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Logically Rectangular Grids

Krbel, Babara[1], Kissmann, Ralf[1]
[1]Universität Innsbruck Institut für Astro und Teilchenphysik

In their article "Logically Rectangular Grids and Finite Volume Methods for PDEs in Circular and Spherical Domains", Calhoun, Helzel and LeVeque are describing the advantages and usage of highly nonorthogonal grids in various physics scenarios. These grids are implemented by deforming a single computational, cartesian domain to the desired geometry via mapping functions. Advantages are a low ratio of the gridcell sizes and the non existence of center or pole singularities, that arise from the usage of coordinates of spherical nature. In our ongoing project on the Cosmic Ray Anisotropy and Interstellar Spectra of the Outer Heliosphere, a cooperation between Bochum (lead Horst Fichtner) and Innsbruck (Ralf Kissmann), we decided to make use of the above mentioned grids and implement them in our numerical HD/MHD framework, Cronos, which was developed by Ralf Kissmann. In the upcoming workshop we would like to present the results of our recent efforts in this regard. One of the typical numerical testcases, the Sedov Explosion, as well as an preliminary heliospheric model will serve to illustrate the differences between the previous version of Cronos, equipped to handle cartesian, spherical and polar grids and the recent one, working with logically rectangular grids.