On quenching of solutions for some semilinear parabolic equations of second order

Théodore K. Boni

1 Introduction

Let Ω be a bounded domain in R^n with boundary $\partial\Omega$ of class C^2. Consider the following boundary value problems:

$$(I) \qquad \begin{aligned} \frac{\partial u}{\partial t} &= Lu + f(u) \quad \text{in} \quad \Omega \times (0,T), && (1.1)\\ \mu\frac{\partial u}{\partial N} + (1-\mu)u &= 0 \quad \text{on} \quad \partial\Omega \times (0,T), && (1.2)\\ u(x,0) &= u_o(x) \quad \text{in} \quad \Omega, && (1.3) \end{aligned}$$

$$(II) \qquad \begin{aligned} \frac{\partial u}{\partial t} &= Lu \quad \text{in} \quad \Omega \times (0,T), && (1.4)\\ \frac{\partial u}{\partial N} &= g(u) \quad \text{on} \quad \partial\Omega \times (0,T), && (1.5)\\ u(x,0) &= u_*(x) \quad \text{in} \quad \Omega, && (1.6) \end{aligned}$$

where

$$Lu = \sum_{i,j=1}^{n} \frac{\partial}{\partial x_i}(a_{ij}(x)\frac{\partial u}{\partial x_j}), \qquad \frac{\partial u}{\partial N} = \sum_{i,j=1}^{n} \cos(\nu, x_i)a_{ij}(x)\frac{\partial u}{\partial x_j}.$$

Received by the editors June 1998.
Communicated by J. Mawhin.
1991 *Mathematics Subject Classification* : 35 K 55, 35 B 40.
Key words and phrases : Quenching, asymptotic behavior, semilinear parabolic equation.