

# Boundary Element Methods for Eigenvalue Problems

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For the solution of eigenvalue problems for linear partial differential equations we propose a boundary element method which is used to solve an equivalent nonlinear eigenvalue problem for an associated boundary integral operator. Here we consider the Dirichlet eigenvalue problem of the Laplace operator as model problem. A Galerkin discretization leads to an algebraic nonlinear eigenvalue problem. The latter can be solved by using some appropriate iterative scheme. We apply Kummer's method which is a shift-and-invert algorithm. Considering the characterization of the eigenvalues with respect to the resolvent the convergence of the discretized algorithm is proven and error estimates for the eigensolutions are made. Finally, numerical examples are presented which confirm the theoretical results.