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Tsuji, Mikio

Prolongation of classical solutions and singularities of generalized solutions. (English)

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Ann. Inst. Henri Poincaré, Anal. Non Linéaire 7, No. 6, 505-523 (1990).

Conditions for existence of global classical solutions or formation of singularities in solutions of Cauchy problems for general partial differential equations of first order are obtained. The reason why properties of singularities may depend on the type of equations (Hamilton-Jacobi equations, conservation laws) is discussed. The Rankin- Hugoniot's condition for a single quasilinear equation is solved.

Reviewer: L.G.Vulkov (Russe)

MSC:

35F25 Initial value problems for nonlinear first-order PDEs
35L67 Shocks and singularities for hyperbolic equations
35B65 Smoothness and regularity of solutions to PDEs

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Keywords:

global classical solutions; formation of singularities; Cauchy problems; Rankin-Hugoniot's condition

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