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Challenges in Advanced Computing

The talk gives an overview of our research activities in computational science and engineering and advanced computing. The focus will be on two topics. First, we will report on efficient algorithmic approaches for flow simulations on Cartesian grids in the context of Peano, a software environment for the efficient large-scale parallel solution of PDE. Second, recent results for the application of spatially adaptive sparse grids to classification problems in high dimensionalities ($d=100$ and higher) are presented.