

MATHEMATISCHES FORSCHUNGSINSTITUT OBERWOLFACH

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Recent Developments in the Numerics of Nonlinear Hyperbolic Conservation Laws

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ABSTRACT. The development of reliable numerical methods for the simulation of real life problems requires both a fundamental knowledge in the field of numerical analysis and a proper experience in practical applications as well as their mathematical modeling.

Thus, the purpose of the workshop was to bring together experts not only from the field of applied mathematics but also from civil and mechanical engineering working in the area of modern high order methods for the solution of partial differential equations or even approximation theory necessary to improve the accuracy as well as robustness of numerical algorithms.

Mathematics Subject Classification (2010): 34-99, 35F25, 35L65, 41A10, 76-99.

Introduction by the Organisers

The workshop *Recent Developments in the Numerics of Nonlinear Hyperbolic Conservation Laws*, organised by Rémi Abgrall (Zürich), Willem Hundsdorfer (Amsterdam), Andreas Meister (Kassel) and Thomas Sonar (Braunschweig) was held September 14th–September 19th, 2015. This meeting was well attended with over 50 participants with broad geographic representation from all continents.

Since modern numerical methods like Discontinuous Galerkin or Spectral Element Finite Difference methods are based on orthogonal polynomials on simplices and use modal filters as well as methods for edge detection and many more mathematical devices from different areas of research we decided to invite renowned

researchers from numerical methods for partial differential equations and approximation theory. Furthermore, to couple mathematical precision with a large range of applicability we also invited scientist from engineering departments working in the field of numerical schemes.

The talks ranged from new Runge-Kutta solvers, new filters and edge detection algorithms, Discontinuous Galerkin methods, Spectral Difference methods, Finite Difference operators, implicit solvers, and finite volume methods to the modeling of shallow water flow, viscous as well as inviscid fluid flow and solid mechanics. Discussions were lively and many different research areas met for the first time resulting in interesting talks and contacts.

The workshop was a tremendous success and we are looking forward to repeat this kind of conference in Oberwolfach again in a few years.

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