Subject: Re: Particle_Trace question ?
Posted by Douglas G. Dirks on Wed, 19 Mar 2008 23:09:42 GMT
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millward.george@gmail.com wrote:
> On Mar 18, 5:23 pm, "mgal...@gmail.com" <mgal...@gmail.com> wrote:
>> On Mar 18, 4:56 pm, millward.geo...@gmail.com wrote:
>>
>>
>>
>>> Hi there,
>>> I am trying to use particle_trace to create streamlines from a vector
>>> field - but I'm having quite alot of trouble
>>> understanding the documentation.
>>> I have a velocity field which is a longitude,latitude array of
>>> Southward and Eastward velocities.
>>> My arrays are 20 longitudes by 91 latitudes. So my 2 arrays are:
>>> V_south(20,91) and V_east(20,91)
>>> I now want to feed these into Particle_trace.
>>> The syntax for Particle_trace requires a single array (which they call
>>> Data) of
>>> size Data[2,dx,dy]
>>> I'm assuming that dx and dy are the indexes for longitude and latitude
>>> and the first dimension (2)
>>> is for the 2 components of the field, so:
>>> data(0,lon,lat) = V_east(lon,lat)
>>> data(1,lon,lat) = 0.0 - V_south(lon,lat)
>>> Nowhere in the documentation does it define the directions - is dx
>>> Eastwards - is dy Northwards? Very confusing !!
>>> And the seed points - are these longitude, latitude points or
>>> something ? Again, no real explanation in the documentation.
>>> ....or have I got it completely wrong ?
>>> Any help with this very much appreciated
>>> Cheers,
>>> George.
>> Here's an example of using PARTICLE_TRACE:
>>
>> ; defines u, v, x, and y
>> restore, filepath('globalwinds.dat', subdir=['examples','data'])
>>
>> data = fltarr(2, 128, 64)
>> data[0, *, *] = u
>> data[1, *, *] = v
>>
>> ; define starting points
>> seeds = [[32, 32], [64, 32], [96, 32]]
>>
>> particle_trace, data, seeds, verts, conn, max_iterations=30

>>
>> ; plot the underlying vector field
>> velovect, u, v, x, y
>>
>> ; overplot the streamlines
>> i = 0
>> sz = size(verts, /structure)
>> while (i lt sz.dimensions[1]) do begin
>>   nverts = conn[i]
>>   plots, x[verts[0, conn[i+1:i+nverts]]], y[verts[1, conn[i+1:i
>> +nverts]]], $
>>   color='0000FF'x, thick=2, linestyle=2
>>   i += nverts + 1
>> endwhile
>>
>> Mike
>> --www.michaelgalloy.com
>> Tech-X Corporation
>> Software Developer II
>
> Mike
>
> Aha - so the seeds are just integer positions within the 2D array -
> got it - thanks !!
>
> Does it matter what the directions of U and V are - maybe not - hmm ?
>
> Thanks for the demo code - that example needs to make it into the
> reference guide.
>
> Cheers,
>
> George.

Hi George,

I've made what I hope are some clarifications to the PARTICLE_TRACE
reference documentation. Here's the meat of it:

  Data
  A three- or four-dimensional array that defines the vector field.
  Data can be of dimensions [2, dx, dy] for a two-dimensional vector
  field or [3, dx, dy, dz] for a three-dimensional vector field,
  where:
  - Data[0,*,*] or Data[0,*,*,*] contains the X components of the
    two- or three-dimensional vector field (commonly referred to as U).
  - Data[1,*,*] or Data[1,*,*,*] contains the Y components of the
    two- or three-dimensional vector field (commonly referred to as V).

- Data[2,*,*,*] contains the Z components of the three-dimensional vector field (commonly referred to as W).

Seeds
An array of two- or three-element vectors ([2, n] or [3, n]) specifying the indices of the n points in the Data array at which the tracing operation is to begin. The result will be n output paths.

And, with Mike's kind permission, I am including a (very slightly modified) version of his example in the docs as well. These changes will show up in the next release of the IDL help system.

Best wishes,
Doug

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