Subject: map function for astronomy
Posted by eshaya on Mon, 15 Dec 2014 23:21:39 GMT
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I want to use the map function for plots of the sky. In the map_set procedure there was a simple reverse=1 keyword to do this. How do we do this with the map function?

Subject: Re: map function for astronomy
Posted by Jim Pendleton on Tue, 16 Dec 2014 01:18:04 GMT
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On Monday, December 15, 2014 4:21:40 PM UTC-7, esh...@umd.edu wrote:
> I want to use the map function for plots of the sky. In the map_set procedure there was a simple reverse=1 keyword to do this. How do we do this with the map function?

All this really means is that the longitudinal orientation is reversed, as you would likely prefer if you were plotting coordinates defined in terms of galactic latitude and longitude, for example. With this keyword, you don't have to resort to tricks with respect to labeling the axes in a custom way or reversing the sense of your data.

Consider this example, with reverse set to 0 or 1:

```
map_set, /mercator, reverse = 1, /grid, $
  xmargin = 5, ymargin = 5, label = 1, /continents, /iso
```

Subject: Re: map function for astronomy
Posted by eshaya on Tue, 16 Dec 2014 19:11:37 GMT
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That is the way I was doing it. But, starting with IDL version 8.0, the map_set was replaced by the map function. As the Help Manual says:
"MAP_SET Procedure - Please see the MAP function, which replicates the functionality of this routine and offers an interactive interface."

The new plotting functions (plot(),surface(),plot3d(),map(), etc) that have replaced the old procedures have big advantages in that you can interactively adjust almost anything and then easily output to any graphic format.
But, I don't see how to get map() reverse the longitude which is required for most astronomical purposes. If I change the limits, it just changes them back.

Subject: Re: map function for astronomy
Posted by eshaya on Tue, 16 Dec 2014 21:24:44 GMT
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On Monday, December 15, 2014 6:21:40 PM UTC-5, esh...@umd.edu wrote:
> I want to use the map function for plots of the sky. In the map_set procedure there was a simple reverse=1 keyword to do this. How do we do this with the map function?

Well, I have gone ahead and wrote the code to force a reversal of the longitude and at least make it possible to plot skymaps with the map procedure. Here is what I did (but if anyone can find an easier way, I am all ears). First, I use the negative of the RA values in the limits:

limit = [decmin,-ramax,decmax,-ramin]

and call the map function with label_format keyword:

map1 = map('Orthographic', limit=limit, label_format = 'mapgrid_labels_reverse')

The label_format keyword is a callback to a user supplied function that can alter the labels. So mine is call mapgrid_labels_reverse:

```
function MapGrid_Labels_Reverse, orientation, location, fractional, defaultlabel
; Reverse RA labels for skymaps
; Be sure to reverse both the RA limits and the RA values
;  And then use map function like so
; m = MAP(orthographic, LABEL_FORMAT='MapGrid_Labels_Reverse', limit=limit)

  ; If grid line is RA (orientation = 0), then reverse it
  if (orientation eq 0) then begin
     location = -location
     if (location lt 0) then location = location + 360.
  endif

  degree = '!M' + STRING(176b) ; Use the Math symbol

  label = STRTRIM(ROUND(location),2) + degree

  return, label
end
```

This just uses degrees. Of course, one could be fancy here and output hours, min, sec etc instead.
Next one has to use the reverse of the ra in plotting any values:
map1 = plot(/overplot,-ra,dec,symbol='+',linestyle='')

Again, hopefully, I am just being silly here and there is some keyword or something that does all of this automagically.

Subject: Re: map function for astronomy
Posted by Matt Haffner on Wed, 21 Jan 2015 18:23:24 GMT
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I've also had to do something similar with the new function graphic calls to get astronomical images plotted correctly. I haven't found anything in testing or in the docs that suggests longitude can be projected in the opposite direction.

In the old days, I flipped the sign, like you've done and just dealt with having to pass negative longitudes for overplotting, labels, etc. But with the new mapping functions, the LIMIT keyword's longitudes can't be less than -180. So, there's a problem if your image has sky coordinates above +180.

However, the *maximum* longitude in LIMIT is allowed to be as high as +540. So I now "flip" the longitude with this function:

```
  new_lon = (360 - orig_lon)
```

A simple label_format function looks like this then:

```
function mapgrid_gal_360flip_labels, orient, value, fractional, default

  if orient eq 0 then v = 360-value else v = value

  if fractional eq 0 then begin
    l = string(v, format = '(I4)')
  endif else begin
    l = string(v, format = '(F6.2)')
  endelse

  return, l

end
```

Any overplotting, etc. needs to convert coordinates with (360 - lon), which is a bit more annoying than just negating. But it works.

STILL, I'd like to make a plea to the developers to please consider adding a simple /REVERSE keyword for projections again for those of us who like to plot data on the inside of spheres :) I'm enjoying a lot of the flexibility and output of the function graphics and would love to move more of our code library in that direction.

- mh

On Tuesday, December 16, 2014 at 3:24:46 PM UTC-6, esh...@umd.edu wrote:
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