
Subject: Re: speher keyword of qhull
Posted by [Haje Korth](#) on Fri, 10 Nov 2006 17:55:18 GMT
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Andy,
yes I hope one of these days, ITTVIS provide a detailed tutorial on qhull/griddata, describing the right combination of keywords to get a particular job done. This should benefit anyone involved in Earth and/or space sciences, which is a pretty broad audience.

I got bit for the colinear-points problem with triangulate a few years ago because I wanted to interpolate data on a sphere which came on a regular grid. On regular grids the probability that three point lie along a great circle is pretty large, thus resulting in the colinear-point error message in triangulate.

Haje

Andy Heaps wrote:

```
> Hello Sebinjapan,  
> an interesting question for me as I was puzzling over the  
> same point last week. I don't have any real answers but the following  
> should maybe provide some illumination on the subject:  
>  
> I have a strange grid of points in longitude and latitude on a globe:  
> LATS      FLOAT  = Array[722, 511]  
> LONGS      FLOAT  = Array[722, 511]  
> TEMPERATURE  FLOAT  = Array[722,511]  
> The longitudes (LONGS) go from -179.997 to 179.999 and the latitudes  
> (LATS) go from -77.0105 to 89.8854. TEMPERATURE is the ocean surface  
> temperature on this grid.  
>  
> The location of the longitudes and latitudes are very irregular so  
> triangulation data is needed to pass to the CONTOUR command. The  
> TRIANGULATE procedure works and CONTOUR produces a pretty decent plot.  
> There is a wrapping problem, however, at the dateline seen as a  
> line from the north to south poles. Adding the /SPHERE to the  
> TRANGULATE call produces:  
> % TRIANGULATE: Points are co-linear, no solution.  
>  
> No hope here then so I then used QHULL on the suggestion of a colleague:  
> If I use QHULL, longs, lats, tri, /DELAUNAY, SPHERE =1  
> I get:  
> % QHULL: Expression must be named variable in this context: <INT  
> ( 1)>.  
>  
> Okay, let's used a named variable:
```

```

> QHULL, longs, lats, tri, SPHERE = s
> HELP, s, tri
> S          DOUBLE   = Array[3, 368943]
> TRI        LONG     = Array[3, 733642]
>
> Using the triangulation data TRI with CONTOUR produces a perfect plot
> with no dateline missing data.
>
> So we're back to your original question - what is returned by
> SPHERE=s? THE IDL reference guide for version 6.0 QHULL says:
> DELAUNAY Performs a Delaunay triangulation and returns the vertex
> indices of the resulting polyhedra; otherwise, the convex hull of the
> data are returned.
> SPHERE Computes the Delaunay triangulation of the points which lie on
> the surface of a sphere. The V0 argument contains the longitude, in
> degrees, and V1 contains the latitude, in degrees, of each point.
>
> It looks like the IDL documentation could be better just here. Does
> SPHERE=s imply a Delaunay triangulation and that s is the convex hull
> of the data? Printing off some values of s I get:
> PRINT, s(*, 0:3)
> PRINT, 'min, max of s are', MIN(s), MAX(s)
>    0.066654513    0.21466261   -0.97441118
>    0.064778714    0.21523610   -0.97441118
>    0.062897982    0.21579320   -0.97441118
>    0.061012460    0.21633386   -0.97441118
> min, max of s are  -0.99999048    0.99999800
>
>
> Is this the sort of thing you're trying to work out as well?
>
>
>    Cheers
>    Andy
>
>
>
> David Fanning wrote:
>> sebinjapan writes:
>>
>>> Does anyone knows was is returned in the sphere variable when using:
>>> qhull, v0, v1, tr, /delaunay, sphere = s
>>
>> As I read the documentation, it seems to me SPHERE is
>> an input variable, with a value of 0 or 1. :-)
>>
>> Cheers,

```

>>

>> David
