Subject: Re: VECTOR_FIELD trouble
Posted by James Kuyper on Tue, 22 Aug 2006 17:28:29 GMT
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Jo Klein wrote:
> Dear IDL wizards,
> Has anyone got experience with the use of VECTOR_FIELD? The data I have
> is quite simple: It's a volume of vectors, where for each spatial
> position of a 3D regular grid I've got x, y and z as the projections of
> a unit-length vector centred on those grid locations. It's volume data
> from diffusion tensor MRI, and the vectors describe apparent diffusion
> directions at any given point in the object studied (a brain, in this
> case). So, to visualise the vectors, I browsed the docs and thought
> VECTOR_FIELD should do the job, but I can't figure out how to use it.
> One slice extracted from the data looks like this (z dimension of the
> vectors dropped):
> IDL> help,myslice
> MYSLICE FLOAT = Array[2, 128, 104]
> IDL> print,myslice[*,60:62,50]
> -0.393992 0.305778
> -0.353878 0.368543
> -0.505301 0.394556
> I set up my vectors like this:
> IDL> vector_field,myslice,outverts,outconn
> IDL> plots,outverts
> .. and the result is a window with just a wobbly looking vertical line,
> instead of lots of little vectors on a rectangular region.
> IDL> print,outverts[*,10000:10002]
> 8.00000 39.0000
> 8.00000 39.0000
> 9.00000 39.0000
>
> I suppose I'm misinterpreting how IDL would like my input data to be
> formatted, but as there are no examples in the VECTOR_FIELD docs, I'm a
> bit at a loss here.
> I'd appreciate any help you can give.
> Thanks a lot everyone,

What's probably happening here is that some of the vectors you're displaying are much longer than the spacing between the elements of your array, probably in the vertical direction. For example, I put together a test case as follows:

```
IDL> x = indgen(20)#replicate(1,30)
IDL> y = replicate(1,20)#indgen(30)
IDL> field = fltarr(2,20,30)
IDL> field[0,*,*] = (x+y)*(x-y)
IDL> field[1,*,*] = (x*x+y*y)
```

IDL> VECTOR_FIELD,field,outverts,outconn
% Compiled module: VECTOR_FIELD.
IDL> plots,outverts[0,*],outverts[1,*],psym=3

The results looked pretty wierd. However, if you restrict the range, it gets clearer:

IDL> plot,outverts[0,*],outverts[1,*],psym=3,xrange=[-10,40]

The problem was the following:
IDL> print,max(field),min(field)
     361.000   -841.000

The solution is scale the vectors to make them fit between the grid points:

IDL> VECTOR_FIELD,field,outverts,outconn,SCALE=0.0005
IDL> plot,outverts[0,*],outverts[1,*],psym=3

Subject: Re: VECTOR_FIELD trouble
Posted by Jo Klein on Wed, 23 Aug 2006 14:26:24 GMT
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Thanks for your insights. I've been able to narrow down the problem with your code, first problem was that I hadn't set up my plot window correctly (d'uh). Then I realised that PLOTS will connect all of the data points, which is not what I need. Of course, I can use a loop to draw my vectors:
for i=0,10000 do plots,outvert[*,2*i:2*i+1]
but that is quite inefficient. I was playing with IVector a bit, which does a good job at displaying my vectors, and can draw line segments when I set the head length to 0.
The direct graphics equivalent, VELOVECT, is painfully slow though, and judging from the source code, uses the same loop approach that I've tried.
I wonder if there's a more intelligent way to plot my line segments, i.e. avoiding the loop? Alternating between plotting and not plotting line segments in some way?
Thanks everyone,
Jo
