
Jari Toivanen
**A domain decomposition method for discontinuous
Galerkin discretizations of Helmholtz problems with
Lagrange multipliers**

Institute for Computational and Mathematical Engineering
Building 500
Stanford University
Stanford
CA 94305
`toivanen@stanford.edu`
Charbel Farhat
Radek Tezaur

A nonoverlapping domain decomposition method is described for Helmholtz problems discretized by a discontinuous Galerkin finite element method. The discretization uses plane wave basis functions and Lagrange multipliers to enforce a weak continuity of solution over element interfaces. A system of linear equations is formulated for the Lagrange multipliers on the subdomain interfaces. This poorly conditioned system is solved iteratively with a local preconditioner after it has been projected onto the complement of a coarse space in the same way as in the FETI-H method. Numerical experiments study the iterative solution of two-dimensional and three-dimensional model problems and compare the convergence and accuracy to the FETI-DPH method.