NOVI SAD JOURNAL OF MATHEMATICS

(Formerly Review of Research
Faculty of Science Mathematics Series)

Volume 45, Number 1
2015

Contributions submitted by the participants of:
Days on Analysis in Novi Sad **DANS14**
International Conference on Generalized Functions **GF2014**

Published by
Department of Mathematics and Informatics
Faculty of Science
University of Novi Sad

Guest Editors:
Jelena Aleksić,
Michael Kunzinger,
Nenad Teofanov

PREFACE

This volume contains contributions submitted by the participants of two international conferences: Days on Analysis in Novi Sad DANS14, and the International Conference on Generalized Functions, GF2014. In general, papers submitted by the participants of the conference Days on Analysis in Novi Sad DANS14 are dedicated to professor Bogoljub Stanković on the occasion of his 90th birthday, while papers submitted by the participants of the International Conference on Generalized Functions GF2014 are dedicated to professor James Vickers on the occasion of his 60th birthday. Some authors participated in both conferences and their contributions are dedicated to both professor Bogoljub Stanković and professor Vickers.

The conference Days on Analysis in Novi Sad - DANS14 was held in Novi Sad, Serbia, in July, 03-07, 2014 in the honor of Professor Bogoljub Stanković's 90th birthday. It was organized and supported by: Department of Mathematics and Informatics - University of Novi Sad - Faculty of Sciences, Serbian Academy of Sciences and Arts, ISAAC - the International Society for Analysis, its Applications and Computation, and the St. Petersburg Department of the Steklov Mathematical Institute.

The lectures given at the conference covered different topics of general mathematical analysis and its applications, which is reflected in the papers submitted for this volume. All of the papers underwent the usual refereeing procedure of the Novi Sad Journal of Mathematics and ten of them are accepted for publication. As a reader's guide, here we briefly list their topics.

The paper of S. Coriasco and L. Rodino is a survey of recent results in the theory of the Symbol-Global type operators, containing relevant information on different aspects of the topic and a carefully written list of references. The subject belongs to general calculus and global ellipticity problems for partial differential operators and pseudo-differential operators on noncompact manifolds, which represents an important topic of modern Mathematical Analysis. In his article, A. Ivić gives a short overview of some applications of Laplace transforms to analytic number theory, including a discussion of two functional equations studied by Professor Bogoljub Stanković back in 1975. The largest contribution in this volume, written by T. Levajković, D. Seleši and S. Pilipović is a review of the most important historical and recent results of Malliavin calculus in the framework of the Wiener-Ito chaos expansion. This expository survey contains detailed proofs and many interesting examples so that an interested reader may clearly see the merits of the chaos expansion technique and its applications to the stochastic calculus of variations. A problem in complex analysis,

on the behavior of the mappings which are both harmonic and quasiconformal with respect the Euclidean metrics, is studied in the short contribution by V. Manojlović. The article of D. Nemzer and J. Vindas contains an elementary approach to Cesaro asymptotics, which belongs to asymptotic analysis, with important references to the work of Professor Bogoljub Stanković. Asymptotic analysis in the framework of generalized functions has shown to be quite useful for the understanding of their structural properties with applications in diverse areas such as Tauberian and Abelian theory for integral transforms, differential equations, number theory, and mathematical physics. The contribution of S. Pilipović, N. Teofanov and F. Tomić is motivated by the problem of finding new types of microlocal properties in test function spaces which are situated between the Gevrey classes and the class of smooth functions, and in the corresponding dual spaces of generalized functions. In their article, P. Dimovski, B. Prangoski and J. Vindas study a class of translation-invariant Banach spaces of quasi-analytic ultradistributions, thus extending some recent results related to distributions and non-quasianalytic ultradistributions, which have shown to be useful in the study of boundary values of holomorphic functions and convolution of generalized functions. The contribution of D. Scarpalezos points out an interesting extension of a well-known equality due to M. Oberguggenberger within the theory of Colombeau's generalized functions, also known as new generalized functions. D. Stoeva's article reviews basis results on frames in Hilbert spaces with corresponding remarks, examples and related open problems. Finally, in their contribution M.Vuković and I. Zubac prove some Abelian theorems for the wavelet transform through quasiasymptotic boundedness, which is another contribution in the field of asymptotic analysis in this volume.

The International Conference on Generalized Functions was held in Southampton, England, from September 8 to 12, 2014. It continued a long-standing tradition of international conferences on generalized functions gathering researchers working in all branches of generalized functions. As seen with the most recent conferences held in Novi Sad (Serbia, 2004), Bedlewo (Poland, 2007), Vienna (Austria, 2009) and Martinique (France, 2011) the spectrum of interrelations with other fields of mathematics and applications has been steadily increasing over the years. Continuing this trend, GF2014 aimed at a broad coverage of research on and applications of generalized functions. It was organized by the University of Southampton, and supported by the London Mathematical Society.

Following the standard refereeing process of the Novi Sad Journal of Mathematics, seven papers were accepted for publication. In C. Bouzar, M. T. Khalladi and F. Z. Tchouar's contribution, the theory of Bochner almost automorphic functions and almost automorphic distributions is extended to the framework of nonlinear generalized functions. G. Hörmann uses the concept of metric splitting to continue the work of J. Vickers and his collaborators on well-posedness of wave equations in generalized functions on Lorentzian manifolds. E. Nigsch applies and extends his functional analytic approach to Colombeau algebras to tempered generalized functions, obtaining, among other results, a strict Fourier inversion theorem in this setting. The paper of Y. Okada is devoted to the study of hyperfunctions with values in a reflexive locally convex space, specifically to proving a Massera-type theorem in this theory. L. Simon's contribution is concerned with establishing the existence of solutions of a system of a semilinear hyperbolic functional differential equations with initial and

boundary conditions, and of a quasilinear elliptic functional differential equation with boundary conditions. T. Todorov investigates initial value problems for ordinary differential equations with highly singular driving terms and derives explicit solution formulas in algebras of generalized functions that do not possess counterparts in L. Schwartz' theory of distributions. Finally, J. K. Dubey, A. Kumar, and S.K. Upadhyay contribute a paper in which they use the fractional Fourier transform to study properties of pseudo-differential operators, SG-elliptic partial differential equations with polynomial coefficients, and localization operators.

Guest Editors:
Jelena Aleksić,
Michael Kunzinger,
Nenad Teofanov

Acknowledgement

This volume is published with the financial support of the Ministry of Education, Science and Technological Development of the Republic of Serbia, as a Proceedings of the conference Days on Analysis in Novi Sad DANS14. We also acknowledge Serbian Academy of Sciences and Arts and Branch of the Serbian Academy of Sciences and Art in Novi Sad for the financial support.