, 1986 (in Russian).

13. D. Shoikhet, Note on fixed points of holomorphic maps in a strictly convex Banach space, *Complex Analysis and Mathematical Physics*, Institute of Physics, Siberian Branch, Academy of Sciences of the USSR, 1987, 131 (in Russian).

14. D. Shoikhet, Note on fixed-points of nonexpansive analytic operators, *Complex Analysis and Mathematical Physics*, Institute of Physics, Siberian Branch, Academy of Sciences of the USSR, 1988, 145-150 (in Russian).

15. D. Shoikhet, N. Tarkhanov, A remark on the probability of degeneration of a multidimensional branching Galton-Watson process, *Serdica* **15**, 1989, 171-173.

16. T. Azizov, V. Khatskevich, D. Shoikhet, On the number of fixed points of a holomorphism, *Siberian Math. J.* **31**, 1990, 192-195; English translation: *Siberian Math. J.* **31**, 1990, 1040-1042.

17. D. Shoikhet, On singular bifurcation points of analytic operators, *VINITI* **15**, 1990 (in Russian).

18. D. Shoikhet, Some properties of Fredholm mappings of Banach analytic manifolds, *Dokl. Akad. Nauk SSSR* **319**, 1991, 1336-1341; English translation: *Soviet Math. Dokl.* **44**, 1991, 358-363.

19. D. Shoikhet, Strong Browder's fixed points principle for Fredholm mappings, *Complex Analysis*, Krasnoyarsk State University, 1991, 6 pp. (in Russian).

20. D. Shoikhet, Some properties of Fredholm operators in Banach analytic manifolds, *Integral Equations Operator Theory* **16**, 1993, 430-451.

21. V. Khatskevich, D. Shoikhet, One version of implicit function theorem for holomorphic mappings, *C. R. Acad. Sci. Paris Sér. I Math.* **319**, 1994, 599-604.

22. V. Khatskevich, D. Shoikhet, Stationary points of one-parameter semigroups with holomorphic generators, *Funct. Differential Equations Israel Sem.* **2**, 1995, 91-110.

23. V. Khatskevich, S. Reich, D. Shoikhet, Fixed point theorems for holomorphic mappings and operator theory in indefinite metric spaces, *Integral Equations Operator Theory* **22**, 1995, 305-316.

24. V. Khatskevich, D. Shoikhet, Null-point sets of holomorphic generators of one-parameter semigroups, *Dynam. Systems Appl.* **4**, 1995, 611-629.

25. V. Khatskevich, S. Reich, D. Shoikhet, Ergodic type theorems for nonlinear semigroups with holomorphic generators, in: Recent Developments in Evolution Equations, Pitman Research Notes in Math. **324**, 1995, 191-200.

26. V. Khatskevich, S. Reich, D. Shoikhet, Fixed points of holomorphic mappings and semigroups in Banach spaces: regularity and uniqueness, in: Interaction between Functional Analysis, Harmonic Analysis and Probability, Marcel Dekker, New York, 1996, 249-254.

27. V. Khatskevich, S. Reich, D. Shoikhet, Null points of holomorphic generators in the Hilbert ball, in: Recent Advances in Metric Fixed Point Theory, Seville, Spain, 1996, 59-72.

28. L. Aizenberg, S. Reich, D. Shoikhet, One-sided estimates for the existence of null points of holomorphic mappings in Banach spaces, *J. Math. Anal. Appl.* **203**, 1996, 38-54.

29. V. Khatskevich, S. Reich, D. Shoikhet, A global implicit function theorem and fixed point theorems for holomorphic mappings and semigroups, *Dokl. Akad. Nauk* **347**, 1996, 743-745.

30. V. Khatskevich, S. Reich, D. Shoikhet, Global implicit function and fixed point theorems for holomorphic mappings and semigroups, *Complex Variables Theory Appl.* **28**, 1996, 347-356.

31. S. Reich, D. Shoikhet, The existence of resolvents of holomorphic generators in Banach spaces. Theory and applications of nonlinear operators of accretive and monotone type, *Lecture Notes in Pure and Appl. Math.*, Dekker, New York, 1996, 251-258.

32. S. Reich, D. Shoikhet, Generation theory for semigroups of holomorphic mappings in Banach Spaces, *Abstr. Appl. Anal.* **1**, 1996, 1-44.

33. V. Khatskevich, S. Reich, D. Shoikhet, Ergodic methods for the construction of holomorphic retractions, *Oper. Theory Adv. Appl.* **98**, Birkhäuser, Basel, 1997, 145-152.

34. V. Khatskevich, S. Reich, D. Shoikhet, Semi-complete vector fields on homogeneous balls in Banach spaces, *Ann. Univ. Mariae Curie-Skłodowska*, Sect. A51, 1997, 143-148.

35. V. Khatskevich, S. Reich, D. Shoikhet, Complex dynamical systems on bounded symmetric domains, *Electron. J. Differential Equations* **19**, 1997, 9 pp.

36. S. Reich, D. Shoikhet, Semigroups and generators on convex domains with the hyperbolic metric, *Atti Accad. Naz. Lincei Cl. Sci. Fis Mat. Natur. Rend. Lincei (9)* **8**, 1997, 231-250.

37. S. Reich, D. Shoikhet, The Denjoy-Wolff theorem, *Ann. Univ. Mariae Curie-Skłodowska*, Sect. A51, 1997, 219-240.

38. V. Khatskevich, S. Reich, D. Shoikhet, Asymptotic behavior of solutions of evolution equations and the construction of holomorphic retractions, *Math. Nachr.* **189**, 1998, 171-178.

