
Subject: Re: What exactly does the command "stretch" do to the colormap?

Posted by [ICBM0926](#) on Mon, 13 Apr 2009 08:49:15 GMT

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Dear David

Thanks for your reply. What I am trying to do is to write a procedure which is a part of my analysis procedures which is used to analysis simulation dumped data in HDF5 format.

I try to make it user friendly, so user only needs to call these procedures with certain parameters and then they get what they want. One of the features is that user can set "dynamical range" of their colored contour plot.

I've written a procedures to creat colored contour. Before the fielddata ("field" array) is sent into this procedures, it goes through following loop to make sure the data within the dynamical range.

```
if fieldarrsize[0] eq 2 then begin
  if n_elements(dyrange) ne 0 then begin
    for j=0 ,nx1-1L do begin
      for i=0 ,nx0-1L do begin
        if field(i,j) GT dyrange[1] then begin
          field(i,j)=dyrange[1]
        endif else if field(i,j) LT dyrange[0] then begin
          field(i,j)=dyrange[0]
        endif
      endfor
    endfor
  endif
endif
endif
```

After this loop, the fielddata is sent into "my_vp_fieldtvscl.pro".

That procedure is used to creat colored contour. What I am trying to accomplish through "stretch" is to make sure the consistency between colorbar and colored contour of fielddata. The following code is "my_vp_fieldtvscl.pro".

```
=====
;*****
;T.H.Hshieh IAMS
;This program is to plot field data with TVSCL.
;20090205
;*****
pro my_vp_fieldtvscl,fielddata, x0axis, x1axis, x0_label=x0_label,
x1_label=x1_label, ct=ct, invct=invct, cbby_title=cbby_title,
title_str=title_str, psoutfilename=psoutfilename, $
  cbby_ticknum=cbby_ticknum, dyrange=dyrange, time=time

if n_elements(x0_label) eq 0 then x0_label='x0'
if n_elements(x1_label) eq 0 then x1_label='x1'
```

```

if n_elements(cbby_title) eq 0 then cbby_title='colorbar'
if n_elements(dyrange) eq 0 then begin
  cbrange=dblarr(2)
  cbrange(0)=min(fielddata)
  cbrange(1)=max(fielddata)
endif else begin
  cbrange=dyrange
endelse
if n_elements(cbby_ticknum) eq 0 then begin
  cbby_ticknum=4
endif
print,"cbby_ticknum",cbby_ticknum
!P.TITLE = title_str
;=====plot parameter=====
x0_charsize=1.2
x1_charsize=1.2
p_charthick=6
line_thick=6
x0_ticklen=0.06
x1_ticklen=0.06
ict=ct
ist_low=0
ist_high=255
;*****position*****
x0_size=30
x1_size=30/1.6803
x0_offset=1
x1_offset=5
;*****colorcon position*****
px1=0.69
py1=0.8
px0=0.2
py0=py1-(4.8*(px1-px0)*1.6803)/7
print,'py0=',py0
;*****color bar position*****
cbx0=0.70
cby0=py0
cbx1=0.74
cby1=py1
;*****Other parameters*****
!P.Multi=[0,1,1]
!x.style=1
!y.style=1
!x.charsize=x0_charsize
!y.charsize=x1_charsize
!p.charthick = p_charthick
!x.thick=line_thick
!y.thick=line_thick

```

```

!p.font=0
;=====max & min=====
x0_min=min(x0axis)
x0_max=max(x0axis)
x0_ticks=5.
x0_minor=5.
x0_interval=(max(x0axis)-min(x0axis))/x0_ticks
x1_min=min(x1axis)
x1_max=max(x1axis)
x1_ticks=5.
x1_minor=5.
colorbar_ticklen=0.2
colorbar_minor=5
;=====
;title
cbby_title=cbby_title
colorbar_max=cbrange(1)
colorbar_min=cbrange(0)

;-----setting color bar array-----
cb_arr=dblarr(1,256)
dcb=(colorbar_max-colorbar_min)/(256.-1.)
cb_arr(0,0)=colorbar_min
for i=1,256-1 do begin
cb_arr(0,i)=cb_arr(0,i-1)+dcb
endfor
; rendering to screen is done. here we render to ps file
set_plot, 'ps'
device,/color,SET_FONT='Helvetica'
device, filename=psoutfilename, /color,
bits_per_pixel=8 ,SET_FONT='Helvetica' $
,xsize=x0_size, ysize=x1_size, xoffset=x0_offset, yoffset=x1_offset,/
portrait
!p.charsize=1.6
;plot data
plot , [x0_min,x0_max],[x1_min,x1_max], /nodata, /noerase $
, position=[px0,py0,px1,py1] $
, xstyle=5, ystyle=5,title="
LoadCT, ict
;*****
;in order to prevent from the incorrect color bar label.
;The color table must be redefined by "strech".
;*****
if (max(fielddata) LT cbrange(1)) or (min(fielddata) GT cbrange(0))
then begin
data_ist_high=ist_high+(cbrange(1)-max(fielddata))/(max(fielddata)-min
(fielddata))*double(n_elements(cb_arr))
data_ist_high=round(data_ist_high)

