Subject: Re: how to label minor tick marks on a log axis??? Posted by Pavel A. Romashkin on Thu, 08 Mar 2001 22:49:57 GMT

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Paul van Delst wrote:

- > Sorry for the twenty questions today but how does one go about labeling the minor tick
- > marks on a log axis (or a linear one for that matter)? Does such a simple thing require
- > use of XYOUTS?

You could try Adobe Illustrator or Corel Draw instead of XYouts. I had a lot more luck with it, making IDL PS files look the way I want them. It is so easy to make, line up, distribute and place them where you need them. Oh, maybe I should've sent this reply to some "comp.graphics.adobe" newsgroup?

Pavel

P.S. I guess I tried to say that I wish some things were easier to do in IDL.

Subject: Re: how to label minor tick marks on a log axis??? Posted by davidf on Thu, 08 Mar 2001 22:50:47 GMT View Forum Message <> Reply to Message

Paul van Delst (paul.vandelst@noaa.gov) writes:

- > Sorry for the twenty questions today but how does one go about labeling the minor tick
- > marks on a log axis (or a linear one for that matter)? Does such a simple thing require
- > use of XYOUTS? I've been futzing about with the X/YTICKS keywords which does the job but
- > makes the resulting axis spacings linear! MAN!

Here's a copy of an old newsgroup article by Martin that hasn't made it to my web page yet:

David

Subject: log axis

From: m218003@modell3.dkrz.de (Martin.Schultz@dkrz.de)

Date: 10 Sep 1999 15:52:08 GMT

--=-= nRxTCCITGsD7YuS/WxuYofYfu =-=-=

Hi there,

until today I still wasn't completely satisfied about plotting logarithmic axis -- I often want to label the 2's and 5's as well as the 10's which is not THAT straightforward as it seems. I had

already written a little function LOGLEVELS.PRO which will return "nice-looking" log levels depending on a Range input, and now I have added a routine named AXLABEL which puts these labels out at the right place -- please find these two attached.

```
Here is how it works:
  : define dummy x and y
  X = findgen(101)/10.-4
  Y = X > .1
 ; get range of data
 mind = MIN(Y,MAX=maxd)
 Lblv = LOGLEVELS([mind,maxd]) ; <===== 1 =====
 PLOT, X, Y, /YLOG, YTICKFORMAT='(A1)'
 AXLABEL,Lblv,charsize=2.4;,format='exponent'; <=== 2 ====
You could also relabel the x axis as follows:
  PLOT,X,Y,/YLOG,YTICKFORMAT='(A1)',XTICKFORMAT='(A1)',XTICK_G ET=xt
 AXLABEL,Lblv,charsize=2.4;,format='exponent'; <=== 2 ====
 AXLABEL,xt,charsize=xc,format='(i12)',/XAxis
                                          : <=== 2 ====
The FORMAT keyword accepts a function name similar to XTICKFORMAT, so
you can use e.g. Stein Vidar's EXPONENT function (which you can find
in David Fanning's web universe).
Thought I'd like to share this with you,
best regards,
Martin
Martin Schultz Max-Planck-Institut fuer Meteorologie
             Bundesstr. 55, 20146 Hamburg
[[
             phone: +49 40 41173-308
[[
                                             [[
            fax: +49 40 441787
                                          [[
[[
   martin.schultz@dkrz.de
[[
                                           [[
--=-= nRxTCCITGsD7YuS/WxuYofYfu__=-=-=
Content-Type: text/plain
Content-Disposition: attachment; filename="axlabel.pro"
: $Id$
;+
NAME:
    AXLABEL
```

PURPOSE:

Put previously calculated axis labels onto the screen at proper position. This routine was designed to work together with LOGLEVELS to produce fancy log plots. It involves several coordinate transformations in order to be device independent and take into account the character size. The user can specify a label format and use 'external' formatting functions similar to the [XYZ]TICKFORMAT keyword of PLOT.

CATEGORY:

Plotting

CALLING SEQUENCE:

AXLABEL, Value [,/XAxis] [,keywords]

INPUTS:

VALUE -> A vector with the values to be labelled on the axis.

