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# BEM-BASED FINITE ELEMENT METHOD WITH PROSPECTS TO TIME DEPENDENT PROBLEMS

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In the development of numerical methods to solve boundary value problems the requirement of flexible mesh handling gains more and more importance. The BEM-based finite element method is one of the new promising strategies which yields conforming approximations on polygonal and polyhedral meshes, respectively. This flexibility is obtained by special trial functions which are defined implicitly as solutions of local boundary value problems related to the underlying differential equation. These functions are treated by means of boundary element methods (BEM) in the realization.

The presentation gives a short introduction into the BEM-based FEM and deals with recent developments. The definitions of first and higher order trial functions are discussed for a primal formulation, cf. [2, 3], which yield optimal rates of convergence on uniform and adaptive polygonal meshes, see [4, 5]. The method is also applicable to mixed formulations involving $H(\mathrm{div})$-conforming approximations, see [1]. Several numerical experiments confirm the proven rates of convergence and show the first results for time dependent problems.

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