

# Stability of finite difference schemes for hyperbolic systems in a segment and/or a corner

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This talk is about the stability of finite difference schemes for hyperbolic systems of PDE in "complex" geometries. This question was first asked by [1] in the half-line. The main result is that a condition on the boundary matrix has to be made to ensure the stability of the scheme. It is interesting to pointed out that this condition is a discrete version of the one ensuring the well-posedness of the analogous problem in the continuous setting.

In this talk we will discuss the same question but in more complex geometries such that segments or corners for which the well-posedness of the continuous problem has not been rigorously established yet (see however [2] and [3]-[4]). Unsurprisingly a new condition (ensuring that the amplification coefficients of trapped rays does not increases) has to be made to ensure the stability of the scheme.

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## Références

- [1] B. GUSTAFSSON, H.-O. KREISS, AND A. SUNDSTROM, *Stability theory of difference approximations for mixed initial boundary value problems. II*. Math. Comp., 26-119, p.649–686, 1972
- [2] S. OSHER, Initial-boundary value problems for hyperbolic systems in regions with corners. I, Trans. Amer. Math. Soc., 176, p141–164,1973
- [3] A. BENOIT, Problèmes aux limites, optique géométrique et singularités, Phd thesis, Université de Nantes, 2015
- [4] A. BENOIT, Lower exponential strong well-posedness of hyperbolic boundary value problems in a strip(Preprint 02/18)