```

```

print,'data_ist_high=',data_ist_high
data_ist_low=ist_low-(min(fielddata)-cbrange(0))/(max(fielddata)-min
(fielddata))*double(n_elements(cb_arr))
data_ist_low=round(data_ist_low)
print,'data_ist_low=', data_ist_low
endif else begin
data_ist_high=ist_high
data_ist_low=ist_low
endelse
stretch ,data_ist_low,data_ist_high
if n_elements(invct) ne 0 then stretch ,data_ist_high,data_ist_low
xsize=(px1-px0)* !D.X_VSize
ysize=(py1-py0)* !D.Y_VSize
xstart=px0* !D.X_VSize
ystart=py0* !D.Y_VSize
TVScl, fielddata, xstart,ystart,XSize=xsize,YSize=ysize
LoadCT,0 ; reset color table
stretch, 0,255
yticksv=dindgen(x1_ticks)*(max(x1axis)-min(x1axis))/x1_ticks + min
(x1axis)
;plot x0 axis

axis, x0_min, x1_min, xaxis=0 $
, xtitle=x0_label $
, xticks=x0_ticks, xminor=x0_minor, ticklen=x0_ticklen
;plot x1 axis
axis, x0_min, x1_min, yaxis=0 $
, ytitle=x1_label $
, yticks=x1_ticks $
, yminor=x1_minor $
, ticklen=x1_ticklen
if n_elements(time) ne 0 then begin
string_temp = 'T='+string(time)+'(s)'
string_temp = strcompress(string_temp,/remove_all)
XYOUTS, 0.1,0.9, string_temp, CHARSIZE=1.5,CHARTHICK=3, /normal
endif
;-----plot remainings-----

;plot color bar
plot ,[0.,1.],[colorbar_min,colorbar_max], /nodata, /noerase $
, position=[cbx0,cby0,cbx1,cby1] $
, xstyle=5,ystyle=5,title="

LoadCT, ict
stretch ,ist_low,ist_high
if n_elements(invct) ne 0 then stretch ,ist_high,ist_low
print,'data_ist_low',data_ist_low
print,'data_ist_high',data_ist_high

```

```

xsize=(cbx1-cbx0)* !D.X_VSize
ysize=(cby1-cby0)* !D.Y_VSize
xstart=cbx0* !D.X_VSize
ystart=cby0* !D.Y_VSize

```

```

TVSCL , cb_arr,xstart,ystart,XSize=xsize,YSize=ysize

```

```

LoadCT, 0
stretch ,0,255
;-----plot y axis-----
axis,1.,colorbar_min,yaxis=1 $
,ticklen=colorbar_ticklen $
,ytitle=cbby_title $
,yticks=cbby_ticknum $
,yminor=colorbar_minor

;-----

; here rendering to file is done. set back to screen defaults
device, /close
print,'Outputfile=', psoutfilename , ' done!'
end
=====

```

Clearly in the above code, I use "dyrange" (Dynamical range, a 2-element factor contains (min,max) of desired data value range.) as colorbar label. But the fielddata can be $\min(\text{fielddata}) > \text{dyrange}(0)$ or $\max(\text{fielddata}) < \text{dyrange}(1)$.

I use "stretch" to make sure the consistency between colorbar and fielddata colored contour. The output plots seems right. I just tried to make sure what i am doing is right.

The colored contour in your web page is plotted by contour command. I remember that that command can only be used for levels < 60. That's why I use TVSCL instead of contour.

Thanks for your references anyway

Best regard
