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Partial Differential Equations and Functional Analysis

The Philippe Clément Festschrift

Erik Koelink
Jan van Neerven
Ben de Pagter
Guido Sweers
Editors

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Editors:

rik Koelink, Jan van Neerven, Ben de Pagter and
Guido Sweers
Technische Universiteit Delft
DIAM
P.O. Box 5031
2600 GA Delft
The Netherlands
e-mail: H.T.Koelink@math.tudelft.nl
J.vanNeerven@math.tudelft.nl
B.dePagter@math.tudelft.nl
G.H.Sweers@math.tudelft.nl

Annemarie Luger
Harald Woracek
Institut für Analysis und Scientific Computing
Technische Universität Wien
Wiedner Hauptstrasse 8–10 / 101
1040 Wien
Austria
e-mail: aluger@mail.zserv.tuwien.ac.at
harald.woracek@tuwien.ac.at

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Preface

The present volume is dedicated to Philippe Clément on the occasion of his retirement in December 2004. It has its origin in the workshop "Partial Differential Equations and Functional Analysis" (Delft, November 29–December 1, 2004) which was held to celebrate Philippe's profound contributions in various areas of Mathematical Analysis.

The articles presented here offer a panorama of current developments in the theory of partial differential equations as well as applications to such diverse areas as numerical analysis of PDEs, Volterra equations, evolution equations, H^∞-calculus, elliptic systems, mathematical physics, and stochastic analysis. They reflect Philippe's interests very well and indeed several of the authors have collaborated with him in the course of his career.

The editors gratefully acknowledge the financial support of the Royal Netherlands Academy of Arts and Sciences, the Netherlands Organization for Scientific Research, and the Thomas Stieltjes Institute for organizing the workshop. They also thank Thomas Hempfling for the pleasant collaboration during the preparation of this volume.

Last but not least the editors, all members of his former group, thank Philippe for his constant inspiration and for sharing his enthusiasm in mathematics with them.

The Editors

This volume is dedicated to *Philippe Clément*
on the occasion of his retirement.

Philippe Clément: Curriculum Vitae

Philippe Clément, born on 9 January 1943 in Billens, Switzerland, started his study in Physics at the Ecole Polytechnique de l' Université de Lausanne (now EPFL) in 1962 and obtained the degree of Physicist-Engineer in 1967. During that period he discovered that his true interest was much more in Mathematics and he obtained the License des Sciences Mathématiques in 1968 from the University of Lausanne. Hereafter he started to work on his Ph.D. thesis in the area of Numerical Analysis at the EPFL with J. Descloux as supervisor. He defended his thesis, "*Méthode des éléments finis appliquée à des problèmes variationnels de type indéfini*", in February 1974. Some of the results were published in his seminal paper "*Approximation by finite element functions using local regularization*" (Rev. Française Automat. Informat. Recherche Opérationelle, RAIRO Analyse Numérique 9, 1975, R-2, 77–84). In this paper he introduced what is nowadays known in the literature as *the Clément-type interpolation operators*, which play a key role in the analysis of adaptive finite element methods.

In the period 1972–74 Philippe was First Assistant at the Department of Mathematics of the EPFL and under the influence of B. Zwahlen he became interested in Nonlinear Analysis. It was a very stimulating and inspiring time and environment for him, in particular, he met at various workshops Amann, Aubin, Da Prato, Grisvard, Tartar and others. The years 1974–77 Philippe continued his mathematical work, supported by the Swiss National Foundation for Scientific Research, in Madison (USA), first as Honorary Fellow at the Mathematics Department, later as a Research Staff Member at the Mathematics Research Center, of the University of Wisconsin. In that period he came into contact with Crandall and Rabinowitz and worked on nonlinear elliptic problems. Together with Nohel and Londen, he started to be involved in nonlinear Volterra equations.

In 1977 Philippe moved to the University of Technology in Delft, were he was appointed as Associate Professor. In 1980 he became full professor and in 1985 he obtained the Chair in Functional Analysis in Delft. His main areas of interest and research were (and still are) the theory of evolution equations, operator semigroups as well as the Volterra equations and elliptic problems mentioned before. In particular, he was involved in problems concerning maximal regularity and problems related to functional calculus. Philippe is widely recognized for his important contributions in these areas. The very stimulating seminars in Delft on the theory of semigroups have resulted in the book "*One-Parameter Semigroups*" (Clément, Heijmans et al.). In recent years his interests also include stochastic integral equations.