

THE EXISTENCE OF EVOLUTION OF CLOSED TYPE

N. IVOCHKINA

Dedicated to Olga Ladyzhenskaya

The principal concern of the paper is the existence of an admissible solution of the first initial boundary value problem for fully nonlinear second-order differential equations. We consider equations nonlinear in the time derivative as well as in the space derivatives up to the second order.

1. The evolving functions

The notion of evolution of closed type was introduced by the author in [6] in the course of investigation of fully nonlinear second-order parabolic equations. The principal differential operator in these equations was described in terms of an evolving nonlinear function $G = G(s, S)$, $(s, S) \in D_0 \subset \mathbb{R}^1 \times \text{Sym}(n)$, where $\text{Sym}(n)$ is the set of symmetric $n \times n$ matrices. *Evolution of closed type* relates to functions G independent of the scalar argument s , i.e., $G = G(S)$, $S \in D_0 \subset \text{Sym}(n)$.

Denote by D_1 the set of positive monotonicity of G :

$$D_1 = \{S \in D_0 : G(S + \eta) \geq G(S) \text{ for all } \eta \in \text{Sym}(n), \eta \geq \mathbf{0}\},$$

by D_2 the set of concavity of G , and finally by D a connected component of $D_1 \cap D_2$.

1991 *Mathematics Subject Classification.* 35B40, 35J65.
The research was supported by RFFI grant 96-01-01199.