39. S. Reich, D. Shoikhet, Averages of holomorphic mappings and holomorphic retractions on convex hyperbolic domains, *Studia Math.* **130**, 1998, 231-244.

40. S. Reich, D. Shoikhet, A characterization of holomorphic generators on the Cartesian product of Hilbert balls, *Taiwanese J. Math.* **2**, 1998, 383-396.

41. S. Reich, D. Shoikhet, Metric domains, holomorphic mappings and nonlinear semigroup, *Abstr. Appl. Anal.* **3**, 1998, 203-228.

42. D. Aharonov, M. Elin, S. Reich, D. Shoikhet, Parametric representations of semicomplete vector fields on the unit balls in $\mathbb{C}^n$ and in Hilbert space, *Atti Accad. Naz. Lincei Cl. Sci. Fis. Mat. Natur. Rend. Lincei (9) Mat. Appl.* **10**, 1999, 229-253.

43. D. Aharonov, S. Reich, D. Shoikhet, Flow invariance conditions for holomorphic mappings in Banach spaces, *Math. Proc. R. Ir. Acad.* **99A**, 1999, 93-104.

44. S. Reich, D. Shoikhet, An interior flow invariance condition for nonlinear semigroups on convex domains in Banach spaces, *Numer. Funct. Anal. Optim.* **20**, 1999, 333-339.

45. M. Elin, S. Reich, D. Shoikhet, Asymptotic behavior of semigroups of holomorphic mappings, *Progr. Nonlinear Differential Equations Appl.* **42**, Birkhäuser, Basel, 2000, 249-258.

46. M. Elin, S. Reich, D. Shoikhet, Holomorphically accretive mappings and spiral-shaped functions of proper contractions, *Nonlinear Anal. Forum* **5**, 2000, 149-161.

47. L.A. Harris, S. Reich, D. Shoikhet, Dissipative holomorphic functions, Bloch radii, and the Schwarz lemma, *J. Anal. Math.* **82**, 2000, 221-232.

48. M. Elin, S. Reich, D. Shoikhet, A semigroup approach to the geometry of domains in complex Banach spaces, *Nonlinear Anal.* **47**, 2001, 3271-3280.

49. M. Elin, S. Reich, D. Shoikhet, Dynamics of inequalities in geometric function theory, *J. Inequal. Appl.* **6**, 2001, 651-664.

50. M. Elin, D. Shoikhet, Dynamic extension of the Julia–Wolff–Carathéodory Theorem, *Dynam. Systems Appl.* **10**, 2001, 421-437.

51. V. Khatskevich, S. Reich, D. Shoikhet, Schröder's functional equation and the Koenigs embedding property, *Nonlinear Anal.* **47**, 2001, 3977-3988.

52. V. Khatskevich, S. Reich, D. Shoikhet, One-parameter semigroups of fractional-linear transformations, *Oper. Theory Adv. Appl.* **123**, Birkhäuser, Basel, 2001, 401-414.

53. T. Kuczumow, S. Reich, D. Shoikhet, The existence and non-existence of common fixed points for commuting families of holomorphic mappings, *Nonlinear Anal.* **43**, 2001, 45-59.

54. L. Aizenberg, D. Shoikhet, Boundary behavior of semigroups of holomorphic mappings on the unit ball in $\mathbb{C}^n$, *Complex Var. Theory Appl.* **47**, 2002, 109-121.

55. L. Aizenberg, D. Shoikhet, A remark on uniform Bloch radii and Bohr phenomena in $\mathbb{C}^n$, *Multidimensional Complex Analysis*, 2002, 5-17.

56. S. Reich, D. Shoikhet, Semigroups of Holomorphic Mappings, in: *Math. Encyclopedia, Supplement*, Kluwer Academic Publishers, 2002, 354-358.

57. S. Reich, D. Shoikhet, The Denjoy-Wolff theorem, in: *Math. Encyclopedia, Supplement*, Kluwer Academic Publishers, 2002, 121-123.

58. D. Shoikhet, The Julia-Wolff-Carathéodory theorem, in: *Math. Encyclopedia, Supplement*, Kluwer Academic Publishers, 2002, 222-224.

59. Y. Alber, S. Reich, D. Shoikhet, Iterative approximations of null points of uniformly accretive operators with estimates of the convergence rate, *Commun. Appl. Anal.* **6**, 2002, 89-104.

60. M. Elin, L. Harris, S. Reich, D. Shoikhet, Evolution equations and geometric function theory in J^*-algebras, *J. Nonlinear Convex Anal.* **3**, 2002, 81-121.

61. M. Elin, S. Reich, D. Shoikhet, Asymptotic behavior of semigroups of ρ-nonexpansive and holomorphic mappings on the Hilbert Ball, *Ann. Mat. Pura Appl. (4)* **181**, 2002, 501-526.

62. M. Elin, D. Shoikhet, Univalent functions of proper contractions spirallike with respect to a boundary point, *Multidimensional Complex Analysis*, 2002, 28-36.

63. M. Elin, V. Goryainov, S. Reich, D. Shoikhet, Fractional iteration and functional equations for functions analytic in the unit disk, *Comput. Methods Funct. Theory* **2**, 2002, 353-366.

64. D. Aharonov, M. Elin, D. Shoikhet, Spiral-like functions with respect to a boundary point, *J. Math. Anal. Appl.* **280**, 2003, 17-29.

65. D. Shoikhet, Representations of holomorphic generators and distortion theorems for spirallike functions with respect to a boundary point, *Int. J. Pure Appl. Math.* **5**, 2003, 335-361.

66. V. Khatskevich, S. Reich, D. Shoikhet, Abel-Schröder equations for linear fractional mappings and the Koenigs embedding problem, *Acta Sci. Math. (Szeged)*, **69**, 2003, 67-98.

