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NONLINEAR MICROLOCAL ANALYSIS OF SEMILINEAR HYPERBOLIC SYSTEMS IN ONE SPACE DIMENSION

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TABLE OF CONTENTS

Introduction. This paper is devoted to the study of the singularities of solutions to semilinear strictly hyperbolic systems in one space variable, that is, systems of the form

$$A_0(x,t)\frac{\partial u}{\partial t} + A_1(x,t)\frac{\partial u}{\partial x} = f(x,t,u)$$

where $(x,t) \in \mathsf{R} \times \overline{\mathsf{R}}_+$, $u(x,t) \in \mathsf{C}^m$, the A_i are smooth $m \times m$ matrix-valued functions, and $f: \mathsf{R} \times \overline{\mathsf{R}}_+ \times \mathsf{C}^m \to \mathsf{C}^m$ is smooth. If the system is strictly hyperbolic, then $\det A_0 \neq 0$ and $\det(\tau A_0 + \xi A_1)$ has m distinct real roots for all (x,t) and $\xi \neq 0$. By a smooth change of dependent variables, the system can be recast in the form

$$\left(\frac{\partial}{\partial t} + \lambda_j(x,t)\frac{\partial}{\partial x}\right)u_j = f_j(x,t,u) \qquad j = 1, \ldots, m \tag{1}$$

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