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Inverse problems for elliptic PDEs, analysis and applications

On Transmission Eigenvalue Problem for Maxwell's Equations

Houssem Haddar

INRIA Saclay Ile de France and CMAP Ecole Polytechnique

Houssem.Haddar@inria.fr

Abstract:
We consider the transmission eigenvalue problem for Maxwell's equations corresponding to non-magnetic inhomogeneities with contrast in electric permittivity that changes sign inside its support. We formulate the transmission eigenvalue problem as an equivalent homogeneous system of boundary integral equation and prove that assuming that the contrast is constant near the boundary of the support of the inhomogeneity, the operator associated with this system is Fredholm of index zero and depends analytically on the wave number. Then we show the existence of wave numbers that are not transmission eigenvalues which by an application of the analytic Fredholm theory implies that the set of transmission eigenvalues is discrete with positive infinity as the only accumulation point. This is a joint work with Fioralba Cakoni and Shixu Meng from the University of Delaware.