

科技资料

# Progress in Functional Analysis

# PROGRESS IN FUNCTIONAL ANALYSIS

*Proceedings of the International  
Functional Analysis Meeting  
on the Occasion of the 60th Birthday  
of Professor M. Valdivia  
Peñíscola, Spain, 22-27 October, 1990*

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## PREFACE

When the 60th birthday of Professor Manuel Valdivia was approaching, some of his former students from the two universities of Valencia decided to hold an international functional analysis meeting in his honour. The Organizing Committee (consisting of K.D. Bierstedt, J. Bonet, J. Horváth and M. Maestre) was formed during the summer of 1989, more than one year ahead of the scheduled date of the congress.

Professor Valdivia is an internationally recognized functional analyst and one of the best known Spanish mathematicians. He has published more than 125 articles, most of them in renowned international journals (in English), and a monograph on locally convex spaces in the North-Holland series Mathematics Studies, he has been invited to many universities and has given invited talks at many meetings all over the world. Valdivia used to lecture abroad by writing in English on the blackboard, but talking in Spanish. In 1988, to the surprise of the audience, he finally started speaking English in his lectures at international conferences.

Professor Valdivia made important contributions to several areas of functional analysis. Among the topics which he became famous for, we only mention the closed graph and open mapping theorems, barrelled, bornological and ultrabornological spaces, Fréchet and (DF)-spaces, sequence space representations of spaces of functions and distributions, and Köthe sequence spaces. In particular, Valdivia proved that the spaces  $\mathcal{D}$  and  $\mathcal{D}'$  of Laurent Schwartz are not  $B_r$ -complete and that ultrabornological spaces (not having the finest locally convex topology) can always be represented as injective inductive limits of Banach spaces which are copies of an arbitrary (fixed) separable infinite dimensional Banach space. He gave the first examples of barrelled (DF)-spaces which are not bornological and of  $B_r$ -complete spaces which are not  $B$ -complete. He solved some problems of Grothendieck, in particular one on products of totally reflexive spaces, by giving a beautiful characterization of the totally reflexive Fréchet spaces and their duals. In recent years, he turned his interest to Banach space theory and, more specifically, to weak compactness and resolutions of the identity. The work of Valdivia has had a profound impact on functional analysis worldwide. It was used and mentioned in many articles and was referred to e.g. in the books of Köthe, Jarchow and Pérez Carreras/Bonet.

Valdivia came to Valencia as a Full Professor in the Faculty of Science of the University of Valencia in 1965. In the next year, he was one of the founders of the Section of Mathematics (later on, Faculty of Mathematics). The analysis group of Valencia originated with him. However, his influence in functional analysis in Spain went far beyond Valencia, and one may say that nowadays functional analysis is one of the most prominent topics in mathematics in Spain, due to Manuel Valdivia. In turn, the work of Spanish mathematicians in functional analysis is quite prominent internationally.

A thorough appreciation of Valdivia's mathematical work and precise references to his main theorems can be found in J. Horváth's article at the beginning of these Proceedings (which corresponds to his lecture during the opening ceremony of the Peñíscola meeting).

Recognizing Valdivia's importance for mathematics both in and out of Valencia, the two

universities of Valencia were quite happy to sponsor the international functional analysis meeting on the occasion of his 60th birthday, and other sponsors joined them. We would like to acknowledge their support and, in particular, we would also like to thank the members of the Honour Committee in this respect. The "Centro de Estudios de la Función Pública" at Peñíscola, Castellón, about 130 km from Valencia was chosen as the site of the congress. This was a perfect choice in several respects, and we are very grateful to the people in charge of the Centro de Estudios for creating a good (working) atmosphere for the meeting.

The topics of the congress were centered around the (many) interests of Professor Valdivia in functional analysis. In September 1989, the organizing committee contacted 30 specialists (from several countries) and invited them to attend the Peñíscola meeting and to present the main talks. Practically everybody replied immediately and agreed to come. When the announcement of the meeting appeared (e.g. in the European Mathematical Newsletter and in the Notices of the American Mathematical Society), together with a list of the main speakers, the organizing committee received many letters with requests for participation in the congress and many abstracts for consideration in the section of short communications. A careful selection was made, and we thank several colleagues who helped us in the evaluation.

The last weeks before the meeting were the time for many preparations, and when the two foreign members of the organizing committee came to Valencia shortly before the congress, they realized how much work had already been done by their Spanish colleagues. During the congress, the amount of work connected with the organization was sometimes overwhelming. The organizing committee gratefully acknowledges that much of all this was done by the members of the Supporting Committee, and we thank them for the invaluable help.

