HIGHER ORDER FINITE ELEMENT METHODS FOR CHALLENGING MATHEMATICAL PROBLEMS IN ENGINEERING AND APPLIED SCIENCES

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ABSTRACT

Obtaining approximate solutions for mathematical problems with guaranteed accuracy and precision is one of the key issues in applied sciences and engineering. An important theoretical finding, which concerns the finite element method and covers standard elliptic problems, was obtained in the 1980s and it states that exponential rates of convergence may be achieved provided that the finite element mesh and polynomial degrees are properly designed and assigned.

Realization of the higher convergence rates in practice and enlargement of the problem class requires scientific breakthroughs and advanced finite element technology. The aim of this minisymposium is to bring together colleagues working on this area and share the most recent findings and challenges.

The applied methodology may range from the conventional conforming methods to discontinuous (Petrov-)Galerkin methods and least squares methods as well as their generalizations. The topics of interest include but are not limited to

* Parallelization of higher order FE codes
* Application of higher order FE methods to difficult problems like wave propagation
* Multigrid solvers for minimum residual methods
* Minimum residual methods in Banach space setting
* Integration of DPG method with time stepping schemes
* Industrial applications
* Simulation governance