Subject: Re: Zooming in Object Graphics
Posted by davidf on Wed, 20 Dec 2000 16:59:22 GMT
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Kellie Brown (mcnaronbrowk@saic.com) writes:

> I'm pretty new to object graphics and have a problem I'm trying to
> figure out. I have a plot object that I allow a simple zooming
> capability. To zoom, I change the value of the viewplane_rect property
> of the IDLgrView. I also track the plot coordinates (translated to data
> space) as I move the mouse within my object graphic window.
>
> The problem: After I zoom in (for example) and change the viewplane_rect
> property, the coordinates that are returned to me are the same values as
> before I zoom. For example, I have a scatter plot of points and I want
> to display the coordinate of a point when I put the cursor over it. If
> the graphic has been zoomed in, then the data range shown in my 400x400
> graphics window has changed, and I'm not getting the same coordinate
> value as before for the same point.
>
> I assume this is because I have not changed the [xyz]coord_conv value of
> the graphic object, but I don't know what to do to change the value. My
> guess is I need to find out the new data range actually displayed in my
> window, but how do I do that based on the new value of viewplane_rect?
> I figure that once I determine this new data range, I can re-calculate
> the [xyz]coord_conv and, therefore, retrieve the same data coordinate
> for a point, even when it's in zoom mode.
>
> Am I on the right track? If so, can anyone help me figure out how to do
> this?

After giving this quite a bit of thought (and after looking
again at how my ZPLOT program works), I'm beginning to think
you may NOT be on the right track. In fact, I think you
may have gotten on the North bound train instead of
the South bound. (This happened to my son and I as we
were traipsing around Europe together last summer. In our
case it didn't matter because wherever we ended up was
fine with us, but it might matter to you.)

I say this because it occurs to me that changing the
Viewport rectangle is exactly what you would do if you
wanted to zoom into a plot and NOT change the data coordinate
space. In fact, NOT changing the data coordinate space is
what *makes* this technique a zooming technique. In other
words, if the data space remains the same, and you map
less of it into the window, you have, effectively, zoomed
into the data space.

But I would argue that you want just the opposite. You want to leave the viewport rectangle alone, but display less of the data coordinate space in *it*. In other words, you want to change the amount of data space that is shown in the window, thereby zooming into the data space. The latter is simply a matter of calculating the end-points of the relevant axis (perhaps with a rubberband box or something similar), and then rescaling the axis end-points into the viewplane rectangle space. This is a simple COORD_CONV operation.

The advantage of doing this is that data points on the plot will now maintain their real data coordinate values, because they will be scaled appropriately.

This little stream-of-consciousness diatribe would require a couple more passes to make intelligible, probably. But I think this would put you back on the right track if you could decipher it. :-)

Cheers,

David

--
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: Zooming in Object Graphics
Posted by btt on Wed, 20 Dec 2000 18:08:49 GMT
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Hello,

I don't want to open a can of worms, but...

This topic always reminds me of Randall Frank's recommendation to use natural data coordinates rather than normalized data coordinates. I have only done the graphics in natural coordinates a couple of times, so I'm skating on thin ice with wobbly ankles. Zooming seems like a place where it might be especially useful; of course, it's just a hunch and I've yet to try it.

The ViewPlane_Rect would have to change as well as the location of the axes/annotations (unless you didn't care to see them when zooming, kind of like zooming on a bitmap.) The data ranges can be controlled by the [XYZ]RANGE keywords. The tricky part is setting up the ViewPlane_Rect so there will be enough room for the axes, etc. I know I build in the border when making object graphics in normalized coordinates (ViewPlane_Rect = [-.2,-.2, 1.4,1.4] or some such thing.) In natural coordinates maybe the following could be done:

xMin = Min(ZoomedDataX, Max = xMax)
yMin = Min(ZoomedDataY, Max = yMax)

xSpan = xMax-xMin
ySpan = yMax-yMin

oView->SetProperty, ViewPlane_Rect = [xMin-0.2*xSpan, yMin-0.2*ySpan, xSpan*1.4, ySpan*1.4]

oGrAtom->SetProperty, xRange = [xMin,yMin], yRange = [yMin,yMax]

oXaxis->Location = [xMin,yMin,0], Range = [xMin,xMax]

oYaxis->Location = [xMin,yMin,0], Range = [yMin,yMax]

Well, it's the holiday season, perhaps I'm having visions of sugared plums...

