

Solution of the n -Dimensional Wave Equation in the Exterior of a Characteristic Cone (II), n Odd

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*This paper is dedicated to Hans Lewy
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1.1. Summary. In (I), the previous paper with the same title [1], L_2 -solutions of the wave equation

$$(1.1) \quad \square^2 w = \sum_{i=1}^n w_{x_i x_i} - w_{tt} = 0$$

were studied in the exterior (*i.e.* $r > |t|$) of the characteristic cone

$$C_0 : r^2 - t^2 = 0, \quad r = |X| = \left(\sum_{i=1}^n x_i^2 \right)^{1/2},$$

n odd, with the vertex at the origin of the space-time. For brevity a solution $w(X, t)$ is called a L_2 -solution [7, 1] if w and its weak derivatives w_x and w_t are locally square integrable in (X, t) , and if moreover the initial data

$$(1.2) \quad w(X, 0) = g(X), \quad w_t = f(X)$$

has finite L_2 norms

$$\|g(X)/r\|, \|g_x\|, \|f\|$$

over the whole space $\mathbf{R}^n(X)$. Any L_2 -solution has locally square integrable boundary values

$$(1.3) \quad \zeta(X) = \zeta_{\pm}(X), \quad \zeta_+(X) = w(X, r), \quad \zeta_-(X) = w(X, -r)$$

on the upper, respectively lower, part of the cone C_0 . From the energy estimates [2], it was derived (in (I) p. 53) that ζ has also weak derivatives ζ_x such that the L_2 norms of ζ/r and ζ_x over \mathbf{R}^n satisfy the inequalities:

$$(1.4) \quad \|\zeta/r\|^2, \|\zeta_x\|^2 \leq \text{const.} (\|f\|^2 + \|g_x\|^2).$$

The purpose of this paper is to answer affirmatively the question of the