

GENERALIZED STEKLOV EIGENVALUE PROBLEMS

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ABSTRACT. We consider the generalized Steklov eigenvalue problem

$$-\Delta u = 0 \quad \text{in } \Omega, \quad \partial_n u = \lambda B u \quad \text{on } \Gamma = \partial\Omega$$

where $B : H^{1/2}(\Gamma) \rightarrow H^{-1/2}(\Gamma)$ is some suitable chosen operator. We discuss and analyze related boundary integral operator eigenvalue problems and their discretizations via boundary element methods. Of particular interest are the relations of the Steklov eigenvalues with associated eigenvalues of boundary integral operators, in particular of the double layer boundary integral operator and its contraction property in $H^{1/2}(\Gamma)$, and their relations to the interior and exterior Dirichlet energies. Numerical results are given which underline the theoretical considerations.

Keywords: Steklov eigenvalue problem, boundary element methods

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