67. M. Elin, D. Shoikhet, V. Volkovich, Semigroups of holomorphic mappings on the unit disk with a boundary fixed point, *Int. J. Pure Appl. Math.* **12**, 2004, 427-453.

68. M. Elin, A. Goldvard, S. Reich, D. Shoikhet, Dynamics of spirallike functions, *Complex Analysis and Dynamical Systems, Contemp. Math.* **364**, 2004, 41-57.

69. L. Aizenberg, M. Elin, D. Shoikhet, On the Rogosinski radius for holomorphic mappings and some of its applications, *Studia Math.* **168**, 2005, 147-158.

70. M. Elin, D. Shoikhet, Angle distortion theorems for starlike and spirallike functions with respect to a boundary point, *Int. J. Math. Math. Sci.* Art. ID 81615, 2006, 13 pp.

71. M. Levenshtein, S. Reich, D. Shoikhet, An application of the resolvent method to rigidity theory for holomorphic mappings, *J. Nonlinear Convex Anal.* **8**, 2007, 99-103.

72. M. Elin, M. Levenshtein, D. Shoikhet, R. Tauraso, Rigidity of holomorphic generators and one-parameter semigroups, *Dynam. Systems Appl.* **16**, 2007, 251-266.

73. M. Elin, M. Levenshtein, S. Reich, D. Shoikhet, Rigidity results for holomorphic mappings on the unit disk, *Complex and Harmonic Analysis*, 2007, 93-109.

74. D. Shoikhet, Linearizing models of Koenigs type and the asymptotic behavior of one-parameter semigroups, *Sovrem. Mat. Fundam. Napravl.* **21**, 2007, 149-166; translation in *J. Math. Sci. (N. Y.)* **153**, 2008, 629-648.

75. M. Elin, D. Shoikhet, L. Zalcman, Controlled approximation for some classes of holomorphic functions, *Complex Analysis and Dynamical Systems III, Contemp. Math.* **455**, 2008, 63-92.

76. M. Elin, D. Shoikhet, L. Zalcman, A flower structure of backward flow invariant domains for semigroups, *Ann. Acad. Sci. Fenn. Math.* **33**, 2008, 3-34.

77. M. Elin, D. Shoikhet, L. Zalcman, A flower structure of backward flow invariant domains for semigroups, *C. R. Math. Acad. Sci. Paris* **346**, 2008, 293-296.

78. M. Elin, S. Reich, D. Shoikhet, A Julia-Carathéodory theorem for hyperbolically monotone mappings in the Hilbert ball, *Israel J. Math.* **164**, 2008, 397-411.

79. M. Elin, S. Reich, D. Shoikhet, F. Yacobzon, Asymptotic behavior of one-parameter semigroups and rigidity of holomorphic generators, *Complex Anal. Oper. Theory* **2**, 2008, 55-86.

80. D. Shoikhet, Another look at the Burns-Krantz theorem, *J. Anal. Math.* **105**, 2008, 19-42.

81. M. Elin, M. Levenshtein, S. Reich, D. Shoikhet, Two rigidity theorems for holomorphic generators of continuous semigroups, *J. Nonlinear Convex Anal.* **9**, 2008, 59-64.

82. M. Elin, D. Shoikhet, F. Yacobzon, Linearization models for parabolic type semigroups, *J. Nonlinear Convex Anal.* **9**, 2008, 205-214.

83. M. Elin, M. Levenshtein, S. Reich, D. Shoikhet, A rigidity theorem for holomorphic generators on the Hilbert ball, *Proc. Amer. Math. Soc.* **136**, 2008, 4313-4320.

84. M. Elin, M. Levenshtein, S. Reich, D. Shoikhet, Commuting semigroups of holomorphic mappings, *Math. Scand.* **103**, 2008, 295-319.

85. A. Goldvard, S. Reich, D. Shoikhet, Asymptotic representations of star-like functions via continuous semigroups of holomorphic mappings, *Math. Proc. R. Ir. Acad.* **108**, 2008, 177-197.

86. M. Elin, S. Reich, D. Shoikhet, F. Yacobzon, Rates of convergence of one-parameter semigroups with boundary Denjoy-Wolff fixed points, *Fixed Point Theory and Its Applications*, Yokohama Publishers, Yokohama, 2008, 43–58.

87. D. Alpay, S. Reich, D. Shoikhet, Rigidity theorems, boundary interpolation and reproducing kernels for generalized Schur functions, *Comput. Methods Funct. Theory* **9**, 2009, 347-364.

88. F. Jacobzon, S. Reich, D. Shoikhet, Linear fractional mappings: invariant sets, semigroups and commutativity, *J. Fixed Point Theory Appl.* **5**, 2009, 63-91.

89. D. Alpay, A. Dijksma, H. Langer, S. Reich, D. Shoikhet, Boundary interpolation and rigidity for generalized Nevanlinna functions, *Math. Nachr.* **283**, 2010, 335-364.

90. M. Elin, D. Khavinson, S. Reich, D. Shoikhet, Linearization models for parabolic dynamical systems via Abel's functional equations, *Ann. Acad. Sci. Fenn. Math.* **35**, 2010, 439-472.

91. F. Bracci, M. Elin, D. Shoikhet, Normal forms and linearization of holomorphic dilation type semigroups in several variables, *J. Nonlinear Convex Anal.* **12**, 2011, 143-154.

92. M. Elin, D. Shoikhet, F. Yacobzon, A distortion theorem for functions convex in one direction, *Complex Anal. Oper. Theory* **5**, 2011, 751-758.

93. M. Elin, D. Shoikhet, Boundary behaviour and rigidity of semigroups of holomorphic mappings, *Anal. Math. Phys.* **1**, 2011, 241-258.

