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Subject: Re: spherical gridding problem

Posted by [Craig Markwardt](#) on Thu, 05 Apr 2001 23:21:44 GMT

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Jonathan Joseph <jj21@cornell.edu> writes:

> Help!

>

> I'm seeing a spherical gridding problem, and I swear I've seen  
> something similar before - but only when I've been working with  
> large datasets, so I'm afraid I don't have a simple  
> small example to show it - only a great whopping example.

>

> Well, here's the description:

>

> I have a random collection of data of the sort  
> [longitude, latitude, value] and I would like  
> to create a uniform cylindrical map of this data,  
> so I use sph\_scatt (equivalent to triangulate followed by trigridd).

>

> When I do this, I sometimes see anomolous features (big positive  
> and negative spikes) in the map. Please see <http://baritone.tn.cornell.edu/~jj/idl>  
> for a zoomed picutre an anomaly (a 6x6 degree sample).

>

> The anomaly seems to be more closely tied to the  
> lat/lon locations of the data than to the data values themselves,

Hi Jonathon--

The results of the output are definitely not right. I can get the artifact to disappear or at least decrease by shifting that center point about 0.1 degrees in any direction.

However I think this may come back to a problem some people have been seeing regarding TRIGRID. [ TRIGRID is the underlying routine of SPH\_SCAT. ] When passed data points that are colinear then TRIGRID actually crashes. In spherical coordinates the problem must manifest when points lie on a great circle. I can imagine that if points are very \*nearly\* colinear then some kind of cancellation error occurs, which might give you the blow-ups you are seeing.

That center point appears to be at a crossing of two sets of nearly colinear points, so that may indeed be a problem. However, I have to admit that there are a lot of other points like that.

How to deal with it? Beats me. This is really something that the RSI people should try to fix. You could test for the error by putting some random scatter in your input lat/lon points and looking for major

deviations in the result.

Sorry I can't help more,  
Craig

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Craig B. Markwardt, Ph.D.      EMAIL:   craigmnet@cow.physics.wisc.edu  
Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response  
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Subject: Re: spherical gridding problem  
Posted by [Jonathan Joseph](#) on Fri, 06 Apr 2001 19:19:58 GMT  
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Does anyone know exactly how the spherical gridding in IDL really works? There is mention under QUINTIC of a paper by Renka, and JD was kind enough to find me an different article by Renka in the ACM titled "Interpolation of data on the surface of a sphere" ( [http://www.acm.org/pubs/citations/journals/toms/1984-10-4/p4\\_17-renka/](http://www.acm.org/pubs/citations/journals/toms/1984-10-4/p4_17-renka/)) though I can't be sure that is the method used by IDL. If it is, I would suspect that the problem is somehow in the calculation of the gradients at the corners of the triangles. Though to tell the truth, I only really followed the idea and not the actual details. Not that knowing the reason would solve my problem.

I guess for now, I'll take your idea Craig and try adding some random scatter in several passes, and try comparing the results to find problem areas. I think I need several passes, because one random scattering is bound to turn up new problems in other places.

-Jonathan

Craig Markwardt wrote:

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> Craig  
>  
> --  
> -----  
> Craig B. Markwardt, Ph.D.      EMAIL: [craigmnet@cow.physics.wisc.edu](mailto:craigmnet@cow.physics.wisc.edu)  
> Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response  
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-Jonathan

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