

ADVANCED NUMERICAL METHODS FOR PDE EIGENVALUE PROBLEMS

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ABSTRACT

This minisymposium focuses on state-of-the-art numerical methods for PDE eigenvalue problems, central in scientific computing due to their critical importance in stability analysis, vibration modeling, quantum physics, etc. Presentations will highlight novel discretization and approximation techniques for standard and non-standard PDE eigensolvers, as well as approaches for nonlinear eigenvalue problems. Some time will also be dedicated to talks on outer-loop methodologies designed to handle parametric and stochastic eigenvalue frameworks such as those arising in inverse problems, optimal design, and uncertainty quantification.

SPEAKERS

1. Fleurianne Bertrand (TU Chemnitz): *Minimal residual FEM for PDE eigenvalue problems.*
2. Joanna Bisch (INRIA Bordeaux): *A Ritz method for solution of parametric generalized EVPs.*
3. Luka Grubisic (U Zagreb): *Stochastic trace estimation for positive trace-class operators.*
4. Harri Hakula (Aalto U): *Eigenproblems on high-genus hyperbolic surfaces: Benchmarks and error estimation.*

5. Andreas Kleefeld (Jülich Supercomputing Centre & U Aachen): *Interior transmission eigenvalue curves.*
6. Duc Khuat (Aalto U): *Regularity of the critical buckling load of shells with uncertain domain.*
7. Jeff Owall (Portland State U): *A canonical gauge for the magnetic Schrödinger eigenvalue problem.*
8. Anna Persson (Uppsala U): *A vortex resolution condition for rotating Gross–Pitaevskii eigenvalue problems.*
9. Davide Pradovera (Stockholm U): *Computing resonances in scattering problems through BEM and randomized rational approximation.*
10. Benjamin Stamm (U Stuttgart): *Reduced order modeling for parametrized eigenvalue problems with application to quantum mechanical systems.*