KEYWORD PARAMETERS:

/XAxis -> If set, the labels are placed on the X achis rather than on the Y axis

/YAxis -> Place the labels on the Y axis (this is the default, and this keyword is there for purely aesthetic reasons)

CHARSIZE -> The character size of the label

FORMAT -> An IDL format string (used as argument to the STRING function) or the name of a function that returns formatted labels. This function must accept three arguments, the third of which is the current value (see the online help to [XYZ]TICKFORMAT for more details). AXLABEL always passes 0 to the first two arguments.

_EXTRA keywords are passed on to XYOUTS (e.g. COLOR or ORIENTATION). Note that the ALIGN keyword value is determined automatically.

OUTPUTS:

Axis labels without fuss.

SUBROUTINES:

None.

REQUIREMENTS:

```
A DATA coordinate system must be established by a previous
     PLOT command.
 NOTES:
     AXLABEL currently operates only on the left and bottom axes.
 EXAMPLE:
 MODIFICATION HISTORY:
     mgs, 10 Sep 1999: VERSION 1.00
 Copyright (C) 1999, Martin Schultz, Max-Planck-Institut f. Meteorologie
 This software is provided as is without any warranty
whatsoever. It may be freely used, copied or distributed
for non-commercial purposes. This copyright notice must be
kept with any copy of this software. If this software shall
; be used commercially or sold as part of a larger package,
please contact the author.
; Bugs and comments should be directed to martin.schultz@dkrz.de
with subject "IDL routine axlabel"
pro axlabel, value, Charsize=Charsize, XAxis=XAxis, YAxis=YAxis, $
    Format=Format,_EXTRA=e
; Lblv = LOGLEVELS([mind,maxd])
; PLOT,X,Y,/YLOG,YTICKFORMAT='(A1)'
 ; Error catching
 if (N_Elements(VALUE) eq 0) then begin
   message, Must supply a label value to AXLABEL!'
 endif
 : Set default for CHARSIZE and FORMAT
 if (n_elements(CHARSIZE) EQ 0) then $
   CHARSIZE = 1.
 if (n_elements(FORMAT) EQ 0) then $
   FORMAT = '(f8.1)'
 if (keyword_set(XAxis)) then begin
   ; Get y position for label
   : Subtract one character size
   PY = !Y.Window[0]
   PYOFF = CONVERT COORD(1,!D.Y CH SIZE*CHARSIZE,/DEVICE,/TO NORMAL)
   PY = PY - 1.05*PYOFF[1]
```

```
PY = REPLICATE(PY,N Elements(VALUE))
   ; Convert data values to normalized x coordinates
   PX = CONVERT_COORD(VALUE, REPLICATE(!Y.CRange[0], N_Elements(VALUE)), $
              /DATA,/TO NORMAL)
   PX = PX[0,*]
 endif else begin ; Y axis label (default)
   ; Get x position for label
   PX = !X.Window[0] - 0.010
   PX = REPLICATE(PX,N Elements(VALUE))
   : Convert data values to normalized coordinates and
   ; subtract half the character size
   PYOFF = CONVERT_COORD(0,!D.Y_CH_SIZE*CHARSIZE,/DEVICE,/TO_NORMAL)
   PY = CONVERT COORD(REPLICATE(!X.CRANGE[0],N Elements(VALUE)),VALUE, $
              /DATA,/TO NORMAL)
   PY = PY[1,*]-0.5*PYOFF[1]
 endelse
 ; Format VALUE according to format string. If this string
 ; does not begin with '(', it is assumed that the user has passed
 : a formatting function as for [XYZ]TICKFORMAT
 ; However, only the third (NUMBER) argument of this function is used
 if (STRPOS(FORMAT, '(') ne 0) then begin
   ValS = STRARR(N_Elements(VALUE))
   for j=0,N Elements(VALUE)-1 do $
     ValS[i] = CALL FUNCTION(FORMAT,0,0,VALUE[i])
              ; apply format string directly
 endif else $
   ValS = STRING(VALUE, format=FORMAT)
 ValS = STRTRIM(ValS,2)
 XYOUTS,PX,PY,ValS,/NORMAL,align=1.-0.5*keyword_set(XAxis), $
   charsize=CHARSIZE, EXTRA=e
 return
end
--=-=_nRxTCCITGsD7YuS/WxuYofYfu__=-=-=
Content-Type: text/plain
Content-Disposition: attachment; filename="loglevels.pro"
; $Id: loglevels.pro,v 1.2 1999/03/24 04:30:05 mgs Exp $
;+
```

: NAME:

LOGLEVELS (function)

PURPOSE:

Compute default values for logarithmic axis labeling or contour levels. For a range from 1 to 100 these would be 1., 2., 5., 10., 20., 50., 100. If the range spans more than (usually) 3 decades, only decadal values will be returned unless the /FINE keyword is set.

