

Applied and Numerical Partial Differential Equations

Computational Methods in Applied Sciences

Volume 15

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Applied and Numerical Partial Differential Equations

Scientific Computing in Simulation,
Optimization and Control
in a Multidisciplinary Context

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Dedicated to Prof. R. Glowinski
at the occasion of his 70th birthday.

Preface

The present volume is comprised of contributions solicited from invitees to conferences held at the University of Houston, University of Jyväskylä, and Xi'an Jiaotong University honoring the 70th birthday of Professor Roland Glowinski. Although scientists convened on three different continents, the editors prefer to view the meetings as single event. The three locales signify the fact Roland has friends, collaborators and admirers across the globe. The contents span a wide range of topics in contemporary applied mathematics ranging from population dynamics, to electromagnetics, to fluid mechanics, to the mathematics of finance among others. However, they do not fully reflect the breath and diversity of Roland's scientific interest. His work has always been at the intersection mathematics and scientific computing and their application to mechanics, physics, aeronautics, engineering sciences and more recently biology. He has made seminal contribution in the areas of methods for science computation, fluid mechanics, numerical controls for distributed parameter systems, and solid and structural mechanics as well as shape optimization, stellar motion, electron transport, and semiconductor modeling. Two central themes arise from the corpus of Roland's work. The first is that numerical methods should take advantage of the mathematical properties of the model. They should be portable and computable with computing resources of the foreseeable future as well as with contemporary resources. The second theme is that whenever possible one should validate numerical with experimental data.

The volume is written at an advanced scientific level and no effort has been made to make it self contained. It is intended to be of interested to both the researcher and the practitioner as well to advanced students in computational and applied mathematics, computational science and engineers and engineering.

Many individuals contributed to the success of the celebration honoring Roland's 70th. The scientific coordination of the events was managed by Prof. Tsorng Whay Pan in Houston and Dr. Kirsi Majava in Jyväskylä. Without their dedicated efforts the conferences and this volume would not have existed.

The solicitation and collect of manuscripts was overseen by Ms. Sharon Lahey in Houston and Ms. Marja-Leena Rantalainen in Jyväskylä. The staffs of the Faculty of Information Technology in Jyväskylä and the Departments of Mathematics of the University of Houston and Jiaotong University need to be recognized for their diligent efforts in logistics, local arrangements and support.

Houston, Texas
Houston, Texas
Jyväskylä, Finland
Jyväskylä, Finland
Paris, France
April 2009

William Fitzgibbon
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