During the week at Peñíscola (October 22-27, 1990), 28 invited lectures of 50 minutes, 7 invited lectures of 25 minutes and 38 short communications of 15 minutes were presented. (The Schedule of Lectures can be found in the editorial part of this book.) Probably none of the 96 participants will ever forget the spectacular beginning of the meeting, with a severe thunderstorm during the first lecture; we all admired Richard Aron for going on with some pertinent remarks when the world became dark and the lights went on and off several times. Fortunately enough, the weather improved, and the meeting turned out to be the success we had hoped and worked for. From the list of speakers and lectures and from the abstracts it had already been obvious that the mathematics would be interesting and very good. It remains to thank the speakers for their excellent, inspiring and well prepared talks, the chairpersons and all the participants in the meeting for their help, their interest and for many stimulating discussions. But also the social part of the congress turned out fine: The old city of Peñíscola is quite picturesque, and the visit to its castle provided us with beautiful sights and nice photos. The excursion on Wednesday afternoon showed another interesting place, Morella, not too far from Peñíscola.

All speakers of invited talks at the meeting had been invited to submit an article to the Proceedings volume. The papers were not to exceed 20 pages, unless authorized by the

organizing committee, which also functioned as editors of the Proceedings. The original deadline was March 1, 1991. Indeed, most of the speakers contributed, but the last papers only arrived in May. The articles were refereed, and we thank the referees very much. Some of them took their job quite seriously, and many helpful comments and criticisms were made which definitely helped to improve several articles, mainly in the exposition and in the layout, or just by removing misprints. In some cases, however, new versions were requested, and with a small number of papers, final corrections had to be made at Paderborn (where the originals were sent), due to lack of time. (We would like to thank Mrs. Duddeck-Buijs for her competence.) At this point, we also thank the editor of "Notas de Matemática", Professor Leopoldo Nachbin, the publisher, Drs. Sevenster, and the Elsevier/North-Holland company for including this book in their series "Mathematics Studies".

As a glance at the table of contents shows, the present Proceedings volume contains 27 articles on various interesting areas of present-day functional analysis: Banach spaces and their geometry, weak compactness; operator ideals, tensor products and tensor norms; Fréchet, (DF)- and (LF)-spaces, barrelled spaces; sequence, function and distribution spaces, as well as infinite dimensional holomorphy (together with a "touch" of automatic continuity and approximation theory). Some of the reports we received from referees confirm our impression that the authors have taken much care with their articles and that many of the papers present important results and methods in active fields of research. We hope, and are quite confident, that this collection of papers, dedicated to Professor Manuel Valdivia on the occasion of his 60th birthday, with best wishes for the future, will prove helpful, valuable and inspiring for anybody interested in functional analysis and related fields.

College Park/Paderborn/Valencia, July 1991

K.D. Bierstedt, J. Bonnet, J. Horváth, M. Maestre

# **INTERNATIONAL FUNCTIONAL ANALYSIS MEETING on the Occasion of the 60th Birthday of Professor M. Valdivia**

Peñíscola, Castellón, 22 - 27 October 1990

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# INTERNATIONAL FUNCTIONAL ANALYSIS MEETING on the Occasion of the 60th Birthday of Professor M. Valdivia

Peñíscola, Castellón, 22 - 27 October 1990

## SCHEDULE OF LECTURES

### Monday, October 22

#### Morning Session

Chair: K.D. Bierstedt

- 9.30 R.M. Aron, Weak-star continuous analytic functions
- 10.30 J. Schmets, On the extent of the (non-) quasianalytic classes
- 12.00 Opening Ceremony, including:  
J. Horváth, The mathematical works of Manuel Valdivia  
Reply of Professor M. Valdivia

#### Afternoon Session

Chair: J. Mujica

- 16.00 K. Floret, Continuity of tensor product operators between spaces  $L_p(E)$  of Bochner integrable functions
- 17.00 A. Defant, Summing norms of finite rank operators  
Chair: R. Aron
- 18.30 R. Meise, On the range of the Borel map for classes of nonquasianalytic functions
- 19.30 J.G. Llavona, Weak topologies on bounded sets of a Banach space and associated function spaces
- 20.30 L. Weis, On the inversion of the vector valued Laplace transform in  $L_p(X)$ -spaces

### Tuesday, October 23

#### Morning Session

Chair: R. Meise

- 9.00 A. Pietsch, Eigenvalues of nuclear operators and geometry of Banach spaces
- 10.00 H. Jarchow, Some remarks on composition operators on classical Hardy spaces
- 11.15 S. Dineen, Complex geodesics on convex domains in Banach spaces



### 12.30 Visit to the Castle of Peñíscola

#### Afternoon Session

Chair: J. Bonet

17.00 P.J. Paul, Barrelled function spaces

Chairs: S. Dierolf (S = Salón de Actos), H. Jarchow (B = Aula B)