CATEGORY:

Tools

CALLING SEQUENCE:

result = LOGLEVELS([range | MIN=min,MAX=max] [,/FINE] [,COARSE=dec])

INPUTS:

RANGE -> A 2-element vector with the minimum and maximum value to be returned. Only levels _within_ this range will be returned. If RANGE contains only one element, this is interpreted as MAX and MIN will be assumed as 3 decades smaller. RANGE superseeds the MIN and MAX keywords. Note that RANGE must be positive definite but can be given in descending order in which case the labels will be reversed.

KEYWORD PARAMETERS:

MIN, MAX -> alternative way of specifying a RANGE. If only one keyword is given, the other one is computed as 3 decades smaller/larger than the given parameter. RANGE superseeds MIN and MAX.

/FINE -> always return finer levels (1,2,5,...)

COARSE -> the maximum number of decades for which LOGLEVELS shall return fine labels. Default is 3. (non-integer values are possible).

OUTPUTS:

A vector with "round" logarithmic values within the given range. The original (or modified) RANGE will be returned unchanged if RANGE does not span at least one label interval. The result will always contain at least two elements.

SUBROUTINES:

none

REQUIREMENTS:

none

NOTES:

If COARSE is It 0, the nearest decades will be returned instead. The result will always have at least two elements. If COARSE forces decades, the result values may be out-of-range if RANGE spans less than a decade.

Caution with type conversion from FLOAT to DOUBLE!!

EXAMPLE:

range = [min(data), max(data)]
c_level = LOGLEVELS(range)
contour,...,c_level=c_level

MODIFICATION HISTORY:

mgs, 17 Mar 1999: VERSION 1.00

; Copyright (C) 1999, Martin Schultz, Harvard University ; This software is provided as is without any warranty ; whatsoever. It may be freely used, copied or distributed ; for non-commercial purposes. This copyright notice must be ; kept with any copy of this software. If this software shall ; be used commercially or sold as part of a larger package, ; please contact the author to arrange payment. ; Bugs and comments should be directed to mgs@io.harvard.edu ; with subject "IDL routine loglevels"

