

On the Solvability of a Problem of Wave Diffraction by a Union of a Strip and a Half-Plane

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We will consider a mathematical analysis of a problem of wave diffraction by a union of a strip and a half-plane which is characterized by a boundary-transmission problem for the Helmholtz equation, having higher order boundary conditions. The problem will be analyzed in an operator theory viewpoint. In particular, it will be possible to describe when the operators associated with the initial problem enjoy the Fredholm property. This is done by constructing several operator extension relations between different types of convolution type operators. The initial problem is considered within a framework of Bessel potential spaces, and the obtained properties are valid for a set of regularity indices of these spaces.

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