Subject: plot (x,y,z) triplets as a surface?
Posted by noymer on Tue, 02 Nov 1999 08:00:00 GMT
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Dear comp.lang.idl-pvwave,

I have some surface data that are generated by a computer simulation I wrote. The simulation itself is not written in IDL, it's an external program that produces an ASCII data set. Before switching to IDL, I used a plotting program that required the surface data to be z only, with x and y determined by column and row.

As far as I can tell, this is also IDL's preferred way to read surface data. Obviously, it is a more economical way to store surface data. However, economy aside, for many reasons I would prefer to have my simulation output (x,y,z) triplets. The x,y values ARE evenly spaced but I would STILL like to output the data as triplets. Call me stubborn.

Is there any way to read (x,y,z) triplets into IDL and make a surface? Sorry if this is a terrible newbie question.

TIA,
Andrew
noymer@my-deja.com

Subject: Re: plot (x,y,z) triplets as a surface?
Posted by davidf on Wed, 03 Nov 1999 08:00:00 GMT
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Mark Hadfield (m.hadfield@niwa.cri.nz) writes:

> Oh, I still haven't seen that one. The sun may rise earlier in NZ than
> (almost) anywhere else in the world, but the delay before news articles
> arrive seems to be large and highly variable.

Yes. I chose my current ISP because I felt like I was going deaf with the previous one: every time I read a newsgroup article they were replying to one I hadn't seen. It was like catching every other word of a conversation. It was to the point that I was even grateful for those people who quote every damn word of the previous article. :-)

Cheers,

David

P.S. Now, if I could just find an ISP who would
cache my articles for 24-hours before sending them
out, so I wouldn't keep embarrassing myself...

--
David Fanning, Ph.D.
Fanning Software Consulting
Phone: 970-221-0438 E-Mail: davidf@dfanning.com
Coyote's Guide to IDL Programming: http://www.dfanning.com/
Toll-Free IDL Book Orders: 1-888-461-0155

Subject: Re: plot (x,y,z) triplets as a surface?
Posted by davidf on Wed, 03 Nov 1999 08:00:00 GMT
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Mark Hadfield (m.hadfield@niwa.cri.nz) writes:

> David--That's a very useful article, but Andrew's original post said that
> the data ARE evenly spaced.

Yes, I know. And I thought Craig's response about REFORMing
the Z data answered the question nicely. I was just pointing
out that this problem of gridding data has come up too many
times to be ignored anymore. An article we can point the
folks towards just seemed needed. And Andrew indicates
in a private e-mail that even he found it useful. :-)

Cheers,

David
--
David Fanning, Ph.D.
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I've been meaning to write an article about gridding
data for a SURFACE plot for about 5 years now. This
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it here:

http://www.dfanning.com/tips/grid_surface.html

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David

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Subject: Re: plot (x,y,z) triplets as a surface?
Posted by Mirko Vukovic on Thu, 04 Nov 1999 08:00:00 GMT
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In article <7vrdi6$8ov$1@nnrp1.deja.com>,
Andrew <noymer@my-deja.com> wrote:
> In article <941660333.808073@clam-55>,
> "Mark Hadfield" <m.hadfield@niwa.cri.nz> wrote:

>
> No amount of rotation, changing aspect, etc., can switch between

> RH/LH, but there must be some clever way to REFORM the data to get RH
> or LH system? The trick is to be very sure the axis labels are
> correct at the end of it all.
>
> Thanks to those who responded. Any ideas about the RH/LH systems?
> Sometimes I mess with surfaces from a million angles, only to find
that
> the ONLY way to make them "look right" is to switch to a LH coordinate
> system. It's simple yet very powerful.
>
> Thanks in advance if you have any more thoughts.
>
Consider using the rotate function to rotate/transpose the array.
A judicious combination of that with axis reversal should give
you what you want.

Mirko

Subject: Re: plot (x,y,z) triplets as a surface?
Posted by noymer on Thu, 04 Nov 1999 08:00:00 GMT
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In article <941660333.808073@clam-55>,
"Mark Hadfield" <m.hadfield@niwa.cri.nz> wrote:
> As I understand it you want to read in a series of (x,y,z) triplets
> which actually represent vertices in a m x n rectangular array, i.e.
> something like this (for m=2, n=3) [SNIP]
> and you want to reorganise the data into an X vector (dimensioned
> [m]), a Y vector (dimensioned [n]) and a Z array (dimensioned [m,n])
> and generate a surface plot. Can you confirm that this is the problem
> you are trying to solve, and indicate which part you are having
> difficulty with.

