



Contents lists available at ScienceDirect

Journal of Computational and Applied Mathematics

journal homepage: www.elsevier.com/locate/cam

Preface



This special issue contains a selection of papers presented at the 14th Seminar NUMDIFF on the Numerical Solution of Differential and Differential–Algebraic Equations, held at the Martin-Luther-Universität Halle-Wittenberg, Halle, Germany, during 7–11 September 2015. Seminar NUMDIFF-14 was organized by the Institute of Mathematics of the Martin-Luther-Universität, the Centrum Wiskunde & Informatica (CWI), Amsterdam, the Netherlands, and the Mathematical Institute, Universiteit Utrecht, the Netherlands, as the 14th edition of a numerical mathematics conference series organized in Halle since 1981. Like all preceding meetings, the focus was on differential and differential–algebraic equations and related topics.

With an attendance of 125 scientists, NUMDIFF-14 encompassed a scientific programme with fourteen plenary invited lectures, four mini-symposia with a total of twenty-eight invited lectures, and a great variety of interesting shorter contributed lectures. The subjects of the mini-symposia included:

- Nonlinear evolution equations. Organizers: Eskil Hansen (Lunds Universitet) and Alexander Ostermann (Universität Innsbruck).
- Local and global error control issues in time stepping methods. Organizers: Gennady Kulikov (Universidade de Lisboa) and Rüdiger Weiner (Martin-Luther-Universität Halle-Wittenberg).
- Geometric integration of partial differential equations. Organizer: Begoña Cano (Universidad de Valladolid).
- Numerical PDEs in financial mathematics. Organizer: Karel in't Hout (Universiteit Antwerpen).

We thank the mini-symposium organizers and their speakers for taking responsibility for this part of the scientific programme. The fourteen plenary invited lectures included the subjects:

- Exponential Krylov subspace time integration for nanophotonics applications, Mike Botchev (Universiteit Twente).
- Stochastic numerics and stability issues, Evelyn Buckwar (Johannes Kepler Universität Linz).
- The construction of high-order G-symplectic methods, John Butcher (University of Auckland).
- Geometric methods for differential equations in applications of computer animation, Elena Celledoni (NTNU, Trondheim).
- Locally implicit and implicit discontinuous Galerkin time domain method for electromagnetic wave propagation in dispersive media, Stéphane Descombes (Université Nice Sophia Antipolis).
- Resolvent Krylov subspace approximation of C_0 -semigroups and their discretisations, Volker Grimm (KIT, Karlsruhe).
- High-order explicit local time-stepping methods for wave propagation, Marcus Grote (Universität Basel).
- High-order accurate methods for fractional differential equations, Jan Hesthaven (EPFL, Lausanne).
- Classical and novel analysis of positive invariance and strong stability preserving time integrators, Zoltán Horváth (Széchenyi István University, Győr).
- Space–time finite element exterior calculus and variational discretizations of gauge field theories, Melvin Leok (University of California, San Diego).
- Asymptotic-preserving methods and differential–algebraic equations, Lorenzo Pareschi (Università degli Studi di Ferrara).
- Structure-preserving integrators for smooth and non-smooth thermomechanical problems, Ignacio Romero (Universidad Politécnica de Madrid).
- Multi-methods for time discretization of evolutionary PDEs, Adrian Sandu (Virginia Tech).
- TVD-based finite volume methods for sound–advection–buoyancy systems, Jörg Wensch (TU Dresden).

Special in NUMDIFF-14 was the session *More than 30 years of differential–algebraic equations*, celebrating the 75th birthday of Roswitha März, including speakers Claus Führer, Martin Arnold, Volker Mehrmann and Caren Tischendorf.

We thank all participants for their contributions to making NUMDIFF-14 a successful and interesting meeting. We gratefully acknowledge the editorial board of the Journal of Computational and Applied Mathematics for allowing us to publish the solicited papers in this special journal issue. All solicited papers were refereed in accordance with the journal's

policy. This was possible only with the help and support of many colleagues who consented to serving as reviewers. We thank all of them for their time and efforts to insure the quality of these proceedings. As organizers we gratefully acknowledge our sponsors for generously supporting the conference:

- Martin-Luther-Universität Halle-Wittenberg.
- Deutsche Forschungsgemeinschaft (DFG).
- Stadt Halle, Dienstleistungszentrum Wirtschaft und Wissenschaft.
- SIMPACK AG, Gilching.

Last but not least we thank the University of Halle-Wittenberg for its hospitality in providing the venue of the meeting.

Martin Arnold
Helmut Podhaisky
Rüdiger Weiner
Martin-Luther-Universität Halle-Wittenberg, Germany

Jason Frank
Universiteit Utrecht, Netherlands

Willem Hundsdorfer*
Centrum Wiskunde & Informatica, Netherlands
E-mail address: Willem.Hundsdorfer@cw.nl.

* Corresponding author.