

Applied Mathematics

An analytic mapping property of the
Dirichlet-to-Neumann operator in
Helmholtz boundary problems

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The analytic version of microlocal analysis shows that if the boundary and the Dirichlet datum of a Helmholtz boundary value problem are real-analytic, then so is the corresponding Neumann datum. However, the domain of analytic continuation of the Neumann datum is, in general, unknown. We shall here relate, in terms of explicit estimates, the domains of analytic continuation of Dirichlet and Neumann boundary data for Helmholtz problems in two or more independent variables, and in neighbourhoods of planar pieces of the boundary. For this purpose, we shall characterise a special subspace of the standard pseudodifferential operators with real-analytic symbols, to which the Dirichlet-to-Neumann operator belongs. The result can be applied in the estimation of the domain of analytic continuation of solutions across planar pieces of the boundary.