

HIGH-ORDER METHODS FOR RANDOM AND PARAMETRIC PDES

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ABSTRACT

The aim of this minisymposium is to discuss recent progress in the analysis and application of high-order methods for approximating the parameter-to-solution map in the context of random and parametric PDEs; such problems arise e.g. in uncertainty quantification and PDE-based optimization and control.

We welcome theoretical, methodological, and application-oriented contributions on, among others, polynomial/rational approximations, kernel and Gaussian process regression methods, low-rank, proper generalized decomposition and reduced order models, as well as scientific-machine-learning-based methods for operator learning.

SPEAKERS

1. Markus Bachmayr (RTWH Aachen): New adaptive stochastic Galerkin methods for nonlinearly parameterizations and for random domains
2. Christoph Schwab (ETH Zurich): Sparse Spectral Approximation of Parametric Matrix Pencils
3. Jacob Zech (U Heidelberg): Low-rank surrogates for high-dimensional operators
4. Davide Pradovera (Stockholm U): Implicit-explicit collocation for parametric PDE eigenvalue problems
5. Gabriele Santin (U Venezia Ca' Foscari): Kernel-Based Integration: Adaptive Node Selection, Convergence Rates, and Applications

6. Frances Kuo (UNSW Sydney): QMC for optimal control under uncertainty for treatment of tumor growth
7. Dirk Nuyens (KU Leuven): Lattice-based hyperbolic-cross Fourier neural operators - universal approximation theorem and parametric regularity
8. Nick Dexter (Florida State U): TBA