



SEMINARIO DE ANÁLISIS NUMÉRICO Y MODELACIÓN MATEMÁTICA

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Título de la Charla:

***A semi-Lagrangian AMR scheme for 2d transport
problems in conservation form***

Fecha y Hora:

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Lugar:

Auditorio Alamiro Robledo, FCFM, Universidad de Concepción.

Resumen

We construct a semi-Lagrangian (SL) Adaptive-Mesh-Refinement (AMR) solver for 1D and 2D transport problems in conservation form. First, we describe the “a-la-Harten” AMR framework: the adaptation process selects a hierarchical set of grids with different resolutions depending on the features of the integrand function, using as criteria the point value prediction via interpolation from coarser meshes, and the appearance of large gradients. We integrate in time by reconstructing at the feet of the characteristics through the Point-Value Weighted Essentially Non-Oscillatory (PV-WENO) interpolator. We propose, then, an extension to the 2D setting by making the time integration “dimension-by-dimension” thanks to a Strang splitting. We discuss the quality of the results and the speedup with respect to a Fixed Mesh (FM) strategy through the following benchmark tests: in 1D, variable-coefficient advections; in 2D, the 1D Vlasov-Poisson system (2D in the phase space) for the case of constant-coefficient advections, and, for the case of variable-coefficient advections, the swirling deformation flow and the guiding-center model.

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