Title: **A multiresolution finite volume scheme for two-dimensional hyperbolic conservation laws**

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One of the difficulties faced by application of numerical methods to the solution of hyperbolic equations, is the possibility of having solutions with singularities or strong gradients that are restricted to small regions of the spatial domain. Those singularities however are very important as they often represent interesting physical phenomena such as shock waves, boundary layers, etc.

A lot of effort has been invested in the design of numerical algorithms that use a very fine spatial resolution for the zones with singularities or strong gradients, together with a coarser (and more efficient from the computational point of view) resolution away from the singularities. Thus, multi-resolution methods strike a balance between the need for extremely high resolution near singularities and computational efficiency (or even feasibility in some cases). A key component of these algorithms is the correct transposition of the solution values calculated in the coarse mesh to the corresponding values on the finer meshes and viceversa.

In this paper the authors introduce a multi-resolution scheme based on a hierarchical collection of nested finite volume grids. The level of resolution at which the numerical representation is computed, is determined by a smoothness factor that is dynamically dependent on the gradients of the solution. Interpolation and flux correction calculations are performed in such a way as to maintain a strict numerical mass preservation, which is a very important feature for the solution of hyperbolic problems.

The solution proceed on a hybrid grid composed by cells at different levels of nested grids. The grid is adapted at each time step to improve the resolution of discontinuities.

The authors present the scheme for a general two dimensional framework. Several examples are presented by the authors to show the proposed scheme stability and convergency. The scheme is touted by the authors as an efficient alternative to the moving mesh method.