Subject: Re: volume visualization and isosurface of axisymmetric data
Posted by Andrea[1] on Tue, 23 Nov 2010 17:55:39 GMT
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On Nov 23, 3:02 pm, "Kenneth P. Bowman" <k-bow...@null.edu> wrote:
> In article
> < 9a6a2ebb-62e2-484a-98ef-e86da2ce0...@k30g2000vbn.googlegroup s.com >,
>
>
>
>   Andrea <negri.an...@gmail.com> wrote:
>> Hi guys, I have a hydrodynamic simulation of an axisymmetric system of
>> gas.
>> Of couse 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 a section of a 3D space with phi = costant, 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 campionation 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 analizing
>> 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 phi.
>
> 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

Sounds good, now I try!