
Subject: Re: How to plot the magnetic field vector along the trajectory

Posted by [David Fanning](#) on Wed, 12 Mar 2008 03:26:44 GMT

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duxiyu@gmail.com writes:

- > I have the magnetic field data and spacecraft position data.
- > I want to plot the magnetic field vector along the trajectory.
- > I think I should first plot the spacecraft trajectory, and then plot
- > the magnetic field vector along the trajectory.
- > But I do not know which procedure in IDL can perform the second step.
- > Is there anyone who can help me?

I've been thinking lately that either we need a refresher course in how to ask technical questions, or my mind is going blank faster than I anticipated. Neither prospect is encouraging to me.

Here is a good place to start if you need a refresher:

<http://catb.org/~esr/faqs/smart-questions.html>

The section on "Be Explicit About Your Question" might be a good place to start, if you are short on time.

If you think my mind is going, then join the line. :-(

Cheers,

David

P.S. With respect to *this* question, I'm not sure I even know which IDL procedure performs the *first* step.

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Seppure ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: How to plot the magnetic field vector along the trajectory

Posted by duxiyu@gmail.com on Wed, 12 Mar 2008 11:06:39 GMT

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I cannot connect to the web site you gave me.

Sorry for my poor English and I did not state my question clearly.

<http://picasaweb.google.com/duxiyu/1/photo#51768046173768035> 86

Could you browse this web page? There is a sample figure.

I have the position data of the satellite and the magnetic field data for each position.

For example, (posx, posy, posz) is the position of satellit and the magneitc field data for this position is (Bx, By, Bz).

Firstly I plot the projection of the satellite trajectory in X-Y plane by using "plot, posx, posy"

Then I want to plot the vector of magnetic field data for each point

Du

On Mar 12, 11:26 am, David Fanning <n...@dfanning.com> wrote:

> dux...@gmail.com writes:

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Subject: Re: How to plot the magnetic field vector along the trajectory
Posted by [lasse](#) on Wed, 12 Mar 2008 11:27:05 GMT

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On 12 Mar, 12:06, "dux...@gmail.com" <dux...@gmail.com> wrote:

> I cannot connect to the web site you gave me.
> Sorry for my poor English and I did not state my question clearly.
>
> <http://picasaweb.google.com/duxiyu/1/photo#51768046173768035> 86
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```

I found the question perfectly straight forward already from the first post. Maybe it's to do with the fact that I fiddle with spacecraft trajectories and magnetic fields every day. Or maybe I'm just in a better mood than David...

Anyway, the way I would do this is:

```
nn = n_elements(posx)
plot, posx, posy
for i=0, nn-1L do $
  plots, posx[i]+[0., Bx[i]], posy+[0., By[i]]
```

So essentially you draw every field vector starting at the current point of the trajectory to the projected magnitude of the vector. You might want to introduce some sort of scaling factor get the magnetic field vectors nicely in the coordinate system. Also, this only works if all 6 components have the same time stamps.

Instead of PLOTS you might want to have a look at ARROW to get nice arrows as in your example, like so

```
arrow, posx[i], posy[i], posx[i]+bx[i], posy[i]+by[i]
```

Cheers
Lasse

Subject: Re: How to plot the magnetic field vector along the trajectory

Posted by [David Fanning](#) on Wed, 12 Mar 2008 13:26:41 GMT

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Lasse Clausen writes:

> I found the question perfectly straight forward already from the first
> post. Maybe it's to do with the fact that I fiddle with spacecraft
> trajectories and magnetic fields every day. Or maybe I'm just in a
> better mood than David...

No question I was in a bad mood after wasting most of the afternoon looking for vestiges of earlier IDL installations on my computer, but it seems to me that how you go about adding magnetic vectors depends **entirely** on how you go about plotting the trajectory.

In the proposed solution, I see we are just throwing out the Z component of both the trajectory and the vector field. Certainly this is the easiest way to proceed. I just wonder if it is accurate though. :-)

Cheers,

David

--

David Fanning, Ph.D.

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Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: How to plot the magnetic field vector along the trajectory

Posted by [lasse](#) on Wed, 12 Mar 2008 14:23:17 GMT

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On 12 Mar, 14:26, David Fanning <n...@dfanning.com> wrote:

> Lasse Clausen writes:
>> I found the question perfectly straight forward already from the first
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We are not throwing away anything, we are merely projecting into the XY plane... ;-) You have to project somewhere as the computer screen is not capable of displaying 3D - nor is paper, incidentally. And the usual way to do this kind of thing is to provide three plots, one in the XY plane, one in XZ and one in YZ. You then have to assemble the 3D picture in your head.

Alternatively, you can do the whole thing in "3D", using SURFACE to establish the coordinate system and then

PLOTS, posx[i]+bx[i], posy[i]+by[i], posz[i]+bz[i], /T3D

to plot the lines.

Cheers
Lasse Clausen
