CONVERGENCE AND OPTIMALITY OF ADAPTIVE BOUNDARY ELEMENT METHODS

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We consider the h-version of the boundary element method (BEM) in 2D and 3D on shape regular meshes. We show convergence and prove quasi-optimality of an adaptive BEM (ABEM), taking Symm's integral equation as our model problem for a first kind integral equation. Optimality here means that the algorithm realizes the optimal rate achievable for solutions for an approximation class that is characterized by the best possible decay rate achievable for the error indicator under the mesh refinements allowed (here: newest vertex bisection). The error indicators that drive the adaptive algorithm are of residual type and hark back to [**?**, **?**]. For the FEM on shape regular meshes, similar convergence and optimality results are available, (Stevenson 2007; Cascon, Kreuzer, Nochetto, Siebert 2008). The BEM setting is more involved and requires different mathematical tools since the operators and pertinent norms are non-local. This mandates in particular the use of non-standard inverse estimates for integral operators, which we present in this talk. We will also discuss extensions of the algorithm to account for data approximations and applications to FEM-BEM coupling.

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