Abstract. Modern numerical methods for hyperbolic conservation laws rely on polynomials of high degree, mostly orthogonal polynomials, on triangular or quadrilateral meshes. Due to shocks stability is an issue and modern means of filtering like spectral viscosity is required. Additional TV-filters are needed in most cases as postprocessors and the choice of the solver for the differential equations to integrate in time is crucial. The workshop was organised to bring together researchers from different areas of mathematics in order to fuel the research on high-order efficient and robust numerical methods.


Introduction by the Organisers

The workshop Recent Developments in the Numerics of Nonlinear Hyperbolic Conservation Laws and their Use in Science and Engineering, organised by Rainer Ansorge (Hamburg), Hester Bijl (Delft), Andreas Meister (Kassel) and Thomas Sonar (Braunschweig) was held January 15th–January 21st, 2012. This meeting was well attended with 45 participants with broad geographic representation from many continents. This workshop was in a sense an experiment. Since modern numerical methods like Discontinuous Galerkin or Spectral Element Finite Difference methods are based on orthogonal polynomials on simplizes and use modal filters and many more mathematical devices from different areas of research we decided to invite renowned researchers from numerical methods for ODEs, image processing,
approximation theory, and numerical methods for hyperbolic conservation laws. Although there was some confusion in the beginning since the image processing people did not know in advance whether they were invited to the right conference or not these confusions could be washed away. At the end of the workshop we heard from several researchers that this was indeed an extraordinary successful workshop in which specialists from so different areas talked with each other for the first time.

The talks ranged from new Runge-Kutta solvers, new filters in image processing, Discontinuous Galerkin methods, Spectral Difference methods, Finite Difference operators, implicit solvers, and finite volume methods to the modeling of shocks, salt distribution in the baltic sea, a new model of atmospheric flow and its numerics, and many more. 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.
Workshop: Recent Developments in the Numerics of Nonlinear Hyperbolic Conservation Laws and their Use in Science and Engineering

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