94. M. Elin, D. Shoikhet, N. Tarkhanov, Separation of boundary singularities for holomorphic generators, *Ann. Mat. Pura Appl. (4)* **190**, 2011, 595-618.

95. Y. Kondratiev, Y. Kozitsky, D. Shoikhet, Dynamical systems on sets of holomorphic functions, *Complex Analysis and Dynamical Systems IV, Contemp. Math.* **553**, 2011, 139-153.

96. D. Shoikhet, A generalized version of the Earle–Hamilton fixed point theorem for the Hilbert ball, *J. Math. Res.* **4**, 2012, 45-56.

97. M. Elin, L. A. Harris, S. Reich, D. Shoikhet, Dynamics of self-maps of the unit disk, Appendix H, in: D. S. Alexander, F. Iavernaro, A. Rosa, *Early Days in Complex Dynamics*, American Math. Soc., London Math. Soc., 2012, 307-312.

98. M. Elin, M. Levenshtein, S. Reich, D. Shoikhet, Some inequalities for the horosphere function and hyperbolically nonexpansive mappings on the Hilbert ball, *Sovrem. Mat. Fundam. Napravl.* **45**, 2012, 75-93; translation in *J. Math. Sci. (N. Y.)* **201**, 2014, 595-613.

99. V. Bolotnikov, M. Elin, D. Shoikhet, Inequalities for angular derivatives and boundary interpolation, *Anal. Math. Phys.* **3**, 2013, 63-96.

100. S Reich, D. Shoikhet, J. Zemanek, Ergodicity, numerical range and fixed points of holomorphic mappings, *J. Anal. Math.* **119**, 2013, 275-303.

101. Y. Kozitsky, D. Shoikhet, J. Zemanek, Power convergence of Abel averages, *Arch. Math. (Basel)* **100**, 2013, 539-549.

102. F. Bracci, D. Shoikhet, Boundary behavior of infinitesimal generators in the unit ball, *Trans. Amer. Math. Soc.* **366**, 2014, 1119-1140.

103. F. Bracci, M. Elin, D. Shoikhet, Growth estimates for pseudo-dissipative holomorphic maps in Banach spaces, *J. Nonlinear Convex Anal.* **15**, 2014, 191-198.

104. A. Frolova, M. Levenshtein, D. Shoikhet, A. Vasil'ev, Boundary distortion estimates for holomorphic maps, *Complex Anal. Oper. Theory* **8**, 2014, 1129-1149.

105. F. Bracci, Y. Kozitsky, D. Shoikhet, Abel averages and holomorphically pseudo-contractive maps in Banach spaces, *J. Math. Anal. Appl.* **423**, 2015, no. 2, 1580-1593.

Conference Program

May 19 – May 24, 2011

Sunday - May 19, 2013

15:00 - 16:45 Informal mathematical discussions

17:15 - 19:00 Informal mathematical discussions

Monday - May 20, 2013

10:50 - 11:35 Plenary Lecture 1
P. Kuchment, *The nodal count mystery*

Morning Session 1: Integral Transforms and Spectral Theory

12:00 - 12:45 A. Iosevich, *Intersections of sets, group actions and Erdös-Falconer problems*

Morning Session 2: Complex Analysis

12:00 - 12:30 G. Gentili, *Regular functions of a quaternionic variable and polynomials orthogonal complex structures*

12:30 - 13:00 C. de Fabritiis, *H^p spaces of s-regular functions*

Morning Session 3: Partial Differential Equations

12:00 - 12:30 S. Gindikin, *Complex analysis and separation of spectrums for ultrahyperbolic differential operators*

12:30 - 13:00 M. Ruzhansky, *Quantization on Lie groups*

Morning Session 4: Geometric Function Theory

12:00 - 12:30 D. Aharonov, *A univalence criterion and its application to the error function*

12:30 - 13:00 V. Dubinin, *A new version of circular symmetrization with applications to the geometric function theory*

14:30 - 15:15 Plenary Lecture 2
M. Abate, *Wolff-Denjoy theorems in non-smooth convex domains*

15:20 - 16:05 Plenary Lecture 3
M. Sugimoto, *Recent progress in smoothing estimates for Schrödinger equations*

Afternoon Session 1: Integral Transforms and Spectral Theory

16:30 - 17:00 A. Montes-Rodriguez, *The Hilbert transform, Perron-Frobenius operators and the Klein-Gordon equation*

17:00 - 17:30 G. Ambartsoumian, *Reconstructing a function from its V-line averages in a disc*

17:40 - 18:10 L. Kunyansky, *Photo- and thermo- acoustic tomography in the presence of reflecting boundaries*

18:10 - 18:40 B. Rubin, *Weighted norm inequalities for Radon transforms*

Afternoon Session 2: Complex Analysis
16:30 - 17:00 V. Katsnelson, *Stieltjes function and Hurwitz stable entire functions*
17:00 - 17:30 G. Kresin, *Sharp real-part theorems for derivatives of analytic functions*
17:40 - 18:10 S. Kanas, *Generalized typically-real functions*
18:10 - 18:40 D. Lubinsky, *Extremal problems for polynomials generate extremal problems for Paley-Wiener space*
Afternoon Session 3: Partial Differential Equations
16:30 - 17:00 J. Ben-Artzi, *Linear instability of the relativistic Vlasov-Maxwell system*
17:00 - 17:30 A. Faminskii, *On large time decay of solutions to equations of Korteweg-de Vries type*
17:40 - 18:10 J. Delgado, *Schatten classes and r-nuclearity on compact Lie groups*
Afternoon Session 4: Geometric Function Theory
16:30 - 17:00 D. Bshouty, *Affine modulus and Nitsche type problem*
17:00 - 17:30 K. Dyakonov, *A reverse Schwarz-Pick inequality*
17:40 - 18:10 A. Golberg, *Singularities of mappings with integrally bounded distortions*
18:10 - 18:40 E. Sevostyanov, *On injectivity radius of local ring Q-homeomorphisms*

