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HPC METHODS FOR EIGENVALUE PROBLEMS IN APPLIED SCIENCE AND ENGINEERING

5000 SCIENTIFIC COMPUTING

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ABSTRACT

Many application problems boil down to eigenvalue problems governed by partial differential equations. The design of efficient and accurate numerical approximation methods for these problems is of fundamental importance. The aim of this minisymposium is to bring together experts on the numerical analysis of eigenvalue problems arising in science and engineering. We welcome contributions on high-performance computing (HPC) methods and advanced numerical algorithms and discretization techniques for solving eigenvalue-related problems. Relevant topics include, but are not limited to, the following:

- Different types of eigenvalue problems (e.g., linear, quadratic, polynomial, and nonlinear)
- Different algorithms for solving eigenvalue problems (e.g., Jacobi–Davidson, LOBPCG, Krylov-based, and analytical methods)
- Advanced discretization techniques for eigen-analysis based on, e.g., finite element methods (FEM), and isogeometric analysis (IGA)
- Enhancing the accuracy and efficiency of the eigen-analysis using, e.g., non-standard integration methods, and dispersion-minimizing algorithms
- Vibration analysis in structures, fluids, and in problems concerning the fluid–structure interactions (FSI)
- Wave propagation problems in homogeneous and heterogeneous media including problem arising in, e.g., acoustics, elastodynamics, and electromagnetics
- A priori and a posteriori error analysis and adaptivity