

HIGH-ORDER NONSTANDARD FINITE ELEMENT METHODS FOR PROBLEMS IN CONTINUUM MECHANICS AND RELATED APPLICATIONS

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ABSTRACT

Accurate and efficient simulation of problems in continuum mechanics relies heavily on advanced finite element methods and related numerical techniques capable of resolving complex solution structures. Recent advances in high-order and nonstandard finite element discretizations, together with emerging operator-learning approaches, have broadened the computational tools available for complex partial differential equations while helping preserve essential mathematical structures and physical properties. This minisymposium brings together researchers working on the theory, analysis, algorithms, and applications of these methods. Topics include mixed and hybridizable finite element methods, structure-preserving discretizations, and efficient iterative algorithms, with applications to eigenvalue and interface problems, solid and fluid mechanics, wave propagation, and related areas of computational science. The minisymposium will provide a forum for exchanging recent advances and fostering collaboration among the numerical analysis and computational mechanics communities.

SPEAKERS

1. Stephanie Zacharias (University of Bonn): “An Equilibrated A Posteriori Error Estimator for the Biharmonic Eigenvalue Problem.”
2. Tanvi Wadhawan (INRIA, Paris): “ hp -a posteriori error analysis for a Hybrid High-Order Method for the biharmonic problem.”
3. Tugay Dağlı (Chemnitz University of Technology): “Adaptive Mixed Finite Element Method for Stress-Based Formulations of Eigenvalue Problems.”
4. Ngoc Tien Tran (University of Augsburg): “Discrete Duality Techniques and Error Analysis for Hybridizable Methods in Convex Minimization.”
5. Sanghyun Lee (Florida State University): “An Optimization-Based Property-Preserving Limiter.”
6. Shudan Tian (Xiangtan University): “Divergence-Free Finite Element Method for Interface Stokes Problem.”
7. Limin Ma (Wuhan University): “A Geometry-Flexible Direct Finite Element Method on Structured Meshes.”
8. Yury Gryazin (Idaho State University): “Compact PFFT–GMRES High-Order Approximation Methods for 3D Helmholtz Subsurface Scattering Problems.”
9. Ludmil T. Zikatanov (Pennsylvania State University): “Iterative Neural Operators (INO): A Multilevel Approach to Operator Learning.”
10. Aditi Tomar (TU Wien): “Goal-Oriented Adaptive Mixed Finite Element Methods.”
11. Ritesh Singla (Umea University): “Title to be announced.”