Tuesday - May 21, 2013

09:00 - 09:50 Plenary Lecture 4
A. Olevskii, *High-dim sampling and interpolation*
09:50 - 10:35 Plenary Lecture 5
I. Mitrea, *Harmonic analytic and geometric measure theoretic methods in several complex variables*
Morning Session 1: Integral Transforms and Spectral Theory
Chairman: A. Iosevich
11:05 - 11:50 A. Koldobsky, *Stability and separation in volume comparison problems*
12:15 - 12:45 A. Tumanov, *Minimizing discrete energy on the sphere*
12:45 - 13:15 D. Ryabogin, *On the continual Rubik's cube*
Afternoon Session 1: Integral Transforms and Spectral Theory
Chairman: F. Gonzalez
14:45 - 15:15 A. Sergeev, *Quantization of universal Teichmüller space*
15:15 - 15:45 F. Gonzalez, *Multitemporal wave equations and mean value operators*
16:00 - 16:30 N. Zobin, *Quantization of Whitney problems*
16:30 - 17:00 S. Tikhonov, *Wiener type theorems on Fourier series with positive coefficients*
17:30 - 18:00 E. Liflyand, *Fourier transform versus Hilbert transform*
18:00 - 18:30 Y. Salman, *Global extendibility phenomenon for the Euler-Poisson-Darboux Equation*
Morning Session 2: Analysis and Dynamics in Banach Spaces
Chairman: M. Abate
11:05 - 11:35 L.A. Harris, *Lagrange polynomials, reproducing kernels and Markov's polynomial inequality*
11:35 - 12:05 T. Kuczumow, *The common fixed point set of commuting holomorphic mappings in Cartesian products of Banach spaces*

12:15 - 12:45 P. Mellon, *Jordan Theory and Holomorphic Dynamics*
12:45 - 13:15 M. Budzyńska, *The Denjoy-Wolff Theorem in complex Banach spaces*
Afternoon Session 2: Complex Analysis and Applied Dynamics
Chairman: P. Mellon
14:45 - 15:15 F. Bracci, *The Julia-Wolff-Carathéodory theorem(s) in higher dimensions for mappings and infinitesimal generators*
15:15 - 15:45 A. Isaev, *Explicit reconstruction of homogeneous isolated hypersurface singularities from their Milnor algebras*
Chairman: G. Gentili
16:00 - 16:30 J. Kozicki, *Stochastic dynamics of a continuum particle system with dispersal and competition: micro- and meso-scopic description*
16:30 - 17:00 Y. Gliklikh, *Dynamical systems with stochastic perturbations in terms of mean derivatives*
17:30 - 18:00 V. Golubyatnikov, *Non-uniqueness of cycles in some simple non linear dynamical systems*
Morning Session 3: Partial Differential Equations
Chairman: M. Ruzhansky
11:05 - 11:35 A. Shishkov, *Localization of singularities of solutions to semi-linear parabolic and elliptic equations with degenerate absorption potential*
11:35 - 12:05 M. Gobbino, *Optimal decay estimates for semi-linear parabolic and hyperbolic equations*
12:15 - 12:45 S. Lucente, *Nonlinear wave equations with variable coefficients*
12:45 - 13:15 M. D'Abbicco, *Effectiveness of a scale-invariant damping for semilinear waves*
Afternoon Session 3: Partial Differential Equations
Chairman: A. Faminskii
14:45 - 15:15 M. Ghisi, *The singular perturbation problem for Kirchhoff equation: sharp decay-error estimates*
15:15 - 15:45 E. Malinnikova, *Logarithmic convexity for discrete harmonic functions*
16:00 - 16:30 G. Taglialatela, *Weakly hyperbolic equations with nonanalytic coefficients*
Morning Session 4: Functional and Complex Analysis
Chairman: R. Hurri-Syrjanen
11:05 - 11:35 A. Ukhlov, *Conformal composition operators and Brennan's conjecture*
11:35 - 12:05 V. Gol'dshtein, *Conformal weights and embedding operators*
12:15 - 12:45 S. Vodopyanov, *On mappings with bounded codistortion*
12:45 - 13:15 M. Bekker, *Automorphic-invariant isometric operators and their unitary extensions*
Afternoon Session 4: Multi-dimensional Complex Analysis
Chairman: M. Budzyńska
14:45 - 15:15 A. Vidras, *Briancon-Skoda theorem for quotient ring*
15:55 - 15:45 P. Liczberski, *Domains with conically accessible boundary in multi-dimensional case*
Chairman: A. Sergeev
16:00 - 16:30 V. Zakharyuta, *Internal capacity characteristics of domains in several complex variables*

16:30 - 17:00 L. Aizenberg, *The separation of singularities of holomorphic functions*
17:30 - 18:00 S. Myslivetz, *Holomorphic extension of functions along the finite families of complex lines in a ball of* $\mathbb{C}^n$

