Efficient Boundary Integral Method for Quantum Billiards

HARALD G.L. SCHWEFEL, Max Planck Research Group, Optics, Photonics & Information, Erlangen, Germany, HAKAN E. TURECI, Center for Theoretical Physics, Sloane Physics Laboratory, Yale University, New Haven, CT, A. DOUGLAS STONE, Department of Applied Physics, Yale University, New Haven, CT — Calculating highly excited eigenvalues of the Laplace equation and their corresponding eigenfunctions are of great current interest in many areas. We present an efficient algorithm based on a novel Fredholm formulation of the Laplace eigenvalue problem, in the spirit of the scattering quantization method proposed by the authors in the context of the basis function expansion technique.\(^1\) We also point out the connection to the scaling eigenfunctions\(^2\) and show how this method can be generalized to dielectric cavities.