Ben

--
Ben Tupper
Bigelow Laboratory for Ocean Sciences
180 McKown Point Rd.
W. Boothbay Harbor, ME 04575
btupper@bigelow.org

Subject: Re: Zooming in Object Graphics
Posted by davidf on Wed, 20 Dec 2000 18:23:22 GMT
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Ben Tupper (btupper@bigelow.org) writes:

> I don't want to open a can of worms, but...
>
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> natural data coordinates rather than normalized data coordinates. I have

> only done the graphics in natural coordinates a couple of times, so I'm
> skating on thin ice with wobbly ankles. Zooming seems like a place where
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>
> oYaxis->Location = [xMin,yMin,0], Range = [yMin,yMax]
>
>
> Well, it's the holiday season, perhaps I'm having visions of sugared plums...

I don't know. Maybe with a couple more egg-nogs I could
see it, but I don't understand how this will *zoom* anything.
If you change *both* the viewport rectangle *and* the axes
endpoints, aren't you just back to where you started!?

Cheers,

David

--
David Fanning, Ph.D.
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Subject: Re: Zooming in Object Graphics
Posted by btt on Wed, 20 Dec 2000 18:55:36 GMT
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David Fanning wrote:

>
> I don't know. Maybe with a couple more egg-nogs I could
> see it, but I don't understand how this will *zoom* anything.
> If you change *both* the viewport rectangle *and* the axes
> endpoints, aren't you just back to where you started!?
>

I don't think so... the data should fit within the viewing rectangle and
have a nice border around it.

I wish that I could speak with more authority on the issue (eshpeciilay
the igg-nog). I think I have to see it stepwise to see it.

If Kellie had an original xrange of [0,100] and wanted to zoom into
xrange = [50,75]...

> oView->SetProperty, ViewPlane_Rect = [xMin-0.2*xSpan, yMin-0.2*ySpan,
xSpan*1.4, ySpan*1.4]

ViewPlane_Rect = [50-0.2*25, yMin-0.2*ySpan, 25*1.4, ySpan*1.4]
ViewPlane_Rect = [45 , yMin-0.2*ySpan, 35 , ySpan*1.4]

oView->SetProperty, ViewPlane_Rect = [45 , yMin-0.2*ySpan, 35 , ySpan*1.4]
oGrAtom->SetProperty, xRange = [50,75], yRange = [yMin,yMax]

oXaxis->Location = [50,yMin,0], Range = [50,75]

oYaxis->Location = [50,yMin,0], Range = [yMin,yMax]

So I would keep track of in normalized values is the *location* of the
graphics atoms relative to the viewplane. The viewplane would then flex
to maintain that same relative location for the graphics atoms.

In normalized terms, the data occupies 0.71 of the viewport (1.0/1.4) of
the viewplane in the x direction. The left and right borders occupy
0.14 of the view plane each.

I'll have to write a routine to test it out (just as long as it works on
my monochrome display - I'm giving up on color!)

Ben

--
Ben Tupper
Bigelow Laboratory for Ocean Sciences
180 McKown Point Rd.
W. Boothbay Harbor, ME 04575
btupper@bigelow.org

Subject: Re: Zooming in Object Graphics
Posted by davidf on Wed, 20 Dec 2000 19:19:21 GMT
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Ben Tupper (btupper@bigelow.org) writes:

> I don't think so... the data should fit within the viewing rectangle and
> have a nice border around it.
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> I wish that I could speak with more authority on the issue (eshpeciilay
> the igg-nog). I think I have to see it stepwise to see it.
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Well, I'm not convinched. But, Im' shure sober Mark
Hatfield alreaady hash somethin like thish already...

