Subject: Re: Plot multiple axes with log and linear scales
Posted by JDS on Thu, 30 Jul 2009 16:21:14 GMT
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On Jul 29, 11:59 am, David Fanning <n...@dfanning.com> wrote:
> Conor writes:
>> I need to make a plot with multiple x-axes. I've done this before
>> without any trouble when both axes had a linear scale, and so I would
>> use the axis command to create the second plot, and just set the
>> xrange keyword to be whatever I needed it to be. Now however things
>> are more complicated, because one axis is a linear scale, and the
>> other axis is sorta kinda logarithmic scale.
>
> Here is how you add a second, logarithmic axis:
>
>   http://www.dfanning.com/tips/another_yaxis.html
>
>> There is a one-to-one
>> relationship between the axes, but the relationship is not in the
>> least bit simple. Basically, I need a way to tell IDL, for these
>> values on the first x-axis, plot these values for the second x-axis.
>> Anyone know how to do this?
>
> I don't have the foggiest idea of what this means. Sorry. :-(

I think this means there is a nonlinear relationship between the first
axis values, and the second axis. Classic example: redshift, and
lookback time: related, but not (at all!) linearly. The way you do
this is to create another axis with the same range as the first, but
give it an [XYZ]TICKFORMAT function which does the nonlinear
conversion for you, ala:

```
IDL> plot,indgen(10),YRANGE=[1,12],YTITLE='first linear
axis',YSTYLE=9,POSITION=[.1,.1,.9,.9],CHARSIZE=2
IDL>
 axis,YSTYLE=1,YAXIS=1,YTICKFORMAT='conv_axis',CHARSIZE=2,YTI TLE='second
non-linear axis'
```

where 'conv_axis' is the name of the function which does the
conversion (e.g.):

```
function conv_axis,axis,index,value
  return,string(FORMAT='(F0.1)',value^1.5*exp(-value^2/100))
end
```

You'll notice (as in this case), you don't even need to maintain
bijection (this is just a made up conversion function). If instead of
matching the first axis' tick locations and ending up with random non-

round values, you can use YTICKV and YTICKS to pass those value which
before non-linear conversion work out to the correct converted
(usually round) numbers. This of course requires you to invert the
conversion equation, which sometimes you can do by hand, but sometimes
you'll have to do numerically (FX_ROOT is your friend here).

JD