
Subject: Re: Matching volumes and surfaces

Posted by [Karl Schultz](#) on Mon, 23 Jan 2006 19:17:37 GMT

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On Thu, 19 Jan 2006 20:52:34 -0600, Kenneth P. Bowman wrote:

> I have a 2-D data set $a(x,y)$ and a 3-D data set $b(x,y,z)$ that are
> defined on the same x and y grid.
>
> I'm using iSurface to plot a and iVolume to overplot an isosurface of b
> in the same display. At the bottom of this message is an example that
> uses an 11×11 grid with data coordinates x , y , and z in the range (0,
> 10). The arrays a and b have been created so that a should coincide
> exactly with the isosurface $b=0$.
>
> After running the commands below, the 2-D surface appears as a yellow
> plane slicing diagonally upward across the volume cube in the
> x -direction. Then, I choose Operations...Volume...Isosurface, change
> the isosurface value to 0.1, and click OK. This renders the $b=0.1$
> isosurface in gray. (Setting the isosurface to 0.1 ensures that the
> isosurface is slightly above the surface a .)
>
> The resulting image can be seen here
>
> <http://csrp.tamu.edu/hiaper/archive/render/rendering.jpg>
>
> The rather obvious problem is that the isosurface only covers the ranges
> $x = (0, 9)$ and $y = (0, 9)$.
>
> Obviously I either don't understand the VOLUME_LOCATION and
> VOLUME_DIMENSIONS keywords, or I don't understand how the isosurface
> algorithm works, or I'm making some other mistake (the possibilities are
> manifold ;-)).
>

I think that the interpretation of the VOLUME_DIMENSIONS keyword is the problem.

Your surface is going to span $0 \rightarrow 10$.

Part of the docs for VOLUME_DIMENSIONS say:

..., a volume with sample size of [20, 25, 20]
would render into
the region [0:19, 0:24, 0:19] in user data units.

So if you want your volume to span the same extent as the surface, you would want to use a value of 11 for VOLUME_DIMENSIONS. In this case, just

don't specify it and it should do the right thing.

The code that is relevant to this discussion starts about line 330 in `idlitvisisosurface__define.pro`. The isosurface vertices are scaled to fit into the volume dimensions if modified by the keyword.

Karl

```
> Can anyone steer me to the path of righteous rendering?
>
> Thanks, Ken Bowman
>
>
> n = 11
> x = FINDGEN(n)
> a = REBIN(x, n, n)
>
> iSurface, a, x, x
>
> xx = REBIN(x, n, n, n)
> zz = REBIN(REFORM(x, 1, 1, n), n, n, n)
> b = zz - xx
>
> iVolume, b, /OVERPLOT, $
>   VOLUME_LOCATION = [ 0.0, 0.0, 0.0], $
>   VOLUME_DIMENSIONS = [10.0, 10.0, 10.0]
```