18.30 S.A. Saxon, The Pérez Carreras/Bonet problems (S)

19.05 E. Behrends, On points of symmetry of compact convex sets in the two-dimensional complex space (Yost problem) (S)

G. Metafune, Quojections and finite dimensional decompositions (B)

#### Short communications

Chairs: S. Dierolf (S), H. Jarchow (B), F. Cobos (A = Aula A)

19.40 J.A. López Molina,  $DF$  and quasibarrelled spaces of  $(q', p')$ -dominated operators (S)

A. Tonge, Another multilinear version of Grothendieck's Theorem (B)

S. Romanelli, Universal Korovkin closures related to positive multipliers on commutative Banach algebras (A)

20.00 J.C. Díaz, The problem of topologies of Grothendieck for quojections of Moscatelli type (S)

F.L. Hernández, Disjointly strictly-singular operators in Banach lattices (B)

V. Echandia, Some results on interpolation between dyadic Hardy spaces and dyadic Orlicz-Lorentz spaces (A)

20.20 C. Fernández, On distinguished Fréchet spaces of Moscatelli type (S)

M. González, Dual factorization of continuous operators (B)

E. Briem, Operating functions for subspaces of  $C_0(X)$  (A)

20.40 A. Galbis, Tensor products of Fréchet or  $(DF)$ -spaces with a Banach space (S)

O. Blasco, Carleson measures and vector-valued Lipschitz functions (B)

J. Cerdá, Some remarks on quasi-Banach valued analytic functions (A)

**Wednesday, October 24****Morning Session**

Chair: K. Floret

9.00 D. Vogt, On inductive limits of Fréchet spaces

10.00 T. Terzioglu, Decomposition method and imbeddings of smooth sequence spaces

Chair: G. Pisier

11.30 J. Diestel, Ülger's characterization of the relatively weakly compact subsets of the space of Bochner integrable functions

12.30 A. Pelczyński, Translation invariant projections in spaces of differentiable functions and Paley's effect

15.00 Visit to Morella

**Thursday, October 25****Morning Session**

Chair: A. Pelczyński

9.00 G. Pisier, Complete boundedness for Banach spaces

10.00 G. Godefroy, Smooth bumps and their applications

Chairs: A. Pietsch (S), M. Maestre (B)

11.30 W. Schachermayer, Slicings, selections and applications (S)

12.30 J. Orihuela, Compactness in function spaces (S)

13.30 W.R. Derrick, Interior properties and fixed points of certain discontinuous operators (S)

D.N. Zarnadze, James sup-theorem for Fréchet spaces and generalization of Grothendieck's homomorphism theorem (B)

**Afternoon Session**

Chair: J. Diestel

16.00 F. Bombal, Distinguished subsets in vector sequence spaces

17.00 K.B. Laursen, Automatic continuity of intertwiners in topological vector spaces

18.30 C. Bessaga, Functional analytic aspects of the theory of metric spaces. Linear extending of metrics and related problems

**Short communications**

Chairs: W. Scharfsmayer (S), M. Maestre (B), J.M. Anselmi (A)

19.45 R. Becker, Integral representation in locally convex spaces (S)

J. Prada, Operators commuting with differentiation (B)

L.D. Nel, Infinite dimensional calculus allowing nonconvex domains with empty interior (A)

20.05 W. Hensgen, Some properties of the vector-valued Banach ideal space  $E(X)$  derived from those of  $E$  and  $X$  (S)

N. Robertson, The metrisability of precompact sets (B)

L.D. García-Tuñón, The Nachbin topology  $\tau_{\omega, \vartheta}$  for a particular  $\vartheta$ -holomorphy type (A)

20.25 A.J. Pallarés, Selection theorems in dual Banach spaces with the Radon Nikodým property (S)

R. Beattie, Multiplication and convolution of rapidly decreasing functions (B)

Y. Meléndez, Inductive limits of Moscatelli type (A)

20.45 P. Aiena, On Fredholm theory for multipliers on commutative Banach algebras (S)

J. Zafarani, Angelicity of spaces of vector-valued measures (B)

**Friday, October 26****Morning Session**

Chair: J. Horváth

9.00 F. Cobos, A class of approximation spaces

10.00 F. Altomare, Lototsky-Schnabl operators and degenerate diffusion equations

Chair: D. Vogt

11.30 S. Dierolf, Remarks on distinguished Fréchet spaces

12.30 J. Taskinen, Factorization of multilinear operators

13.30 L.A. de Moraes, On  $F$ -quotients and holomorphy

**Afternoon Session**

Chair: S. Dincen

16.00 J.M. Anselmi, Embeddings of spaces of holomorphic germs

17.00 J. Mujica, Linearization of holomorphic mappings of bounded type

**Short communications**

Chairs: G. Godefroy (S), J. Schmets (B), J. Orihuela (A)

18.15 P. Harmand, M-ideals and spaces of compact operators (S)

M. López Pellicer, On Valdivia's barrelledness property in  $l_0^\infty(X, \mathcal{A})$  (B)

Fan Ming, Some problems on the joint spectrum and the joint numerical range (A)

