
Subject: Re: Skymap and Array Problems

Posted by [Mark Hadfield](#) on Tue, 08 Jul 2003 21:43:48 GMT

[View Forum Message](#) <> [Reply to Message](#)

"Stephanie Wissel" <wissels@yahoo.com> wrote in message
news:d7877ccd.0307081143.22d78b61@posting.google.com...

> Hello,

>

> I'm an undergraduate and admittedly inexperienced in the ways of IDL
> (more akin to C++ and Java). I've been working on the following
> problem for a while and could use any help you can offer.

>

> At any rate, I must use IDL to plot a contour skymap of some data in
> a particular region first in celestial coordinates and then in galactic
> coordinates. I've used a procedure from the astro libraries on the
> web to convert from ra and dec to galactic latitude and longitude.

>

> Frustrated with MAP_SET and contour plots, I turned to object-oriented
> graphics. Basically, I used three arrays: one for the data, one for
> the x-coordinates and one for the y-coordinates. This was all fine
> and good, until I converted to galactic coordinates, because in the
> conversion, the lat is dependent on the long and vice versa. While I
> originally began with a 110x110 set of coordinates independent of one
> another, I am left with an set of 12100 points (x and y) corresponding
> to each data point.

This shouldn't be a problem.

> Furthermore, the galactic coordinates do not come out in sequential
> order, so I need to sort them (along with their referenced data
> points).

This might be. Could you please try to explain the geometry of your grid in galactic coordinates. You start out with a rectangular grid in celestial coordinates, right? I.e. one that can be described by 1D x & y arrays (not necessarily evenly spaced). Is the grid in galactic coordinates a distorted rectangular grid? Or (as I think you are implying) something more general. Distorted rectangular grids are not hard to deal with--I spend much of my time displaying data from an ocean model with a curvilinear horizontal grid and a terrain-following vertical coordinate. For more general grids you need to describe not only the vertex positions of the grid, but also the connectivity (which points are next to which). It can still be done in IDL, but it's a little harder. In IDL object graphics, the IDLgrPolygon object can display 2D or 3D grids with almost any connectivity. The IDLgrContour and IDLgrSurface objects are less flexible so if you want to use them you will need to regrid your data. But in either case you need to start by describing the grid properly to IDL.

> This poses another problem, because the three arrays are
> separate from each other, galx, galy, and gal_arr and I don't know how
> to combine them so that I could read
>
> galx galy gal_arr.

Sorry, I don't understand this. Read them from what?

--

Mark Hadfield "Ka puwaha te tai nei, Hoesa tatou"
m.hadfield@niwa.co.nz
National Institute for Water and Atmospheric Research (NIWA)

Subject: Re: Skymap and Array Problems
Posted by [wissels](#) on Wed, 09 Jul 2003 14:28:42 GMT
[View Forum Message](#) <> [Reply to Message](#)

>> Furthermore, the galactic coordinates do not come out in sequential
>> order, so I need to sort them (along with their referenced data
>> points).
>
> This might be. Could you please try to explain the geometry of your grid in
> galactic coordinates. You start out with a rectangular grid in celestial
> coordinates, right? I.e. one that can be described by 1D x & y arrays (not
> necessarily evenly spaced). Is the grid in galactic coordinates a distorted
> rectangular grid? Or (as I think you are implying) something more general.

The grid in galactic coordinates is not distorted. The transformation involves rotation (the galactic plane is 63deg from the celestial plane) and translation from the earth centered vertex to vertex at the center of the galaxy.

I must have made the problem sound worse than it is. I'm just frustrated, because of my lack of understanding in idl.

The main problem is that after conversion the coordinates are not chronological. Meaning that instead of

Long	Lat	i get.....	Long	Lat
-182	-89		12	23
-155	-45		-155	-45
12	23		-189	-89
35	78		35	78

As far as I can tell IDLgrCONTOUR (or CONTOUR for that matter) will not let me plot well if the coordinates are not sorted. So I have to sort all three arrays (the latitude set, the longitude set and the

data set) in order to map correctly. I hope that makes my problem a little clearer. I will try looking at IDLgrPolygon.

Thanks!
Stephanie

Subject: Re: Skymap and Array Problems
Posted by [Mark Hadfield](#) on Wed, 09 Jul 2003 23:59:26 GMT
[View Forum Message](#) <> [Reply to Message](#)

"Stephanie Wissel" <wissels@yahoo.com> wrote in message
news:d7877ccd.0307090628.5bd563a9@posting.google.com...
> The grid in galactic coordinates is not distorted. The
> transformation involves rotation (the galactic plane is 63deg from the
> celestial plane) and translation from the earth centered vertex to
> vertex at the center of the galaxy.
>
> ...
>
> The main problem is that after conversion the coordinates are not
> chronological. Meaning that instead of
>
> Long Lati get.....Long Lat
> -182 -89 12 23
> -155 -45 -155 -45
> 12 23 -189 -89
> 35 78 35 78

Hmm. It's still not clear to me if this can be represented by an IDLgrContour or IDLgrSufarce object.

Imagine a regular, unrotated rectangular grid with, say, $m \times n$ vertices and each vertex joined to its 4 neighbours (fewer for edge or corner vertices) by line segments. For what it's worth, The total number of connecting line segments is $(m-1)*n + (n-1)*m$. As you know, an IDLgrSurface or IDLgrContour can represent this grid, using 1-D DATAX & DATAY arrays (GEOMX & GEOMY for an IDLgrContour). DATAX & DATAY must be monotonic, maybe increasing (I'm not sure), but don't need to be evenly spaced. If we rotate this grid around the zaxis, stretch it or otherwise distort it in the xy plane (I've forgotten the technical terms here) then DATAX & DATAY will probably have to be two-dimensional. I haven't explored the limits here, but I think the constraint is that the line segments may not cross. The IDLgrSurface and IDLgrContour objects also support DATAZ (GEOMZ) keywords, so the vertices can be shifted normal to the xy plane. Then the model they're contained in can be rotated, translated or scaled in 3D space. So potentially you should be able to use them to represent your data, provided that there is *some* direction from which the layout looks like a (possibly distorted)

rectangular grid, with non-crossing line segments. Make that your z direction, set up your DATAx, DATAy & DATAz arrays then rotated, translated, and scale your model to get the viewpoint you want. Good luck!

An IDLgrPolygon is much more general. In addition to the vertex positions (the DATA property) you can also represent how they're connected (the POLYGONS property). Given the vertex positions, you can create the polygon descriptors by triangulation, but if you already know how the points are connected, then it's better to use the information.

You can represent data values on an IDLgrPolygon by colouring the vertices. I don't know if it's possible to generate contours on an IDLgrPolygon.

Hope this helps.

-- -

Mark Hadfield "Ka puwaha te tai nei, Hoesa tatou"
m.hadfield@niwa.co.nz
National Institute for Water and Atmospheric Research (NIWA)
