Wave Equations with non-regular coefficients

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Résumé

We consider the Cauchy problem for second order strictly hyperbolic operators when the coefficients of the principal part are not Lipschitz continuous, but only "Log-Lipschitz" with respect to all the variables. This class of equation is invariant under changes of variables and therefore suitable for a local analysis.
In particular, we study local existence, local uniqueness and finite speed of propagation for the noncharacteristic Cauchy problem.

We also give an application of the method to a continuation theorem for nonlinear wave equations where the coefficients depend on u: the smooth solution can be extended as long as it remains Log-Lipschitz.

Moreover we consider the case of coefficients only "Log-Zygmund" continuous with respect to time variable and "Log-Lipschitz" continuous with respect to space variables. Finally we consider the analogous problem for hyperbolic systems.

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