function loglevels,range,min=mind,max=maxd, \$ coarse=coarse,fine=fine

if (n_elements(COARSE) eq 0) then COARSE = 3

; Make sure to have a valid range which is positive definite ; NOTE that range does not need to be sorted! if (n_elements(mind) gt 0) then begin mind = mind[0] if (n_elements(maxd) eq 0) then maxd = mind*1000. endif if (n_elements(maxd) gt 0) then begin maxd = maxd[0]

```
if (n elements(mind) eq 0) then mind = maxd*0.001
 endif
 ; still not defined, I.e. neither mind nor maxd given
 if (n_elements(mind) eq 0) then begin
   mind = 0.1
   maxd = 100.
 endif
 ; RANGE superseeds min and max
 if (n elements(range) eq 0) then range = [ mind, maxd ]
 ; one element for RANGE is interpreted as MAX
 if (n_elements(range) eq 1) then range = [ range*0.001, range ]
 thisrange = double(range) > 1.D-100
 thisrange = thisrange(sort(thisrange))
 ; set lower range to 3 decades below upper range if it is zero
 if (thisrange[0] It 1.D-36) then thisrange[0] = thisrange[1]/1000.
 ; get log of ranges and decadal log
 Irange = alog10(thisrange)
 if (Irange[0] | t 0.) then Irange[0] = Irange[0] - 1.0D-6
 if (lrange[1] It 0.) then lrange[1] = lrange[1] - 1.0D-6
if (lrange[1] gt 0.) then lrange[1] = lrange[1] + 1.0D-6
 drange = fix(Irange)
 ; create label arrays to choose from
 ; currently 1.D-15 to 5.D+16
 ; ranges outside these limits always return only decades
 ; set mode according to following rules:
 ; - range outside limits -> return decades
 ; - coarse exceeded -> return decades
 ; - /fine set -> return 1,2,5,... for any number of decades
 : - [automatic] -> return decades if more than COARSE decades
            otherwise 1,2,5,...
 mode = 0 ; return decades
 if (keyword set(fine)) then mode = 1
 if ((lrange[1]-lrange[0]) le COARSE) then mode = 1
 if (thisrange[0] It 1.D-15 OR thisrange[1] gt 5.D16) then mode = 0
 if (mode) then begin
   : make overall array
   labels = [1.D-15, 2.D-15, 5.D-15, 1.D-14, 2.D-14, 5.D-14, $
          1.D-13, 2.D-13, 5.D-13, 1.D-12, 2.D-12, 5.D-12, $
          1.D-11, 2.D-11, 5.D-11, 1.D-10, 2.D-10, 5.D-10, $
```

```
1.D-09, 2.D-09, 5.D-09, 1.D-08, 2.D-08, 5.D-08, $
         1.D-07, 2.D-07, 5.D-07, 1.D-06, 2.D-06, 5.D-06, $
         1.D-05, 2.D-05, 5.D-05, 1.D-04, 2.D-04, 5.D-04, $
         1.D-03, 2.D-03, 5.D-03, 1.D-02, 2.D-02, 5.D-02, $
         1.D-01, 2.D-01, 5.D-01, 1.D+00, 2.D+00, 5.D+00 ]
 labels = [ labels, $
        1.D+01, 2.D+01, 5.D+01, 1.D+02, 2.D+02, 5.D+02, $
         1.D+03, 2.D+03, 5.D+03, 1.D+04, 2.D+04, 5.D+04, $
         1.D+05, 2.D+05, 5.D+05, 1.D+06, 2.D+06, 5.D+06, $
         1.D+07, 2.D+07, 5.D+07, 1.D+08, 2.D+08, 5.D+08, $
         1.D+09, 2.D+09, 5.D+09, 1.D+10, 2.D+10, 5.D+10, $
         1.D+11, 2.D+11, 5.D+11, 1.D+12, 2.D+12, 5.D+12, $
         1.D+13, 2.D+13, 5.D+13, 1.D+14, 2.D+14, 5.D+14, $
         1.D+15, 2.D+15, 5.D+15, 1.D+16, 2.D+16, 5.D+16]
  llabels = alog10(labels)
  ind = where(llabels ge lrange[0] AND llabels le lrange[1])
  ; if range values are too close, return original range
  if (ind[0] It 0) then return, range
  ; return reversed labels if range[0] gt range[1]
  if (range[0] gt range[1]) then $
    return,reverse(labels[min(ind):max(ind)]) $
  else $
    return, labels[min(ind):max(ind)]
endif else begin
 if (lrange[1] lt 0.) then drange[1] = drange[1] - 1
 exponent = indgen(drange[1]-drange[0]+1)+drange[0]
 if (n_elements(exponent) eq 1) then $
   exponent = [exponent, exponent+1]
 if (range[0] gt range[1]) then $
   return,reverse(10.D0\(^\)exponent) \( \$
 else $
   return, 10. D0^exponent
endelse
```

Subject: Re: how to label minor tick marks on a log axis??? Posted by davidf on Thu, 08 Mar 2001 23:02:26 GMT

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end

Pavel A. Romashkin (pavel.romashkin@noaa.gov) writes:

> P.S. I guess I tried to say that I wish some things were easier to do in IDL.

Yeah, I've been using it to try and improve my backhand, and it's worthless. :-(

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: how to label minor tick marks on a log axis??? Posted by Paul van Delst on Fri, 09 Mar 2001 15:12:18 GMT

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David Fanning wrote:

>

> Paul van Delst (paul.vandelst@noaa.gov) writes:

>

- >> Sorry for the twenty questions today but how does one go about labeling the minor tick
- >> marks on a log axis (or a linear one for that matter)? Does such a simple thing require
- >> use of XYOUTS? I've been futzing about with the X/YTICKS keywords which does the job but
- >> makes the resulting axis spacings linear! MAN!