18.35 R. Payá, Banach spaces with strongly subdifferentiable norm (S)

F. Balibrea, Permutation metric and weak topology (B)

J. Motos, A note on the vector-valued Fourier transform (A)

18.55 W. Werner, The asymptotic behaviour of BAP on subspaces of  $c_0$  (S)

E. Martín-Peinador, On Pontryagin duality (B)

J.H. Fourie, Wedge spaces of operators on Hilbert spaces (A)

19.15 D. Yost, Convex sets and M-ideals in Banach spaces (S)

T. Gilsdorf, Regular inductive limits of (K)-spaces (B)

L.M. Sánchez, On the open mapping theorem without convexity conditions (A)

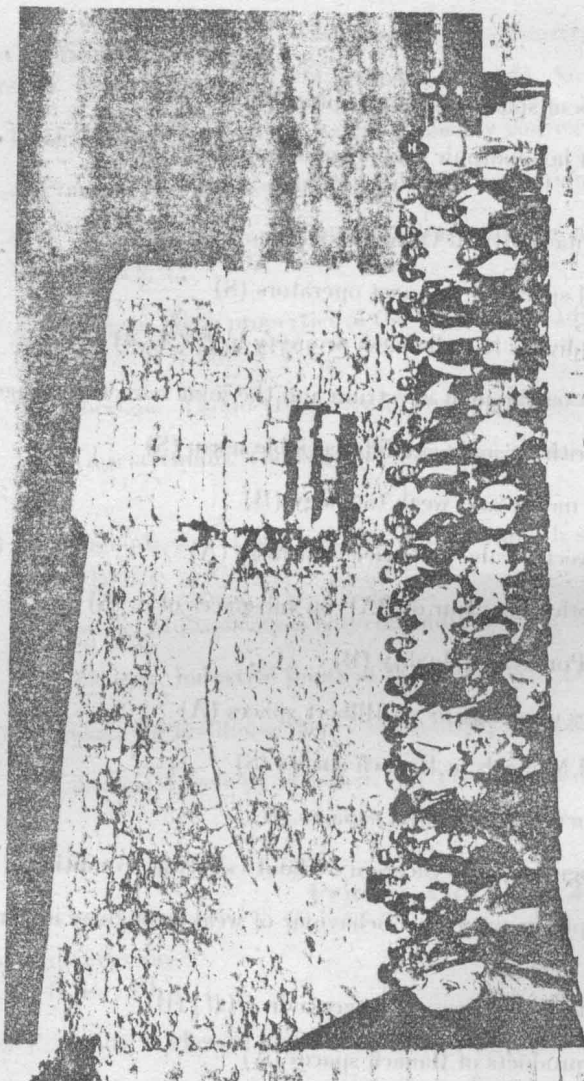
19.35 T. Kühn, Optimal asymptotic eigenvalue behaviour of weakly singular integral operators (S)

M.C. de las Obras, Relations between convergence in  $G(H)$  (B)

J.F. Castillo, Sums and products of Banach spaces (A)

21.00 **Special dinner****Saturday, October 27**9.30 **Departure to Valencia**12.00 **Closing Ceremony** (Paraninfo de la Universidad)





The participants of the meeting during the visit to the castle of Peniscola

# INTERNATIONAL FUNCTIONAL ANALYSIS MEETING on the Occasion of the 60th Birthday of Professor M. Valdivia

Peñíscola, Castellón, 22 – 27 October 1990

## LIST OF PARTICIPANTS

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J. Zafarani (Isfahan, Iran)  
D.N. Zarnadze (Georgian Academy of Science, Tblisi, USSR)



## PROTOCOLO DEL ACTO DE APERTURA

Peñíscola, Centro de Estudios de la Función Pública, Avd. del Puerto.  
Lunes 22 de Octubre de 1990, 12 horas.

1. Apertura de la sesión por el Presidente.
2. El Presidente da la palabra al Profesor J. Bonet, de la Universidad Politécnica de Valencia, quien, en nombre del Comité Organizador, da la bienvenida a los participantes.
3. El Presidente da la palabra al Profesor J. Horváth de la Universidad de Maryland (EEUU), el cual dictará la Lección Inaugural Homenaje al Profesor M. Valdivia. (En este momento la mesa presidencial pasará a ocupar los asientos asignados en la primera fila, donde permanecerán hasta el término de la exposición del Profesor J. Horváth. Finalizada esta volverán a ocupar la mesa presidencial.)
4. El Presidente da la palabra al Profesor M. Valdivia.
5. Apertura del Congreso por el Presidente.

For the lecture of J. Horváth see his article "On the mathematical works of Manuel Valdivia" in these Proceedings. The English translation of the reply of Professor M. Valdivia follows on the next pages.