

In article

<9a6a2ebb-62e2-484a-98ef-e86da2ce0127@k30g2000vbn.googlegroups.com>,
Andrea <negri.andre@gmail.com> wrote:

> Hi guys, I have a hydrodynamic simulation of an axisymmetric system of
> gas.
> Of course the computation (I use ZEUS2D) is made in cylindrical
> coordinates (R,phi,z) so, computationally speaking, the simulation is
> 2D, and in IDL I have a matrix, eg density[i,j] where the first index
> refer to z axis and second index refer to R axis. Physically speaking
> this is a section of a 3D space with phi = constant, ie a meridional
> plane.
>
> Until now I made maps with contour (David Fanning will forgive me, I
> saw FSC_Contour only last week!) on meridional plane, but now I should
> make some 3D isosurface, but I have a 2D array, and I don't know a way
> to tell to iVolume that the system is axisymmetric.
> iVolume (or the counterpart in direct graphics) accept only 3D matrix
> in cartesian coordinates, right? Because if iVolume accept a matrix in
> cylindrical coordinates, eg [phi,z,R] instead of [x,y,z], I can build
> a 3D matrix of density like this:
>
> density3D[i,*,*]=density2D[*,*]
>
> where i go on the phi dimension of the space.
>
> This trick is possible or I have to move on another program, like
> tecplot? I want use IDL as long as possible, since my analyzing
> program is written in IDL.
>
>
> Thanks a lot for help.
> Andrea

Because the iTools 3-D visualization programs only deal with
Cartesian coordinates, you will need to interpolate from
cylindrical to Cartesian coordinates to plot 3-D volumes
(e.g., isosurfaces or rendered volumes).

Because the flow is axisymmetric, you know the flow as
a function of (phi,z,r). So the basic idea is to create
a 3-D Cartesian grid (x,y,z), find (z,r) for each (x,y,z)
on the Cartesian grid, then interpolate from your
2-D slice to the 3-D grid points. Because the flow

is axisymmetric, you don't need to interpolate in ϕ .

This procedure is easier than it sounds. The real work is in computing the interpolation coordinates. That is, where the Cartesian grid points are with respect to the cylindrical grid. I suggest that you use INTERPOLATE with bilinear interpolation, and you might want to look at this

http://csrp.tamu.edu/pdf/idl/sample_chapter.pdf

Ken Bowmabn
