

1023-65-564

**Jie Shen\*** ([shen@math.purdue.edu](mailto:shen@math.purdue.edu)), Department of Mathematics, Purdue University, West Lafayette, IN 47906. *Efficient and Stable Spectral Methods for the Helmholtz equation in exterior domains.*

I shall present an efficient and stable spectral algorithm and their numerical analysis for the Helmholtz equation in both two- and three-dimensional exterior domains. The algorithm couples a boundary perturbation technique with a well-conditioned spectral-Galerkin solver based on an essentially exact Dirichlet-to-Neumann operator. Error analysis with explicit dependence on the wave number as well as ample numerical results will be presented to show the accuracy, stability, and versatility of this algorithm. (Received September 18, 2006)