Elitenetzwerk Bayern

UNIVERSITÄT BAYREUTH

Lecture Series as part of the elite degree programme Scientific Computing

Date: 11.12.2019 | Time: 4:30 pm | Location: H31, Building FAN B

Coffee/tea from 4:00 pm in the K6, FAN B

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Adaptive BEM with inexact PCG solver yields almost optimal computational costs

Dirk Praetorius

Technische Universität Wien

Abstract: In our talk, we will sketch our recent work [Führer et al., Numerische Mathematik 141, 2019]. We consider the preconditioned conjugate gradient method (PCG) in the frame of the boundary element method (BEM) with adaptive mesh-refinement. As model problem serves the weakly-singular integral equation associated with the Laplace operator. We propose an adaptive algorithm, which steers the local mesh-refinement as well as the termination of PCG. We prove that this algorithm leads to linear convergence with optimal algebraic rates. Moreover, if the preconditioner is optimal (e.g., multi-level diagonal additive Schwarz preconditioner) and if we employ H2-matrices for the effective treatment of the discrete integral operators, then the algorithm leads even to almost optimal convergence rates with respect to the computational complexity (i.e., the computational time).

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