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ON NON-ELLIPTIC BOUNDARY PROBLEMS

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Introduction

The purpose of this paper is to study the boundary value problems for the second order elliptic differential equation

$$(1) \qquad AU = -\sum_{i,j=1}^{n} \partial_i(a_{ij}\partial_j U) + \sum_{i=1}^{n} b_i\partial_i U + cU = F$$

in a bounded domain Ω in R^n ($n \geqq 3$) with the boundary condition

$$(2) \qquad BU = \sum_{i=1}^{n} \alpha_i\partial_i U + \beta U = f$$

on the boundary Γ of Ω, where we assume that

1) for every $x \in \Gamma$, the inequality

$$\sum_{i=1}^{n} \alpha_i(x)^2 > 0$$

holds,

2) let $(n_1(x), \cdots, n_n(x))$ be the exterior unit normal vector to Γ at x, then the subset of Γ,

$$\Gamma_0 = \left\{x \in \Gamma; \sum_{i=1}^{n} \alpha_i(x) n_i(x) = 0\right\}$$

is a C^∞-manifold of dimension $n-2$,

3) at every point $x \in \Gamma_0$, the n-vector $(\alpha_1(x), \cdots, \alpha_n(x))$ is not tangent to Γ_0.

Here ∂_i denotes $\partial/\partial x_i$, a_{ij} is symmetric on Ω, and Γ is assumed to be infinitely smooth and of dimension $n-1$. We further assume that the coefficients of the equations (1) and (2) are real-valued and infinitely differentiable on $\bar{\Omega} = \Omega \cup \Gamma$ and Γ, respectively, and that there exists a positive constant c_0 such that

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