

```

; **** IDL_2dtv_bar.pro *** Ling-Hsiao Lyu 04/22/2009
;
;=====
fn00='Jz'
;fn00='Ez'
;fn00='By'
; save,time,lx,ly,ax,ay,data,fn0f,filename=fn00+'2D.save'
restore,fn00+'2D.save'

myfttitle='!8J!Dz!N/J!D0!N  time='+string(format='(f4.1)',time)
;myfttitle='!8E!Dz!N/J!D0!N  time='+string(format='(f4.1)',time)
;myfttitle='!8B!Dy!N/J!D0!N  time='+string(format='(f4.1)',time)

;=====
; Set up Device
;
; !P.FONT=0
set_plot,'ps'
;
; device default length unit is centimeter
; define page size to be A4 size: 21cm x 29 cm
; one must define bits_per_pixel=8
; otherwise, default bits_per_pixel=4, result in poor gray level image
; ****The option xoffset=0.,yoffset=0. is a necessary option****(err1)
;
xpage=21 & ypage=29
device,xsize=xpage,ysize=ypage, xoffset=0.,yoffset=0.,bits_per_pixel=8
;,/centimeters ; this is the default device length unit
;device,/color ;if loadct,ict >0
;device,/HELVETICA,/BOLD ;if without !P.FONT=0, this statement is useless
;
fnps=fn00+'_IDL_2dtv_bar.ps'
device,file=fnps
myxttitle='!8x/x!D0!N'
myyttitle='!8y/x!D0!N'
maintitle=myfttitle
;=====
print,'device size in cm (xpage,ypage)=' ,xpage, ypage
;
; real size: for TVSc1
;
wx=10. & wy=10. ;pre-set wx and wy to be real number
;print,'enter wx, wy (image size in cm, e.g., 10, 15)'
;read,wx,wy
;
nbar=20
wbar=wx/nbar
;
xedge=(xpage-wx-2*wbar)*0.5
xbedge=xedge+wx+wbar
yedge=(ypage-wy)*0.5
;
; normalized size: for plot
;
xl=wx/xpage & xorg=xedge/xpage
yl=wy/ypage & yorg=yedge/ypage
xlbar=wbar/xpage
x0=xorg & x1=x0+xl & x2=x1+xlbar & x3=x2+xlbar
y0=yorg & y1=y0+yl & y2=y0 & y3=y1
;

```

```

;=====
;ict=0
ict=33
;print,'enter ict (e.g., 0 for gray level, or 33 for color level)'
;read,ict
if ict gt 0 then device,/color ; for loadct,ict>0
LoadCT,ict
;
ist_low=0 & ist_high=255
;ist_low=255 & ist_high=0
;read, ist_low, ist_high
stretch,ist_low,ist_high
;=====
lxmin=1 & lxmax=lx & ymin=1 & ymax=ly
;lxmin=? & lxmax=? & ymin=? & ymax=?
;print,'enter lxmin, lxmax, ymin, ymax, (e.g., 1,','lx','1','ly,')'
;read, lxmin, lxmax, ymin, ymax
lxplot=lxmax-lxmin+1 & xmin=ax(lxmin-1) & xmax=ax(lxmax-1)
lyplot=ymax-lymin+1 & ymin=ay(lymin-1) & ymax=ay(lymax-1)

data2d=fltarr(lxplot,lyplot,/nozero)
; build data2d
for ii=0,lxplot-1 do begin &$
for jj=0,lyplot-1 do begin &$
  i=ii+lxmin-1 & j=jj+lymin-1 & data2d(ii:ii,jj:jj)=data(i:i,j:j) &$
endfor &$
endfor
;
;=====
; find fmin, fmax
fmax=max(data2d)
fmin=min(data2d)
print,'fmin,fmax=',fmin,fmax
;
; *****Change fmin, fmax*****
;
;print,'enter new fmin_new,fmax_new'
;read, fmin_new,fmax_new
;
; increase the range of (fmin,fmax): for fixed color level in animation
;
;if fmin_new lt fmin then data2d(0:0,0:0)=fmin_new
;if fmax_new gt fmax then data2d(0:0,1:1)=fmax_new
;
; reduce the range of (fmin,fmax):
; to see the detail fine structures in the range of (fmin,fmax)
;
;if fmin_new gt fmin then begin &$
;for ii=0,lxplot-1 do begin &$
;for jj=0,lyplot-1 do begin &$
; if data2d(ii:ii,jj:jj) lt fmin_new then data2d(ii:ii,jj:jj)=fmin_new &$
;; if data2d(ii:ii,jj:jj) gt fmax_new then data2d(ii:ii,jj:jj)=fmax_new &$
;endfor &$
;endfor &$
;endif
;
;if fmax_new lt fmax then begin &$
;for ii=0,lxplot-1 do begin &$
;for jj=0,lyplot-1 do begin &$
; if data2d(ii:ii,jj:jj) gt fmax_new then data2d(ii:ii,jj:jj)=fmax_new &$