>

- > Here's a copy of an old newsgroup article by Martin that
- > hasn't made it to my web page yet:

David (and Martin),

Thanks, this is exactly what I wanted. Unfortunately my joy was short-lived when I couldn't figure out how to shift the y-axis title over enough not to overwrite my new fancy tick labels. Sigh. (Or, how come there's no X|Y|ZTITLE_OFFSET keyword to PLOT to account for X|Y|ZTICKFORMAT='(a1)'?) Do you (or Martin?) have something in your bag-o-tricks to do this? I looked at Martin's and your IDL webpage but didn't see anything. The thought of having to futz about with CONVERT_COORD and XYOUTS to allow simple shifting of an axis title makes me want to1.2.3.4.5....10 I better go and get some coffee.

I think the curmudgeon factor that Craig Markwardt has mentioned in the past is starting to affect me.... :o(

thanx again,

paulv

--

Paul van Delst A little learning is a dangerous thing;

CIMSS @ NOAA/NCEP Drink deep, or taste not the Pierian spring;

Ph: (301)763-8000 x7274 There shallow draughts intoxicate the brain,

Fax:(301)763-8545 And drinking largely sobers us again.

paul.vandelst@noaa.gov Alexander Pope.

Subject: Re: how to label minor tick marks on a log axis??? Posted by davidf on Fri, 09 Mar 2001 15:37:29 GMT

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Paul van Delst (paul.vandelst@noaa.gov) writes:

- > Thanks, this is exactly what I wanted. Unfortunately my joy was short-lived when I
- > couldn't figure out how to shift the y-axis title over enough not to overwrite my new
- > fancy tick labels. Sigh. (Or, how come there's no X|Y|ZTITLE OFFSET keyword to PLOT to
- > account for X|Y|ZTICKFORMAT='(a1)'?) Do you (or Martin?) have something in your
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- > anything. The thought of having to futz about with CONVERT_COORD and XYOUTS to allow
- > simple shifting of an axis title makes me want to1.2.3.4.5....10 I better go and get
- > some coffee.

Uh, normally we position the plot in the window with the POSITION keyword. :-)

- > I think the curmudgeon factor that Craig Markwardt has mentioned in the past is starting
- > to affect me.... :o(

Probably. :-)

You might be happy to know that Martin and I will soon be releasing some software (for free!) that might make all of this easier. We have a PlotConfig program that is similar to PSConfig. It allows the user to configure plot options without having to muck around with keywords.

I have to get off my kiester and write some documentation, and then I have to block off three weeks to answer e-mail and change everything about it at the request of people brave enough to use it (it is an object, of course), but I think it will be *slightly* better than that program Pavel offered yesterday. :-)

Cheers,

David

--

David Fanning, Ph.D.

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Subject: Re: how to label minor tick marks on a log axis??? Posted by Paul van Delst on Fri, 09 Mar 2001 16:01:27 GMT

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David Fanning wrote:

>

> Paul van Delst (paul.vandelst@noaa.gov) writes:

>

- >> Thanks, this is exactly what I wanted. Unfortunately my joy was short-lived when I
- >> couldn't figure out how to shift the y-axis title over enough not to overwrite my new
- >> fancy tick labels. Sigh. (Or, how come there's no X|Y|ZTITLE_OFFSET keyword to PLOT to
- >> account for X|Y|ZTICKFORMAT='(a1)'?) Do you (or Martin?) have something in your
- >> bag-o-tricks to do this? I looked at Martin's and your IDL webpage but didn't see
- >> anything. The thought of having to futz about with CONVERT_COORD and XYOUTS to allow
- >> simple shifting of an axis title makes me want to1.2.3.4.5....10 I better go and get
- >> some coffee.

>

- > Uh, normally we position the plot in the window with
- > the POSITION keyword. :-)

Yeah, well, I put use of the POSITION keyword in the same bucket as the rest of the above. The last thing I want to do is to have to position multiple plots on the page separately simply to make the y-axis label readable.

- >> I think the curmudgeon factor that Craig Markwardt has mentioned in the past is starting
- >> to affect me.... :o(

>

> Probably. :-)

Definitely.

- > You might be happy to know that Martin and I will soon be
- > releasing some software (for free!) that might make all of
- > this easier. We have a PlotConfig program that is similar

- > to PSConfig. It allows the user to configure plot options
- > without having to muck around with keywords.

