

Well-posedness of hyperbolic systems with multiplicities and smooth coefficients

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In this paper we study $m \times m$ hyperbolic systems with variable multiplicities and smooth coefficients. In the case of non-analytic, smooth coefficients we prove well-posedness in any Gevrey class and when the coefficients are analytic we prove C^∞ well-posedness. The proof is based on a transformation to block Sylvester form introduced by D’Ancona and Spagnolo in [1] which increases the system size but does not change the eigenvalues. This reduction introduces lower order terms for which appropriate Levi-type conditions are found. These translate then into conditions on the original coefficient matrix. This paper can be considered as a generalisation of [2], where weakly hyperbolic higher order equations with lower order terms were considered.

References

- [1] P. D’Ancona and S. Spagnolo, *Quasi-symmetrisation of hyperbolic systems and propagation of the analytic regularity*. Boll. UMI, 8(1B) (1998), pp. 169–185.
- [2] C. Garetto and M. Ruzhansky, *Weakly hyperbolic equations with non-analytic coefficients and lower order terms*. Mathematische Annalen, **357(2)**, pp. 401–440, doi:10.1007/s00208-013-0910-9