ON ALL-REGIME LAGRANGE-REMAP NUMERICAL SCHEMES FOR COMPRESSIBLE FLUIDS SYSTEMS

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Abstract. It is the purpose of this contribution to provide an overview on recent advances in the development of all-regime Lagrange-Remap numerical schemes for compressible fluids systems with source terms. We will consider in particular the case of large friction coefficients and the case of low-Mach numbers. More precisely, we will present a discretization strategy for gas dynamics equations for unstrutctured grids based on a Lagrange-Remap approach that does not involve any moving mesh. A natural semi-implicit extension of the method that allows to remain stable under a CFL condition involving only the material velocity will be given, together with an extremely simple modification that allows to provide an accurate and stable solver for simulations involving low-Mach regions in the flow. The stability properties of the proposed schemes and several numerical experiments will be presented.

This contribution is based on a series of joint works [1], [2], [3], [4] with Mathieu Girardin and Samuel Kokh. These works were performed during M. Girardin's PhD thesis.

Keywords: gas dynamics equations, large friction regime, low-Mach regime, finite volume schemes, lagrange-remap decomposition, all-regime and asymptotic-preserving schemes

References

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