

## PREFACE

The III International Course of Mathematical Analysis in Andalusia, held in La Rábida (Huelva), 3–7 September 2007, continued the tradition of previous courses in Cádiz (2002) and Granada (2004). Five years ago, representatives of several Andalusian universities made a concerted effort organizing a course to provide an extensive overview of the research in different areas of Mathematical Analysis. The friendly cooperation of many Andalusian research groups in these areas and the initiative of Antonio Aizpuru and Fernando León made possible the organization of the first course in Cádiz. A new and wider cooperation of the Andalusian research groups in Real Analysis, Complex Variable and Functional Analysis and, mainly, the encouragement and hard work of María Victoria Velasco were the cornerstone to support the second course in Granada. During the Gala Dinner in this course (held in a beautiful house which was used as a summer palace by the latter Arab–Andalusian Kings), a group of professors from the universities of Sevilla and Huelva agreed to organize the third course. With the support of the Spanish National Government, the universities of Seville and Huelva, sponsored by several private and official institutions and hosted by the International University of Andalusia (Sede Iberoamericana de La Rábida) where we could invite some leading researchers in this area to give three seminars and eleven plenary lectures. The course brought more than 70 participants from different countries and provided an ideal forum for learning and exchanging of ideas. The high scientific quality of the lectures and seminars offered in this course made us think about the interest of a book collecting these talks. We asked the speakers for a written version of their lectures. The lecturers kindly facilitated us and we could agree with World Scientific Publishing Co. the publication of these proceedings which can be of high interest to graduate students and researchers in several areas of Mathematical Analysis.

The present book includes the contributions corresponding to the seminars by Marco Abate, Eleonor Harboure and Edward Odell and to the plenary talks by Óscar Blasco, Joaquim Bruna, Bernardo Cascales, Francisco

L. Hernández, Lawrence Narici, Héctor Salas, Bertram Schreiber, Antonio Villar and Wiesław Żelazko. Seminars and talks lectured by these prestigious researchers attracted the interest of a big number of graduate students and researchers who attended this conference. The excellent work of the lecturers and the scientific contributions from them and all participants made possible the success of this course.

The talks of M. Abate concerns the theory of local discrete dynamical systems in complex dimension 1, describing what is known on the topological and dynamical structure of the stable set, and on topological, holomorphic and formal conjugacy classes.

O. Blasco presents DeLeeuw-type transference theorems for bilinear multipliers. They allow us to obtain the boundedness of the periodic and discrete versions of bilinear multipliers (even for their maximal versions) and to get new applications of these results in Ergodic Theory.

J. Bruna studies functions which generate the Lebesgue space by translations. He shows that the discrete translation parameter sets  $\Lambda \subset \mathbb{R}$  for which some  $\varphi \in L_1(\mathbb{R})$  exists such that the translates  $\varphi(x - \lambda)$ ,  $\lambda \in \Lambda$ , span  $L_1(\mathbb{R})$  are exactly the uniqueness sets for certain quasianalytic classes, and gives explicit constructions of such generators  $\varphi$ .

B. Cascales' lecture shows that several classical results about compactness in functional analysis can all be derived from some suitable inequalities involving distances to spaces of continuous or Baire one functions. In particular, he gives quantitative versions of Grothendieck's characterization of weak compactness in spaces  $C(K)$ , and Eberlein–Grothendieck and Krein–Smulyan theorems.

E. Harboure poses several situations in analysis where some kind of smooth functions play a fundamental role. In connection with the study of Laplace equation, she analyzes the behavior of the fractional integral operator on  $L_p$ -spaces and presents a brief description of Besov spaces and their connection with a problem of non-linear approximation of a function by its wavelet expansion.

The domination problem for positive operators between Banach function spaces consists in given two positive operators  $0 \leq R \leq T$  between two Banach lattices  $E$  and  $F$  and assuming that  $T$  belongs to a certain operator class, should  $R$  belong to the same class? F. Hernández surveys recent results on the behavior of related operator classes like strictly singular (or *Kato*) operators, strictly co-singular (or *Pelczynski*) operators as well as their local versions.

L. Narici explains to us many facts concerning the Hahn–Banach Theorem and the significant role played by the Austrian mathematician Eduard Helly in the development of this theorem.

The contribution by E. Odell discusses the Banach space structure of  $L_p[0, 1]$ , mostly in the reflexive setting,  $1 < p < \infty$ . This classical Banach space has been a prime case study for abstraction to a more general study of Banach space structure. E. Odell revises the most relevant properties of this space, concerning complemented and non-complemented subspaces, embeddings, normalized unconditional sequences, distortions of the norm, etc.

H. Salas revises properties of hypercyclic operators and presents several problems, some of them in the new classes of dual hypercyclic operators and frequently hypercyclic operators.

In B. Schreiber’s lecture, the Operator Algebra Basic Theory is outlined and some applications are described. Many of these applications lead easily to open problems worthy of investigation, both in the area of the application and in the development of the basic theory.

A. Villar’s lecture deals with the mathematical tools that permits to understand the logics of competitive markets. It refers to the solvability of a finite system of equations with non-negativity restrictions. Some changes in the environment are also considered: non-competitive behavior, non-convex feasible sets, non-finite sets of markets, a continuum of agents, etc.

W. Żelazco discusses some recent results and some open problems concerning unital  $F$ -algebras (i.e., a topological algebra which is an  $F$ -space). The following questions are considered:

- (1) When are all maximal ideals closed?
- (2) When are all ideals closed?
- (3) When does a dense principal ideal exist?

There were many other pluses to the course; the tourist trip across Huelva Ría on a typical boat with dinner on board, the memorable trip to the Riotinto Mine Park and to the Marvels’s Cave in Sierra de Aracena Natural Park, not to mention the BBQ and Gala Dinner held in the garden of La Rábida Residence followed by an amazing “Cheen–Cheen-Poom” dancing.

No conference can succeed without a lot of generous support and we would like to express our gratitude to the other organizers, specially to Cándido Piñeiro, Ramón Rodríguez and Enrique Serrano, who were in charge of almost all necessary organization duties, the Sede Iberoameri-

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The editors

J. M. Delgado and T. Domínguez

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