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Well-posedness in Sobolev spaces for second-order strictly hyperbolic equations with non-differentiable oscillating coefficients. (English) Zbl 1047.35079

Ann. Global Anal. Geom. 25, No. 2, 99-119 (2004).

Summary: The goal of this paper is to study well-posedness to strictly hyperbolic Cauchy problems with non-Lipschitz coefficients with low regularity with respect to time and smooth dependence with respect to space variables. The non-Lipschitz condition is described by the behaviour of the time-derivative of coefficients. This leads to a classification of oscillations, which has a strong influence on the loss of derivatives. To study well-posedness we propose a refined regularizing technique. Two steps of diagonalization procedure basing on suitable zones of the phase space and corresponding nonstandard symbol classes allow to apply a transformation corresponding to the effect of loss of derivatives. Finally, the application of sharp Gårding's inequality allows to derive a suitable energy estimate. From this estimate we conclude a result about C^∞ well-posedness of the Cauchy problem.

MSC:

[35L15](#) Initial value problems for second-order hyperbolic equations

[35L80](#) Degenerate hyperbolic equations

[35S05](#) Pseudodifferential operators as generalizations of partial differential operators

[35B65](#) Smoothness and regularity of solutions to PDEs

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Keywords:

[sharp Gårding's inequality](#); [pseudo-differential operators](#); [diagonalization procedure](#)

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