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ON PROPAGATION OF SINGULARITIES FOR FUCHSIAN QUASILINEAR DIFFERENTIAL OPERATORS

BY

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Introduction

A Meyer type flow, of a Tricomi gas for nozzle problem, is expressed in terms of solutions of the system

$$\begin{pmatrix} s \\ \theta \end{pmatrix}_{\psi} = \begin{pmatrix} 0 & 1 \\ s & 0 \end{pmatrix} \begin{pmatrix} s \\ \theta \end{pmatrix}_{\phi} \tag{0.1}$$

where s is the speed, θ is the inclination of the velocity, ψ is the stream function and ϕ is the velocity potential (see Bers, [1]). Therefore, for sufficiently smooth solutions, one could reduce the problem to the study of solutions of the equation

$$u_{xx} - uu_{yy} - (u_y)^2 = 0. \tag{0.2}$$

A generic propagation of singularity result was proved in Guillemin–Schaeffer [3] for a linearization of (0.2), (considering Taylor expansion of u and u_y). This result was completed for the n-dimensional case by Santos Filho [6].

Based in the theory of paradifferential operators of Bony [2], see also Meyer [5], we can prove a result which, in particular, states that for sufficiently smooth solutions of (0.2) singularities can not be isolated in the set $\{(x, y);\ u(x, y) = 0,\ \nabla u(x, y) \neq 0\}$. The paper is organized as follows: In §1 we state the theorem and recall the main definitions and basic theorems of Bony's theory. In §2, we prove the main result. Finally, in §3, we state a generalization of our theorem.

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