

Numerical exploration of the Kreiss-Lopatinskii condition for finite difference schemes

vendredi 7 novembre 2025 11:30 (45 minutes)

The approximate resolution of hyperbolic problems using finite difference methods requires a specific treatment of boundary conditions: artificial truncation of the computational domain, incorporation of physical boundary conditions, and so on. Even if the interior scheme has good convergence properties, the choice of boundary scheme can seriously impair the quality of the overall approximation. I will introduce the key concepts involved in formulating the Kreiss–Lopatinskii condition, which characterizes the stability of the scheme, and present numerical tools for its concrete verification, developed in a work with N. Seguin and P. Le Barbenchon.

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