I don't mind keywords - in fact I prefer them to GUI's. The less my fingers have to move from the keyboard, the better my right elbow likes it. It's when there isn't a keyword to do something simple that the mucking about comes into play.

thanx again.

paulv

--

Paul van Delst A little learning is a dangerous thing;

CIMSS @ NOAA/NCEP Drink deep, or taste not the Pierian spring;

Ph: (301)763-8000 x7274 There shallow draughts intoxicate the brain,

Fax:(301)763-8545 And drinking largely sobers us again.

paul.vandelst@noaa.gov Alexander Pope.

Subject: Re: how to label minor tick marks on a log axis??? Posted by Pavel A. Romashkin on Fri, 09 Mar 2001 16:38:44 GMT View Forum Message <> Reply to Message

David Fanning wrote:

- > I think it will be *slightly* better than that program
- > Pavel offered yesterday. :-)

David, I thought I asked you not to look at it!

Oh well. Al least, my using the condemned platform takes me off the hook for writing poor programs. Should have put it on an FTP site, for easy deletion, instead of attaching to the post :-(

Pavel

Subject: Re: how to label minor tick marks on a log axis??? Posted by davidf on Fri, 09 Mar 2001 17:02:36 GMT

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Paul van Delst (paul.vandelst@noaa.gov) is still ranting when he writes:

- > Yeah, well, I put use of the POSITION keyword in the same bucket as the rest of the above.
- > The last thing I want to do is to have to position multiple plots on the page separately
- > simply to make the y-axis label readable.

I think we could probably both agree that aesthetics is not really RSI's thing. :-)

Cheers,

David

P.S. Let's just say that like any good spiritual practice, IDL has its high and low moments.

--

David Fanning, Ph.D.

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Subject: Re: how to label minor tick marks on a log axis??? Posted by John-David T. Smith on Fri, 09 Mar 2001 23:43:48 GMT View Forum Message <> Reply to Message

"Pavel A. Romashkin" wrote:

> Oh well. Al least, my using the condemned platform ...

Take heart:

http://www.rsinc.com/AppProfile/idl_Motorola.cfm

and I quote:

"The Macintosh is now our fastest platform for basic binary operations on arrays in IDL. That is quite a statement"

Now, about that OSX command line version...

JD

Subject: Re: how to label minor tick marks on a log axis??? Posted by robert.m.candey.1[2] on Tue, 13 Mar 2001 20:05:57 GMT View Forum Message <> Reply to Message

In article <3AA8F2D2.A614462D@noaa.gov>, Paul van Delst <paul.vandelst@noaa.gov> wrote:

> David Fanning wrote:

```
>>
>> Paul van Delst (paul.vandelst@noaa.gov) writes:
>>
>>> Sorry for the twenty questions today but how does one go about labeling
>>> the minor tick marks on a log axis (or a linear one for that matter)?
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>>
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> Thanks, this is exactly what I wanted. Unfortunately my joy was short-lived
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> PLOT to account for X|Y|ZTICKFORMAT='(a1)'?) Do you (or Martin?) have something in
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> allow simple shifting of an axis title makes me want to ....1.2.3.4.5....10 I better
> go and get some coffee.
> I think the curmudgeon factor that Craig Markwardt has mentioned in the past
> is starting to affect me.... :o(
>
> thanx again,
> paulv
```

One way to open the left margin for all plots using !p.multi is to set !x.omargin=[5,0] or so. This is outside margin and adds to !x.margin.

In addition, I have a little routine for writing the titles with their own font size and color, attached below (please send improvements). We use Martin Schultz's code for minor ticks (see <ftp://cdaweb.gsfc.nasa.gov/pub/CDAWlib/source/>) and I have continued to bug RSI to add labeling minor ticks on log plots with scales less than 2 decades or so.

Robert.M.Candey@gsfc.nasa.gov 1-301-286-6707 (286-1771 fax) NASA Goddard Space Flight Center, Code 632 Greenbelt, MD 20771 USA http://nssdc.gsfc.nasa.gov/personnel/rcandey/

