

# Wave diffraction by wedges having arbitrary aperture angle

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The problem of plane wave diffraction by a wedge sector having arbitrary aperture angle has a very long and interesting research background. In fact, we may recognize significant research on this topic for more than one century. Despite this fact, up to now no clear unified approach was implemented to treat such a problem from a rigorous mathematical way and in a consequent appropriate Sobolev space setting. In the present paper, we are considering the corresponding boundary value problems for the Helmholtz equation, with complex wave number, admitting combinations of Dirichlet and Neumann boundary conditions. The main ideas are based on a convenient combination of potential representation formulas associated with (weighted) Mellin pseudo-differential operators in appropriate Sobolev spaces, and a detailed Fredholm analysis. Thus, we prove that the problems have unique solutions (with continuous dependence on the data), which are represented by the single and double layer potentials, where the densities are solutions of derived pseudo-differential equations on the half-line.

The talk is based on joint work with co-author Luís P. Castro from the University of Aveiro.