```

```

;; if data2d(ii:ii,jj:jj) gt fmax_new then data2d(ii:ii,jj:jj)=fmin_new &$
;endfor &$
;endfor &$
;endif
;fmin=fmin_new & fmax=fmax_new
;=====
; build bar2d from fmax, fmin
lxbar=2
lybar=100
bar2d=fltarr(lxbar,lybar,/nozero)
delf=(fmax-fmin)/(lybar-1)
for ii=0,lybar-1 do bar2d(*,ii:ii) = fmin+ii*delf
;=====
; *****BEGINNING OF PLOT*****
; make each plot twice
; (plot the axes one more time after the TVSCAL)
;
!P.Multi=[0,4,1] ;[nth_plot,ncolumn, nrow]
;!P.charsize=1.25 ;for one plot
!P.charsize=2.5 ;for three plots
;=====
; Define plotting area: [lower-left (x,y), upper-right (x,y)] in normalize scale
;
; ****The following plot statement should not be ignored****(err2)*
;
plot,ax,/nodata,position=[x0,y0,x1,y1],xstyle=5,ystyle=5
;
;=====
; plot image (x,y in real length)
;*****
; reduce file size
; 300 dpi * 10 inches = 3000 points
; 300 dpi * 8 inches = 2400 points
L3000=lyplot
L2400=lxplot
if L3000 gt 3000 then L3000=3000
if L2400 gt 2400 then L2400=2400
;*****
;
; rescale the floating array data2d to an image array data2d_img
; which contains L2400xL3000 pixels
; and with data value ranges from 0-255
;
data2d_img=BytScl(ConGrid(data2d,L2400,L3000))
;
; using TVScl to plot the image:
; TVScl, image_array,x,y,xsize=?,ysize=?,/real_scale
;
; where the (x,y) is the coordinate of the lower-left corner of the image
; w.r.t. the lower-left corner of the device (origin) in the real_scale;
; xsize=? and ysize=? define the real size of the image to be plotted.
;
TVScl,data2d_img,xedge,yedge,xsize=wx,ysize=wy,/centimeters
;
;=====
; plot frame again, since the frame were covered by the image.
;
plot,ax,/nodata,position=[x0,y0,x1,y1],$
back=255,color=0,thick=2,charthick=2,$

```

```

title=maintitle,xtitle='!8x/x!D0!N',ytitle='!8y/x!D0!N',$
xrange=[xmin,xmax],yrange=[ymin,ymax], xstyle=1,ystyle=1

;=====
; plot color bar
;
; ****The following plot statement can be ignored****
;   If it is ignored, you should reduce the number of plots per page
;   e.g., set !P.Multi=[0,3,1] in this example
;
plot,ax,/nodata,position=[x2,y2,x3,y3],xstyle=5,ystyle=5

bar2d_img=BytScl(ConGrid(bar2d,L2400,L3000))
TVScl,bar2d_img,xbedge,yedge,xsize=wbar,ysize=wy,/centimeters
;=====
; plot frame of color bar
;   xstyle=1+4=5 : for exact x-range and no axis will be plotted
;;   xminor=-1  : no minor tickmark
;;   xticks=1   : no major tickmark
;
; fmax0 : lower 3 points from top for 300dpi image
;
fmax0=fmin+(fmax-fmin)*(wy-0.0254)/wy
plot,[0.,1.,1.,0.,0.],[fmin,fmin,fmax0,fmax0,fmin],position=[x2,y2,x3,y3],$
  back=255,color=0,thick=2,charthick=2,$
  title='',xtitle='',ytitle='', $
  xrange=[0.,1.],yrange=[fmin,fmax],xstyle=5,ystyle=5
;
;=====
; yaxis=0      : plot y-axis on the left-hand-side boundary
; yaxis=1      : plot y-axis on the right-hand-side boundary
; yticklen=0.2 : for longer y-tickmark
;
axis,1,0,yaxis=1,charthick=2,yticklen=0.2,ytitle='', $
  xrange=[0.,1.],yrange=[fmin,fmax],ystyle=1
;   xrange=[0.,1.],yrange=[fmin,fmax] ;this gives you incorrect color-bar (err3)
;
; plot additionl subtitles using xyouts
;x=x0+0.025
;y=y1-0.025
;xyouts,x,y,subtitle,size=1.5,/normal
;=====

device,/close

exit

```