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# Sparse Grids and Applications – Miami 2016

 Springer

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# Preface

Sparse grids are a popular approach for the numerical treatment of high-dimensional problems. Where classical numerical discretization schemes fail in more than three or four dimensions, sparse grids, in their different flavors, are frequently the method of choice, be it spatially adaptive in the hierarchical basis or via the dimensionally adaptive combination technique.

The Fourth Workshop on Sparse Grids and Applications (SGA 2016), which took place in Miami, Florida, USA, from October 4 to 7 in 2016, demonstrated once again the importance of this numerical discretization scheme. Organized by Hans-Joachim Bungartz, Jochen Garcke, Michael Griebel, Markus Hegland, Dirk Pflüger, Clayton Webster, and Guannan Zhang, almost 50 participants from six different countries have presented and discussed the current state of the art of sparse grids and their applications. Thirty-seven talks covered their numerical analysis as well as efficient data structures and new forms of adaptivity and a range of applications from clustering and model order reduction to uncertainty quantification settings and optimization. As a novelty, the topic high-performance computing covered several talks, targeting exascale computing and related tasks. Besides data structures and communication patterns with excellent parallel scalability, fault tolerance was introduced to the SGA series, the hierarchical approach providing novel approaches to the treatment of hardware failures without checkpoint restart. This volume of LNCSE collects selected contributions from attendees of the workshop.

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