

Bachelor or semester thesis

RW/CSE or INFK

Supervisor: Prof. Christoph Schwab

Analysis and implementation of adaptive wavelet methods

Project description:

Adaptive finite element methods for partial differential equations have been successfully used for decades before rigorous proofs of convergence were obtained by applied mathematicians. Publications by Cohen, Dahmen and DeVore [Math. Comp. 70 (233), 2001 and Found. Comput. Math. 2 (3), 2002] not only meant a break-through in the field but also initiated an avalanche of research in what is now called *adaptive wavelet methods for operator equations*, which by now include representatives of elliptic, eigenvalue and parabolic partial differential and integro-differential equations.

Today, a number of software implementations of these ideas exist, and it is the goal of this project to gain an overview, to assess and to document the usability of these packages on model elliptic equations, such as the Poisson equation posed on nontrivial domains in several space dimensions.

It is possible to continue the development of adaptive wavelet methods within current research projects at the Seminar for Applied Mathematics in form of a MSc thesis.

Prerequisites: Strong `c++` knowledge
Interest in applied mathematics
Independent worker

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