Eskin, Gregory

The wave equation in a wedge with general boundary conditions. (English) Zbl 0790.35055

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The paper is devoted to the wave equation in $\mathbb{R} \times \Omega$ with the zero initial conditions and boundary conditions $B_i u = h_i$ on Γ_i, $i = 1, 2$, where $\Omega \subset \mathbb{R}^n$ is a wedge bounded by Γ_1, Γ_2, $\Gamma_1 = \{x \in \mathbb{R}^n;$ $x_1 \geq 0$, $x_2 = 0\}$, $\Gamma_2 = \{x \in \mathbb{R}^n;$ $x_1 \sin\alpha - x_2 \cos\alpha = 0$, $x_1 \cos\alpha + x_2 \sin\alpha \geq 0\}$ and homogeneous (in the derivatives) polynomials B_1, B_2 satisfying a uniform Lopatinsky condition. The problem is equivalent to the solution of integral equations on the boundary, which is reduced to two Riemann-Hilbert problems with a shift and these are solved explicitly. Uniqueness and existence of the solution in the appropriate spaces of distributions is proved.

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MSC:

35L05 Wave equation
35A20 Analyticity in context of PDEs
35C15 Integral representations of solutions to PDEs
35D05 Existence of generalized solutions of PDE (MSC2000)

Keywords:

Fourier transform; pseudodifferential operator; uniqueness; wave equation; uniform Lopatinsky condition; integral equations on the boundary; two Riemann-Hilbert problems; existence

Full Text: DOI