Wednesday - May 22, 2013

09:00 - 09:45 Plenary Lecture 6
Vincent Moncrief, *Lightcone estimates for spacetime curvature in general relativity*
09:50 - 10:35 Plenary Lecture 7
Simeon Reich, *Problems and results in nonlinear analysis: An update*
Morning Session 1: Integral Transforms and Spectral Theory
Chairman: A. Olevskii
11:10 - 11:55 M. Zaidenberg, *Automorphism groups of affine varieties and their Lie algebras*
12:20 - 12:50 M. Sodin, *On the number of components of zero sets of smooth random functions of several real variables*
12:50 - 13:20 Y. Yomdin, *Generalized Remez inequality for (s;p)-valent functions*
Afternoon Session 1: Integral Transforms and Spectral Theory
Chairman: M. Zaidenberg
14:45 - 15:15 N. Lev, *Multi-tiling and Riesz bases*
15:15 - 15:45 D. Batenkov, *Accurate Fourier reconstruction of piecewise-smooth functions*
16:15 - 16:45 L. Nguyen, *Spherical mean transform from a PDE point of view*
16:45 - 17:15 E. Grinberg, *Integral transforms defined by intrinsic geometry of Riemannian manifolds*
Morning Session 2: Complex Analysis
Chairman: K. Dyakonov
11:10 - 11:40 S. Krushkal, *Strengthened Grunsky and Milin inequalities*
11:40 - 12:10 A. Solynin, *Minimization of area: Iceberg-type problems in the plane*
12:20 - 12:50 J. Globevnik, *Boundary values of holomorphic functions in terms of the argument principle*
12:50 - 13:20 J. Dziok, *Analytic functions associated with functions of bounded variation*
Afternoon Session 2: Complex Analysis
Chairman: M. Zaidenberg
14:45 - 15:15 M.D. Contreras, *Boundary behavior of the iterates of a self-map of the unit disk*
15:15 - 15:45 V. Bolotnikov, *Shift-invariant subspaces, inner functions and related linear systems: the weighted Bergman space setting*
Morning Session 3: Partial Differential Equations
Chairman: M. Gobbino
11:10 - 11:40 M. Reissig, *Semi-linear structural damped waves*
11:40 - 12:10 M. Cicognani, *Well-posedness for degenerate Schrödinger equations*
12:20 - 12:50 E.S. Titi, *On the loss of regularity for the three-dimensional Euler equations*
12:50 - 13:20 Y. Guo, *Persistency of analyticity for quasi-linear wave equations: an energy- like approach*

Afternoon Session 3: Partial Differential Equations
Chairman: E. Titi
14:45 - 15:15 O. Kelis, *On solvability of multi-order parabolic systems*
Morning Session 4: General Relativity
Chairman: G. Galloway
11:10 - 11:40 F. Schwartz, *Geometric inequalities for hypersurfaces*
11:40 - 12:10 N. Charalambous, *The essential spectrum of the Laplacian on complete manifolds*
12:20 - 12:50 D. Fajman, *Nonlinear stability for the Einstein-Vlasov system*
12:50 - 13:20 T. Oliynyk, *Dynamical compact bodies in general relativity*
Afternoon Session 3: General Relativity
Chairman: F. Schwartz
14:45 - 15:15 C. Cederbaum, *Uniqueness of photon spheres in static spacetimes*
15:15 - 15:45 K. Moore, *Evolving hypersurfaces by their inverse null mean curvature*
16:45 - 17:15 G. Weinstein, *The Penrose Inequality with charge*

Thursday - May 23, 2013
09:00 - 09:45 Plenary Lecture 8
P. Topping, *Instantaneously Complete Ricci flows*
09:50 - 10:35 Plenary Lecture 9
V. Maz'ya, *Bounds for eigenfunctions of the Laplacian on noncompact Riemannian manifolds*
Morning Session 1: Integral Transforms and Spectral Theory
Chairman: P. Kuchment
11:00 - 11:45 Z. Rudnick, *Nodal intersections*
12:10 - 12:40 V. Gichev, *Some metric properties of polynomials on compact homogeneous spaces*
12:40 - 13:10 K. Taylor, *Intersections of fractal sets*
Morning Session 2: Dynamics and Lowner Theory
Chairman: F. Bracci
11:10 - 11:30 S. Diaz-Madrigal, *Local and global aspects in Loewner theory*
11:30 - 12:00 P. Gumenyuk, *Boundary behaviour of one-parameter semigroups and evolution families*
12:10 - 12:40 G. Ivanov, *Non-exploding analytic diffusions in the unit disk*
Morning Session 3: Free Boundary Problems
Chairman: A. Solynin
11:00 - 11:30 D. Khavinson, *An overdetermined boundary value problem*
11:30 - 12:00 A. Klein, *Viscous fingering in the evaporation fronts of thin liquid films*
12:10 - 12:40 T. Savina, *On some generalized Hele-Shaw flows*
12:40 - 13:10 R. Hurri-Syrjanen, *On fractional Poincaré inequalities*
Morning Session 4: General Relativity
Chairman: G. Weinstein
11:00 - 11:45 J. Solomon, *The space of positive Lagrangian submanifolds*
12:10 - 12:55 E. Milman, *Sharp isoperimetric inequalities and model spaces for the Curvature-Dimension-Diameter condition*

Friday - May 24, 2013

09:10 - 09:55 Plenary Lecture 10
D. Vassiliev, *Spectral theory of first order elliptic systems*

10:30 - 11:15 Plenary Lecture 11
A. Vasiliev, *Stochastic Loewner-Kufarev evolution with a random Herglotz field*

