
Subject: Spherical gridding at a pole
Posted by [ECSPRS](#) on Tue, 25 Jul 1995 07:00:00 GMT
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Hi.
I'm having some problems with the TRIANGULATE function when trying to grid some irregular data over the south pole. I have data points defined for each hour of the day (hence each 15 deg in longitude) and for latitudes -90 to -50. So the data looks like the spokes of a wheel radiating out from the pole. Now I wanted to grid this and make a contour plot on top of a map of Antarctica so I used the spherical implementation of TRIANGULATE vis;

```
TRIANGULATE,lon,lat,tr,SPHERE=s,FVALUE=epot,/DEGREES
```

Where lon, lat and epot are vector arrays of longitude, latitude and data. This statement causes either IDL to crash or Windows to crash (wow...how surprising). Any ideas? It just occurred to me that the point -90 latitude will appear 24 times in the array, once for each longitude. Would this help mess things up? (I'll try taking the extra ones out but I'd rather send this first before disaster strikes).

I also noticed that while in the doco the GS, Limits parameters are in brackets as optional for TRIGRID (spherical gridding mode), the command won't work unless you put them in there.

I'm using IDL 4.0
Cheers,
Paul

Subject: Re: Spherical gridding at a pole
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In <1995Jul25.062615.28748@lugb.latrobe.edu.au> ECSPRS@LUFF.LATROBE.EDU.AU writes:

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> I'm having some problems with the TRIANGULATE function when trying to grid some
> irregular data over the south pole. I have data points defined for each hour

[snip snip]

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Well lo and behold, having the south pole defined 24 times does crash triangulate, although it would be nice if it didn't drag everything else down

with it. Sorry about this premature posting. However I'm stuck again on TRIGRID now. Using,
con=TRIGRID(epot,[1.,1.],[-90.,-180.,-50.,180.],SPHERE=s,/DE GREES)

causes an arithmetic floating underflow error. I've changed the [1., 1.] to larger values but no luck. 's' is a structure that has some very low values (order 1e-19), 'epot' values are all well defined. I'm assuming the [-90., -180., -50., 180.] array is giving me the bounds I want to cover the polar region. As mentioned previously, IDL doesn't let you use TRIGRID without these two arrays. It's almost time to give up and write something to calculate lat lons for each grid point after doing non-spherical gridding (which works). Ok, hope I haven't served myself egg on face again
Paul

Subject: Re: spherical gridding
Posted by [Ben Tupper](#) on Sun, 17 Sep 2000 07:00:00 GMT
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Hello,

The XGRID and YGRID keywords to TRIGRID will return vectors of the grid row and column locations. That is, for example, each element of XGRID will identify the coordinates of each column of the output grid (in your case degrees longitude). You might consider using IDLgrSurface which is set up to handle Z (2d array), and X and Y (vector coordinates for grid elements).

Ben

Sylvain Carette wrote:

- > Not sure if my understanding of spherical gridding correspond to the
- > actual implementation in TRIANGULATE and TRIGRID function and proc.
- > Running the sample code below as surface give a sine shaped surface
- > while I was expecting a sphere.
- > I figure that perhaps SURFACE only display "flat" surface and what I
- > see is a unwarped sphere (?).
- > I though it would be better to feed the trigrid output to a polygon as
- > in IDLgrPolygon but now this one want xyz value while as far I can see
- > trigrid result is 2 dimentional array...
- > What do I miss?
- >
- > My intend here is to project elevations grids onto wgs84 geoid but
- > projecting onto a perfect sphere will be just fine to begin with. If
- > I'm unclear, I need the final dem be patch of a sphere so that when
- > putting all of them together they form a globe and the cartesian space
- > holding it have its origin at the center of the globe.

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>
> I've done once an autolisp function in Autocad doing this but the dem
> have to be converted first to dxf in no more than 300x300 chunk and it
> do not handle the case for dems that are not in long/lat proj. Very,
> very big and slow...
>
> Here the sample code from TRIGRID example2 feeded to SURFACE:
>
>> ; Create some random longitude points:
>>
>> lon = RANDOMU(seed, 50) * 360. - 180.
>>
>> ; Create some random latitude points:
>> lat = RANDOMU(seed, 50) * 180. - 90.
>>
>> ; Make a fake function value to be passed to FVALUE. The system
>> ; variable !DTOR contains the conversion value for degrees to
>> ; radians.
>> f = SIN(lon * !DTOR)^2 * COS(lat * !DTOR)
>>
>> ; Perform a spherical triangulation:
>> TRIANGULATE, lon, lat, tr, $
>>   SPHERE=s, FVALUE=f, /DEGREES
>>
>> ; Perform a spherical triangulation using the values returned from
>>
>> ; TRIANGULATE. The result, r, is a 180 by 91 element array:
>> r=TRIGRID(f, SPHERE=s, [2.,2.],$
>>   [-180.,-90.,178.,90.], /DEGREES)
>> surface, r
>>
>> end
>>
>
> Any cues welcome thanks
>
> Sylvain Carette
> VRML designer-composer
>

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