Cheers,

David

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Subject: Re: Zooming in Object Graphics
Posted by Mark Hadfield on Wed, 20 Dec 2000 21:12:59 GMT
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"David Fanning" <davidf@dfanning.com> wrote in message
news:MPG.14aab41f9ee42b1c989cc6@news.frii.com...
> Well, I'm not convinched. But, Im' shure sober Mark
> Hatfield alreaady hash somethin like thish already...

"sober Mark Hatfield"? What!?

As a matter of fact, I am sober. It's 10 am here & I haven't had time to drink any egg nog yet. Egg nog isn't all that appealing in the middle of summer anyway.

Yeah I do have something like thish, it's called an MGH_Plot.

The basic idea is that when the user selects a new data range in the X direction, the X axes are recalculated so that they span the new data range, but with no change in the normalised range. This requires a change in XCOORD_CONV and this new value is passed on to all the atoms that are associated with that X axis. Pretty much what you said, David (before the egg nog) and there's no changing the viewplane rectangle.

It's just a prejudice of mine, but I like to keep the viewplane rectangle dimensions close to 2 x 2 and also try to ensure that a square in normalised coordinates on the viewplane is square on the window or printer page.

Those who have looked at any of my code will not be surprised to hear that MGH_Plot calls on a whole heap of other classes in my object library and there's some really neat stuff in there with "master-slave" relationships between the axes and atoms that I won't explain because I've forgotten how it works. But if you want to take a look go to:

http://katipo.niwa.cri.nz/~hadfield/gust/software/idl/

This URL looks a bit odd right now because the sysadmin fiddled with the Apache settings.

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

Subject: Re: Zooming in Object Graphics
Posted by Pavel A. Romashkin on Thu, 21 Dec 2000 19:34:23 GMT
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I am not helping with keeping the can of worms open, I hope. After all, I am always open for an ig-nock. Anyway, I have tried both messing with viewplane rectangle and with coord_conv, and for my degree of dumbness, the coord conversion was much easier. With the Viewplane_rect approach I finally zoomed to where I did not see anything at all in my Display, and could not bring the contents back even manually. I am planning to dive into Direct Coordinate Object Graphics realm, but for now the coord_conv works.

In fact, for the 2D case I have written a simple IDLgrPlot method that zooms in and out, and all you have to do is give it the mouse press and relase coordinates. It can be found at http://spot.colorado.edu/~romashki/idl/IDLgrPlot__zoom.pro (talking about exclusively named methods! :-).
I am not trying to say its good, but its fast and short. All you have to do is get mouse click coords and call ZOOM method on any of the IDLgrPlots in the current Model. Everything that pertains to the Plot (axes, other plots) gets rescaled appropriately, new Coord_convs are returned to you, etc.

Cheers,
Pavel

Subject: Re: Zooming in Object Graphics
Posted by Mark Hadfield on Thu, 21 Dec 2000 21:38:34 GMT
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"Pavel A. Romashkin" <pavel.romashkin@noaa.gov> wrote in message news:3A425B40.D3115BB@noaa.gov...
> ...It can be found at
> http://spot.colorado.edu/~romashki/idl/IDLgrPlot__zoom.pro (talking
> about exclusively named methods! :-).

Hi Pavel

That URL should be all lower-case, i.e.

http://spot.colorado.edu/~romashki/idl/idlgrplot__zoom.pro

Remember that some of the more primitive OSes have case-sensitive file systems!

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

Subject: Re: Zooming in Object Graphics
Posted by Pavel A. Romashkin on Thu, 21 Dec 2000 22:32:34 GMT
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Thank you, Mark. My 9th Level Mac OS is so entirely undoubtedly superior to any of them puny Unix flavors that it found the plain case name, too,

through the mixed case link. The file name originally *was* mixed case,
but when I posted the URL I realized that IDL on some inferior OSes
might not find the mixed-case method, so I renamed the file, but not the
link :-)

Cheers,
Pavel

Disclaimer : for those who fail to see it, the above statements about
OSes are a *joke*, not an invitation for the OS fight!

Mark Hadfield wrote:
>
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> Hi Pavel
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>
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