List of Participants

M. Abate
Università di Pisa, Italy

B. Abramovitz
ORT Braude College, Israel

M. Agranovsky
Bar-Ilan University, Israel

D. Aharonov
Technion – Israel Institute of Technology, Israel

L. Aizenberg
Bar-Ilan University, Israel

G. Ambartsoumian
The University of Texas at Arlington, USA

D. Batenkov
Weizmann Institute of Science, Israel

M. Bekker
University of Pittsburgh, USA

J. Ben-Artzi
Cambridge University, UK

M. Ben-Artzi
Hebrew University, Israel

C. Beneteau
University of South Florida, USA

M. Berezina
ORT Braude College, Israel

M. Berman
ORT Braude College, Israel

V. Bolotnikov
College of William & Mary, USA

M. Bozejko
Uniwersytet Wrocławski, Poland

F. Bracci
Università di Roma "Tor Vergata", Italy

D. Bshouty
The Technion – Israel Institute of Technology, Israel

M. Budzyńska
Uniwersytet Marii Curie-Skłodowskiej w Lublinie, Poland

C. Cederbaum
University of Tübingen, Germany

N. Charalambous
University of Cyprus, Cyprus

Z. Chesnokov
ORT Braude College, Israel

M. D. Contreras
Universidad de Sevilla, Spain

M. D'Abbicco
Università degli Studi di Brescia, Italy

C. de Fabritiis
Università Politecnica delle Marche Via Brecce, Italy

J. Delgado
Imperial College London, UK

S. Díaz-Madrigal
Universidad de Sevilla, Spain

V. Dubinin
Russian Academy of Sciences, Russia

K. Dyakonov
Universitat de Barcelona, Spain

J. Dziok
Uniwersytet Rzeszowski, Poland

M. Elin
ORT Braude College, Israel

D. Fajman
Universität Wien, Austria

A. Faminskii
Peoples' Friendship University of Russia

M. Fleeman
University of South Florida, USA

A. Frolova
Universitetet i Bergen, Norway

G. Galloway
University of Miami, USA

G. Gentili
Università di Firenze, Italy

M. Ghergu
University College Dublin, Ireland

M. Ghisi
Università di Pisa, Italy

V. Gichev
Sobolev Institute of Mathematics, Russia

S. Gindikin
Rutgers University, USA

Y. Gliklikh
Voronezh State University, Russia

V. Glizer
ORT Braude College, Israel

J. Globevnik
Univerzi v Ljubljani, Slovenia

M. Gobbino
Università di Pisa, Italy

A. Golberg
Holon Institute of Technology, Israel

V. Gol'dshtein
Ben Gurion University of the Negev, Israel

V.P. Golubyatnikov
Sobolev Institute of Mathematics, Russia

F. Gonzalez
Tufts University, USA

E. Grinberg
University of Massachusetts Boston, USA

P. Gumenyuk
Università di Roma "Tor Vergata", Italy

Y. Guo
Weizmann Institute, Israel

L. Harris
University of Kentucky, USA

R. Hernández Reyes
Universidad Adolfo Ibáñez, Chile

R. Hurri-Syrjanen
Helsingin yliopisto, Finland

A. Iosevich
University of Rochester, USA

A. Isaev
Australian National University, Australia

G. Ivanov
Universitetet i Bergen, Norway

S. Kanas
Politechnika Rzeszowska, Poland

L. Karp
ORT Braude College, Israel

V. Katsnelson
Weizmann Institute of Science, Israel

O. Kelis
Haifa University and Ort Braude College, Israel

R. Kerdman
ORT Braude College, Israel

V. Khatskevich
ORT Braude College, Israel

D. Khavinson
University of South Florida, USA

A. Klein
The Hebrew University, Israel

A. Koldobsky
University of Missouri-Columbia, USA

V. Korman
ORT Braude College, Israel

J. Kozicki
University of Maria Curie-Skłodowska, PolandLublinie, Poland

G. Kresin
Ariel University, Israel

S. Krushkal
Bar-Ilan University, Israel

P. Kuchment
Bar-Ilan University, Israel

T. Kuczumow
University of Maria Curie-Skłodowska, Poland

L. Kunyansky
University of Arizona, Tucson, USA

A. Kytmanov
Siberian Federal University, Russia

N. Lev
Bar-Ilan University, Israel

M. Levenshtein
ORT Braude College, Israel

M. Levenshtein
ORT Braude College, Israel

E. Levin
Open University, Israel

P. Liczberski
ORT Braude College, Israel

E. Liflyand
Bar-Ilan University, Israel

D. Lubinsky
Georgia Institute of Technology, Atlanta, USA

S. Lucente
Università degli Studi di Bari Aldo Moro, Italy

Y. Lutsky
ORT Braude College, Israel

Y. Lyubarskii
Norges Teknisk-naturvitenskapelige Universitet, Norway

E. Malinnikova
Norges Teknisk-naturvitenskapelige Universitet, Norway

M. J. Martín
Universidad Autónoma de Madrid, Spain

V. Maz'ya
Linköpings Universitet, Sweden

P. Mellon
University College Dublin, Ireland

E. Milman
The Technion – Israel Institute of Technology, Israel

I. Mitrea
Temple University, USA

V. Moncrief
Yale University, USA

A. Montes-Rodríguez
Universidad De Sevilla, Spain

K. Moore
Universität Potsdam, Germany

S. Myslivets
Siberian Federal University, Krasnoyarsk, RussiaL. Nguyen
University of Idaho, USA

A. Olevskii
Tel Aviv University, Israel

T. Oliynyk
Monash University, Australia

E. Oshiro
Siberian Federal University, Russia

V. Ostrovskii
ORT Braude College, Israel

E. Pogrebnyak
ORT Braude College, Israel

D. V. Prokhorov
Saratov State University, Russia

S. Reich
Technion – Israel Institute of Technology, Israel

M. Reissig
Technische Universität Bergakademie Freiberg, Germany

B. Rubin
University of Louisiana, USA

Z. Rudnick
Tel Aviv University, Israel

M. Ruzhansky
Imperial College, London, UK

D. Ryabogin
Kent State University, USA

Z. Rychlik
Uniwersytet Marii Curie-Skłodowskiej w Lublinie, Poland