That's exactly it. I have not had a chance to mess around with
Craig's suggestion (thanks Craig) of REFORM, but if I had known about
that function I would have tried that before posting.

> Do you know m and n in advance?

Yes.

> Can you control the order in which the data are written into
> the file?

I can control everything ;-). It's a Pascal program written by me, so I can have it write the data any-which-way.

Allow me to give some more information, and you'll see why this has been such a vexing problem for me. There is also an adjunct problem that I hope people will have some ideas for.

Before starting to use IDL, I used a plotting program that *ONLY* could plot surfaces in the way I indicated: an array of Z-values with X,Y determined by column and row. The REFORMation suggested by Craig does not have an analogue in my old program. It could make a 3D scatterplot from (X,Y,Z) triplets, but to grid a surface it needed the data in an array. The problem of unevenly-spaced data, discussed by David, is likewise impossible in the package I used before.

MAIN PROBLEM: Now, the data I have are evenly spaced in X (age) and Y (time), but there was always a problem with axis labeling. The axis labels always popped up 1..50, 1..100 if the array was 50x100, for example. Never mind that the units were in months, so 12=1year, but I needed labels in years etc. In X-Y-Z, I have control over units! I used to always have to go in and change the axis labels by hand when I was on my "final" version, but inevitably, I would want to change something again, and it became a nightmare to keep the axis labels accurate. Part of the reason I want triplets is to keep track of my age/time variables in their real units, not in arbitrary units. It seems that IDL can work this much better: from the manual for SURFACE: "X -- A vector or two-dimensional array specifying the X coordinates of the grid. If this argument is a vector, each element of X specifies the X coordinate for a column of Z (e.g., X[0] specifies the X coordinate for Z[0,*])." So I specify my X,Y vectors and I'm home free? This used to cause me no end of aggravation.

ADJUNCT PROBLEM: My old package could switch between RH and LH coordinate systems with the touch of a button. I was just looking at some of the graphs, and I wrote down an example. In RH, we have (in this case) X on the horizontal axis and Y on the vertical axis and Z the depth axis. Z starts at 0 (away from the viewer) and goes to 80 (closer to the viewer). X is 0 at left, 100 at right, and Y is 0 at bottom and 150 at top. In LH, Z and Y are unchanged, but X goes from 100 at left to 0 at right.

I asked someone at RSI about changing between RH/LH coordinate systems, and got a response that IDL doesn't have a setting to do this. But upon considering the above, it seems to me that IDL could do this, no? In a 2D PLOT, it is trivial in IDL to reverse one axis but leave the other. I'm less sure about SURFACE.

No amount of rotation, changing aspect, etc., can switch between RH/LH, but there must be some clever way to REFORM the data to get RH or LH system? The trick is to be very sure the axis labels are correct at the end of it all.

Thanks to those who responded. Any ideas about the RH/LH systems? Sometimes I mess with surfaces from a million angles, only to find that the ONLY way to make them "look right" is to switch to a LH coordinate system. It's simple yet very powerful.

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-- Andrew

noymer@my-deja.com

Subject: Re: plot (x,y,z) triplets as a surface?
Posted by Mark Hadfield on Thu, 04 Nov 1999 08:00:00 GMT
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David Fanning <davidf@dfanning.com> wrote in message news:MPG.128a5893802727dc989939@news.frii.com...
> Mark Hadfield (m.hadfield@niwa.cri.nz) writes:
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Mark Hadfield
m.hadfield@niwa.cri.nz http://katipo.niwa.cri.nz/~hadfield/
National Institute for Water and Atmospheric Research
PO Box 14-901, Wellington, New Zealand

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Posted by Mark Hadfield on Thu, 04 Nov 1999 08:00:00 GMT
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0 0 [Z value]
0 1 [Z value]
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Cheers...

Mark Hadfield
m.hadfield@niwa.cri.nz http://katipo.niwa.cri.nz/~hadfield/

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