pro plotLabel, title, yaxis=yaxis, xaxis=xaxis, color=color, font=font, \$ charsize=charsize, thickness=thickness; Robert.M.Candey.1@gsfc.nasa.gov, 1995 June 21

```
; 1995 July 26, BC changed font sizing
; print label on Y axis or X axis; use instead of ytitle to get control
     over font, font size and color
 main problem is lack of knowledge of how big tick labels are
; title:
                text to print as title of an axis (required)
                    0 for left Y axis, 1 for right (default=0)
; vaxis=vaxis:
                    0 for bottom X axis, 1 for top (default=none)
: xaxis=xaxis:
                    text character color index (default=!p.color)
: color=color:
; charsize=charsize: text character size (default=1.0)
                  text character font (default=-1 for Hershey fonts)
: font=font:
; thickness=thickness: text character thickness (default=1.0)
if n_elements(color) eq 0 then color = !p.color
if n_elements(font) eq 0 then font = !p.font
ticklength = 0.0
tickLabelsize = 1.0
if n elements(charsize) eq 0 then begin
 charsize = 1.0
 if !p.charsize qt 0 then charsize = !p.charsize
 if !p.charsize qt 0 then tickLabelsize = !p.charsize
 if !p.ticklen It 0 then tickLength = !p.ticklen
 if n_elements(xaxis) ne 0 then begin; x axis label
  if !x.charsize gt 0 then charsize = !x.charsize * charSize
  if !x.charsize qt 0 then tickLabelsize = !x.charsize * tickLabelsize
  if !x.ticklen It 0 then tickLength = !x.ticklen; override p.ticklen
 endif else begin; y axis label
  if !y.charsize gt 0 then charsize = !y.charsize * charSize
  if !y.charsize gt 0 then tickLabelsize = !y.charsize * tickLabelsize
  if !y.ticklen It 0 then tickLength = !y.ticklen; override p.ticklen
 endelse
endif
;if n_elements(charsize) eq 0 then charsize = 1.0
if n elements(thickness) eq 0 then $
 if !p.charthick gt 0 then thickness = !p.charthick else thickness = 1.0
if n_elements(xaxis) ne 0 then begin; xaxis label
 Xmid = (!x.window(1) - !x.window(0)) / 2. + !x.window(0)
 if xaxis eq 1 then begin; top label
  ticklabelLen = 0.5 < (!y.omargin(1) + !y.margin(1)); characters
  maxTside = (1.0 - (!d.x_ch_size * charsize * 1.1)/!d.y_size) < 1.0
  Tside = (!y.window(1) + ticklength + \$)
   (!d.y_ch_size * tickLabelsize * tickLabelLen)/!d.y_size ) < maxTside
  xyouts, Xmid, Tside, title, alignment=0.5, charsize=charsize, $
     orientation=0, font=font, color=color, /normal
 endif else begin; bottom label
```

```
ticklabelLen = 2.5 < (!y.omargin(0) + !y.margin(0)); characters
  minBside = ((!d.x_ch_size * charsize * 1.1)/!d.y_size) > 0.0
  minBside = 0.01
  Bside = (!y.window(0) - ticklength - $
   (!d.y_ch_size * tickLabelsize * tickLabelLen)/!d.y_size ) > minBside
  xyouts, Xmid, Bside, title, alignment=0.5, charsize=charsize, $
     orientation=0, font=font, color=color, /normal
 endelse
endif else begin ; yaxis label
 Ymid = (!y.window(1) - !y.window(0)) / 2. + !y.window(0)
 if n_elements(yaxis) ne 0 then if yaxis eq 1 then begin; right label
  ticklabelLen = 1.5 < (!x.omargin(1) + !x.margin(1)); characters
  maxRside = (1.0 - (!d.y_ch_size * charsize * 1.1)/!d.x_size) < 1.0
  Rside = (!x.window(1) + ticklength + \$)
   (!d.x_ch_size * tickLabelsize * tickLabelLen)/!d.x_size ) < maxRside
  xyouts, Rside, Ymid, title, alignment=0.5, charsize=charsize, $
     orientation=90, font=font, color=color, /normal
     orientation=270, font=font, color=color, /normal
 endif else begin ; left label
  ticklabelLen = 6.5 < (!x.omargin(0) + !x.margin(0)); characters
  minLside = ((!d.y_ch_size * charsize * 1.1)/!d.x_size) > 0.0
  Lside = (!x.window(0) - ticklength - $
   (!d.x ch size * tickLabelsize * tickLabelLen)/!d.x size ) > minLside
  xyouts, Lside, Ymid, title, alignment=0.5, charsize=charsize, $
     orientation=90, font=font, color=color, /normal
 endelse
endelse
return
end; plotlabel
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```