A. Azzam and E. Kreyszig
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SMOOTHNESS OF SOLUTIONS OF PARABOLIC EQUATIONS IN REGIONS WITH EDGES

A. AZZAM AND E. KREYSZIG*

§1. Introduction

We consider the mixed initial-boundary value problem for the parabolic equation

$$(1.1) \qquad Lu = \sum_{i,j=1}^{2} a_{ij}(x, t)u_{x_i x_j} + \sum_{j=1}^{2} a_j(x, t)u_{x_j} + b(x, t)u - u_t = f(x, t)$$

in a region $\Omega \times (0, T]$, where $x = (x_1, x_2)$ and $\Omega \subset \boldsymbol{R}^2$ is a simply-connected bounded domain having corners.

Our main objective will be the study of smoothness properties of solutions of that problem. Early investigations of that type concern *elliptic* equations in domains with a *smooth* boundary, starting with the Dirichlet problem for the Laplace and Poisson equations and proceeding to general second order elliptic equations as well as general boundary conditions; see S. Agmon, A. Douglis and L. Nirenberg [1]. A more recent survey of the elliptic case and further references are given by D. Gilbarg and N. S. Trudinger [6].

Similar work on *parabolic* equations appeared later; we mention in particular investigations by A. Friedman [5] on the first boundary value problem, by Z. Itô [8] and L. I. Kamynin and V. N. Maslennikova [9] on the second boundary value problem and by N. V. Zitarasu [15] on general boundary value problems. Further references are given in [12].

The case of a *nonsmooth boundary* was treated by E. A. Volkov [14], V. A. Kondrat'ev [10] and others whose work is discussed or mentioned in [7]; all these papers concern *elliptic* equations, whereas we shall deal with *parabolic* equations.

We want to mention that those problems in regions with edges and

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