

# ADVANCES IN NUMERICAL APPROXIMATION OF INTEGRAL OPERATORS

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## ABSTRACT

Integral operators play a key role in a wide range of mathematical models, including boundary integral formulations and nonlocal problems such as fractional differential equations. Their discretization by means of the boundary element method (BEM) or finite element techniques pose significant challenges due to singular kernels, nonlocal interactions, dense matrices, and reduced (boundary) regularity of solutions. Recently, many contributions to counteract these difficulties have been made that enable the accurate simulation of integral equations.

The goal of this minisymposium is to bring together researchers currently working on the numerical analysis and implementation of boundary integral and fractional differential operators, with a particular focus on high-order methods and efficient discretizations such as adaptive mesh refinement, quadrature techniques, kernel approximation, and operator compression.

## SPEAKERS

1. Juan Pablo Borthagaray (Universidad de la República, Uruguay): Discretization of the Riesz fractional gradient and applications
2. Oscar Bruno (California Institute of Technology, USA): TBA
3. Markus Faustmann (TU Wien, Austria):  $hp$ -FEM for the integral fractional Laplacian in 3d
4. Thomas Führer (Pontificia Universidad Católica de Chile, Chile): Boundary elements for clamped Kirchhoff–Love plates

5. Gregor Gantner (University of Twente, Netherlands): Optimal convergence rates of an adaptive hybrid FEM-BEM method for full-space linear transmission problems
6. Helmut Harbrecht (Universität Basel, Switzerland): The isogeometric boundary element method for shape uncertainty quantification
7. Michael Karkulik (Universidad Técnica Federico Santa María, Chile): Space-time FEM-BEM couplings for parabolic transmission problems
8. Ludvig af Klinteberg (Mälardalen University, Sweden): High-order regularization of singular and nearly singular boundary integral operators
9. Franz Nowakowsky (University of Twente, Netherlands): Adaptive space-time BEM for the heat equation with Neumann boundary conditions
10. Carlos Pérez Arancibia (University of Twente, Netherlands): Maxwell à la Helmholtz: From curl operators to curvature-dependent boundary conditions
11. Dirk Praetorius (TU Wien, Austria): Functional a-posteriori error estimators for BEM
12. Alexander Rieder (TU Wien, Austria): Beyond algebraic accuracy in time domain integral equations for wave propagation
13. Abner Salgado (University of Tennessee, USA): TBA
14. Stefan Sauter (University of Zurich, Switzerland): BEM for variable coefficient second-order problems
15. Carolina Urzua Torres (TU Delft, Netherlands): Space-time BEM for the wave equation in 2d