T. Savina
Ohio University, USA

F. Schwartz
University of Tennessee, USA

B. W. Schulze
Universität Potsdam, Germany

F. Schwartz
University of Tennessee, USA

A. Sergeev
Steklov Institute of Mathematics, Moscow, Russia

Y. Sevostyanov
Steklov Institute of Mathematics, Moscow, Russia

A. Shishkov
Institute of Applied Mathematics and Mechanics, Ukraine

D. Shoikhet
ORT Braude College, Israel

L. Shvartsman
ORT Braude College, Israel

M. Sodin
Tel Aviv University, Israel

J. Solomon
Hebrew University, Israel

A. Solynin
Texas Tech University, USA

I. Spitkovsky
College of William & Mary, USA

M. Sugimoto
University of Nagoya, Japan

G. Taglialatela
University of Bari, Italy

S. Tikhonov
ICREA and CRM, Spain

E. Titi
Weizmann Institute of Science, Israel

P. Topping
University of Warwick, UKCollege, Israel

A. Tumanov
University of Illinois, USA

V. Turetsky
ORT Braude College, Israel

A. Ukhlov
Ben-Gurion University of the Negev, Israel

I. Vainstein
Ben-Gurion University of the Negev, Israel

A. Vasil'ev
Universitetet i Bergen, Norway

D. Vassiliev
University College London, UK

A. Vidras
University of Cyprus, Cyprus

S. Vodopianov
Sobolev Institute of Mathematics,
Russia

G. Weinstein
Monash University, Australia

Y. Weit
University of Haifa, Israel

F. Yacobzon
ORT Braude College, Israel

Y. Yomdin
Weizmann Institute of Science, Israel

M. Zaidenberg
Institut Fourier, Grenoble, France

V. Zakharyuta
Sabanci University, Turkey

L. Zalcman
Bar-Ilan University, Israel

N. Zobin
College of William & Mary, USA

Published Titles in This Subseries

Israel Mathematical Conference Proceedings (IMCP) is a publication, part of the Contemporary Mathematics Series, devoted to the proceedings of conferences, symposia and seminars. Collections of papers focusing on a certain subject will also be published. Prospective volumes may be submitted to any member of the editorial board. Each volume has an editor (or editors) responsible for its preparation. In order to ensure inexpensive and timely distribution, authors are requested to submit to the Editor of the volume an electronic TEX file of their manuscript in $\mathcal{AMS}$-LaTeX, using the Contemporary Mathematics style file which can be downloaded at `http://www.ams.org/tex/author-info.html`. For further information, contact the Managing Editor, IMCP, Department of Mathematics, Bar-Ilan University, Ramat-Gan 52900, Israel; e-mail: `rowen@macs.biu.ac.il`.

653 **Mark L. Agranovsky, Matania Ben-Artzi, Greg Galloway, Lavi Karp, Dmitry Khavinson, Simeon Reich, Gilbert Weinstein, and Lawrence Zalcman, Editors,** Complex Analysis and Dynamical Systems VI: Part 1: PDE, Differential Geometry, Radon Transform, 2015

636 **Simeon Reich and Alexander J. Zaslavski, Editors,** Infinite Products of Operators and Their Applications, 2015

619 **Gershon Wolansky and Alexander J. Zaslavski, Editors,** Variational and Optimal Control Problems on Unbounded Domains, 2014

591 **Mark L. Agranovsky, Matania Ben-Artzi, Greg Galloway, Lavi Karp, Vladimir Maz'ya, Simeon Reich, David Shoikhet, Gilbert Weinstein, and Lawrence Zalcman, Editors,** Complex Analysis and Dynamical Systems V, 2013

568 **Simeon Reich and Alexander J. Zaslavski, Editors,** Optimization Theory and Related Topics, 2012

554 **Mark Agranovsky, Matania Ben-Artzi, Greg Galloway, Lavi Karp, Simeon Reich, David Shoikhet, Gilbert Weinstein, and Lawrence Zalcman, Editors,** Complex Analysis and Dynamical Systems IV: Part 2. General Relativity, Geometry, and PDE, 2011

553 **Mark Agranovsky, Matania Ben-Artzi, Greg Galloway, Lavi Karp, Simeon Reich, David Shoikhet, Gilbert Weinstein, and Lawrence Zalcman, Editors,** Complex Analysis and Dynamical Systems IV: Part 1. Function Theory and Optimization, 2011

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

404 **Alexander Borichev, Håkan Hedenmalm, and Kehe Zhu, Editors,** Bergman Spaces and Related Topics in Complex Analysis, 2006

402 **Zvi Arad, Mariagrazia Bianchi, Wolfgang Herfort, Patrizia Longobardi, Mercede Maj, and Carlo Scoppola, Editors,** Ischia Group Theory 2004, 2006

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

CONM 653

Complex Analysis and Dynamical Systems VI • Agranovsky et al., Editors

This volume contains the proceedings of the Sixth International Conference on Complex Analysis and Dynamical Systems, held from May 19–24, 2013, in Nahariya, Israel, in honor of David Shoikhet's sixtieth birthday.

The papers in this volume range over a wide variety of topics in Partial Differential Equations, Differential Geometry, and the Radon Transform. Taken together, the articles collected here provide the reader with a panorama of activity in partial differential equations and general relativity, drawn by a number of leading figures in the field. They testify to the continued vitality of the interplay between classical and modern analysis.

The companion volume (Contemporary Mathematics, Volume 667) is devoted to complex analysis, quasiconformal mappings, and complex dynamics.

ISBN 978-1-4704-1653-9

CONM/653

AMS/BIU