

# Index

PREFACE .....	vii
---------------	-----

## COMMUNICATIONS

R.D. GRIGORIEFF

Qualocation for periodic pseudodifferential operators: additional order convergence, an overview .....	1
-----------------------------------------------------------------------------------------------------------	---

F.J. GASPAR, F.J. LISBONA, AND C. RODRIGO

Efficient implementation of box-relaxation multigrid methods for the poroelasticity problem on semi-structured grids .....	21
-------------------------------------------------------------------------------------------------------------------------------	----

C.M. LEE, D.J. HIGHAM, D.C. AND J.K. VASS

Non-negative Matrix Factorisation for Network Reordering .....	39
----------------------------------------------------------------	----

G. VANDEN BERGHE AND M. VAN DAELE

Fourth-order symplectic exponentially-fitted modified Runge-Kutta methods of the Gauss type: a review .....	55
----------------------------------------------------------------------------------------------------------------	----

J.M. FRANCO AND I. GÓMEZ

Sobre la construcción de métodos Runge–Kutta–Nyström explícitos ajustados exponencialmente y de orden alto .....	71
---------------------------------------------------------------------------------------------------------------------	----

L. BRUGNANO, F. IAVERNARO AND T. SUSCA

Numerical comparisons between Gauss-Legendre methods and Hamiltonian BVMs defined over Gauss points .....	95
--------------------------------------------------------------------------------------------------------------	----

J. P. GARCÍA-SEGUÍ AND F. CASAS

On the convergence of generalized polar decompositions in Lie groups .....	113
----------------------------------------------------------------------------	-----

I. HIGUERAS

Positivity properties for the classical fourth order Runge-Kutta method .....	125
-------------------------------------------------------------------------------	-----

M. CALVO, S. GONZALEZ-PINTO AND J.I. MONTIJANO

Extending convergence results of Runge–Kutta methods for stiff semi linear initial value problems .....	141
------------------------------------------------------------------------------------------------------------	-----

R. BARRIO AND S. SERRANO	
Modificaciones del método de Variación de los Parámetros.	
Aplicaciones en Astrodinámica. ....	155
J. F. CARIÑENA AND M. F. RAÑADA	
Lagrangians of a non-mechanical type for second order	
Riccati and Abel equations .....	165
A. BULTHEEL, R. CRUZ-BARROSO, P. GONZÁLEZ-VERA AND F. PERDOMO-PÍO	
On the computation of symmetric Szegő-type quadrature formulas .....	177
J. M. CARNICER AND M. GASCA	
Multivariate polynomial interpolation: some new trends .....	197
M. ALFARO, J. J. MORENO-BALCÁZAR, A. PEÑA AND M. L. REZOLA	
On Sobolev type orthogonal polynomials	
with unbounded support: asymptotic properties .....	209
D. ALONSO-GUTIÉRREZ, J. BASTERO AND J. BERNUÉS	
A note on typical sections of isotropic convex bodies .....	225
P. J. MIANA AND N. ROMERO	
Rational identities in the Catalan triangle .....	233
L. A. KURDACHENKO AND J. OTAL	
Groups with families of generalized normal subgroup .....	241

## Preface

This *Monografía de la Real Academia de Ciencias de Zaragoza* collects the proceedings of the conference MCalv6(5) that took place in Zaragoza, September 7-9, 2009. (<http://iuma.unizar.es/mcal65/>).

The conference was organized to celebrate the 65th birthday of Manuel Calvo. The idea of having such a conference come from his Ph.D. students, who wanted to share Manuel's birthday with his many friends and colleagues.

Firstly, we would like to express our thanks to all speakers and contributors in the conference. We must say that when they were contacted to participate in this event, all of them immediately accepted. Manuel Calvo is, indeed, very popular among their colleagues.

The conference took place at the Instituto Universitario de Matemáticas y Aplicaciones (IUMA) of the University of Zaragoza and included many high quality talks on diverse topics, with speakers coming from Berlin, Leiden, Iowa, Gent, Florence, Valladolid, La Laguna, Alicante and Zaragoza. All of them, researchers of the first international level, are good friends of Manuel. More than 50 people attended the conference and many others that could not participate, transmitted us their congratulations to Manuel. A warm and friendly atmosphere characterized the meeting.

With this conference we wanted to acknowledge and to thank Manuel for all the excellent work he has been doing during the many years of his career. Manuel belongs to a group of people that had to start practically from scratch. Indeed, by the early seventies, there was no much research on Applied Mathematics in Spain, and in particular in Zaragoza. Manuel, was among the first ones in going abroad to study new theories, develop techniques and skills on Numerical Analysis, and then, coming back to create a new research group that soon acquired an international reputation, and all that with almost no means, neither financial support nor infrastructure.

The conference was organized not only because Manuel has done a good job in Applied Mathematics. With no doubt, the most important reason to organize the Conference in his honor is their human qualities. He is good teacher, generous, meticulous, careful, precise and, obviously, a good mathematician. Particularly, we would mention as a good quality his commitment to everything he does. Whatever he does, teaching, research or

administration, he has to do it well. A characteristic point of Manuel that we would like to emphasize is his curiosity. He is always willing to know new ideas, concepts, etc. He has passion for knowing and understanding new things. At any conference, after a talk when the chairman says “any question”, we think “besides the ones from Manuel”. But you can be sure that this is not due to vanity or because he likes to be the center of attention. It is just curiosity.

Manolo is a great master and also a good friend. We thank him for everything, and we are sure that all his colleagues, students and friends want to join us again in wishing him a long and fruitful scientific and personal life.

The Editors

Antonio ELIPE

Juan Ignacio MONTIJANO

Luis RÁNDEZ

# MCalv6(5)



## Conference in Honour of the 65th Birthday of Prof. Manuel Calvo

Zaragoza, September 7-8, 2009



### Organizing Committee

A. Elipe  
J.I. Montijano  
L. Rández

### Main Speakers

L. Brugnano  
J. M. Ferrándiz  
M. Gasca  
P. González-Vera  
R. Grigorieff  
L. Jay  
J. Sanz-Serna  
M. Spijker  
G. Vanden Berghe

<http://iuma.unizar.es/mcal65/>  
Instituto Universitario de Matemáticas y Aplicaciones



Universidad de  
Zaragoza

Patrocina:



