Subject: Re: interpolation around a contour
Posted by davidf on Wed, 08 Mar 2000 08:00:00 GMT
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Inpakala Simon (isimon@bme.jhu.edu) writes:

> I have tried IDL's technical support and their suggestions did not
> work. I have tried several permutations of TRIGRID, TRIANGULATE,
> Spline_P, and CONGRID. They do not give me the right answer. Perhaps I
> am choosing the wrong keywords?
>
> Any help would be most appreciated.

In such cases, I've always found it useful to
reformulate the problem so that it conforms
to one of my solutions. :-)

Cheers,

David

--
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Subject: Re: interpolation around a contour
Posted by Mirko Vukovic on Thu, 09 Mar 2000 08:00:00 GMT
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In article <38C6A585.68AC4E2B@bme.jhu.edu>,
isimon@bme.jhu.edu wrote:
> Dear Group:
>
> This is what I have:
>
> I have an xy array of coordinates for a contour (closed contour if you
> connect the points) that has the following properties:
> - arbitrary number of coordinates, they are generally bigger than
200.
> - coordinates are irregularly spaced.
>
> This is what I need:
>
> I need to interpolate points around the old contour so that

>
> - the number of points = a power of 2 = 256
> - interpolated points are equidistantly spaced from one another.
>
> The original and interpolated contour should have the same perimeter
and
> shape.
>
Several solutions come to mind. As someone already pointed out, you can calculate the euclidean (straight-line) distance between succesive points, and use that as a parameter t for a spline interpolation of x vs. t and y vs. t (with appropriate boundary conditions).

If you take a look at Numerical Algorithms with C by Engeln-Mullges and Uhlig (Springer-Verlag, ISBN 3-540-60530-4), Section 10.1.3, you will find a discussion and algorithms on this topic. I believe there is a version of this book with the code in Fortran

They also consider the case when there are sharp turns in the curve, where a cirle is fitted to three adjacant points. This is a generalization of the euclidean distance idea.

Another approach I know of is that of Donald Knuth in his work on font generation. Knuth uses Bezier curves to connect points, and developed algorithms to calculate the coefficients of the Beziers. (Bezier's are a special kind of polynomial, in this case fourth order).

Good luck,

Mirko

Subject: Re: interpolation around a contour
Posted by Med Bennett on Thu, 09 Mar 2000 08:00:00 GMT
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Just curious - have you experimented with the INTERPOLATE function? Otherwise, I can see how I would do this with brute force - i.e. loop through the line segments making up the contour, accumulate euclidean distance, find the interpolation interval, calculate new coords, etc. Sounds tedious though.

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> Regards,
>
> Inpakala Simon
>
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