Preconditioned iterative methods for the boundary element solution of a hypersingular integral equation.

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Mortar Boundary Elements

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Abstract

We establish a mortar boundary element scheme for hypersingular boundary integral equations representing elliptic boundary value problems in three dimensions. We prove almost quasi-optimal convergence for a model problem involving the hypersingular operator of the Laplacian. The advantages of this domain decomposition scheme (easier construction of meshes and availability of parallel techniques) also apply to the BEM. To be precise, we apply the mortar technique directly to the boundary-element discretization, not as a coupling procedure between boundary and finite elements as in [8]. The analysis of finite elements for the discretization of boundary integral equations of the first kind goes back to Nédélec and Planchard [21], and Hsiao and Wendland [17]. Stephan [22] studied

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However, our findings showed that an appropriate scatter window combination can reduce this difference between TEW and ESSE methods.

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Rivlin, Chebyshev Polynomials from Approximation Theory to Algebra and Number Theory, Wiley, New York, 1990. This algorithm has several important improvements.

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The preconditioner is derived by first making the nodal and side basis functions locally orthogonal to the element internal bases, and then by decoupling the nodal and side bases from the internal bases.

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