

Boundary value problems governed by the Helmholtz equation in a half-plane with an obstacle perpendicular to the boundary

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The physical motivations behind the present study arise from the problem of acoustic and electromagnetic time-harmonic plane wave diffraction by a strip interacted with the boundary. In particular, we deal with boundary value problems for the Helmholtz equation. We prove the unique existence of solutions for different types of boundary value problems of wave diffraction by a half-plane with a screen or a crack perpendicular to the boundary. Representations of the solutions are also obtained upon the consideration of some associated operators. This is done in a Bessel potential spaces framework and for complex (non-real) wave numbers. The investigation is mostly based on the construction of explicit operator relations, the potential method, and a factorization technique for a certain class of oscillating Fourier symbols which naturally arise from the problems. This is a joint work with D. Kapanadze and based on [1].

References

- [1] *L. P. Castro, D. Kapanadze*: Wave diffraction by a half-plane with an obstacle perpendicular to the boundary. *J. Differ. Equations* *254* (2013), 493–510.