
MINISYMPOSIUM 2: Domain Decomposition Based on Boundary Elements

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For non-overlapping domain decomposition methods the Steklov–Poincaré operator or its inverse play a decisive role to represent the Dirichlet to Neumann of the Neumann to Dirichlet map. In corresponding research during the last decades remarkable achievements have been made by using boundary integral and boundary element methods. In the minisymposium several aspects were discussed.

In particular for exterior boundary value problems the coupling of finite and boundary element methods seems to be mandatory. In the case of spherical domains one may use an explicit representation of the Dirichlet to Neumann map as it was considered in the talk of Yu Dehao on the natural boundary reduction and the domain decomposition method in unbounded domains. Coupled finite and boundary element tearing and interconnecting methods for nonlinear potential problems in unbounded regions were considered by C. Pechstein. Since the boundary integral formulation of Helmholtz and Maxwell boundary value problems may involve non-trivial eigensolutions, i.e. spurious modes, special care has to be taken. Therefore, R. Hiptmair presented a resonance free interface coupled BEM for the Maxwell system. A boundary element tearing and interconnecting approach for the numerical solution of variational inequalities was presented by Z. Dostál. Finally, A. Litvinenko discussed the use of hierarchical matrices as domain decomposition preconditioner for the skin problem.