Subject: Re: find a plane in a 3D plot
Posted by Wox on Mon, 22 Sep 2008 09:15:45 GMT
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On Fri, 12 Sep 2008 09:20:43 -0700 (PDT), Nicola
<nicola.vianello@gmail.com> wrote:

> How I put the found plane on the same 3D box?

Well, I'm not sure there is an easy way, but this is what I would do:

1. The plane you have is defined by its normal n and a point p0:
n.(p-p0)=0 (. = scalar product)

2. Consider a box around your data:
p1 = 12 starting points of the lines that make the box
p2 = 12 end points of the lines that make the box

3. Find all intersections between the box-lines and the plane:
t = [n.(p0-p1)]/[n.(p2-p1)]
=> (numerator eq 0) AND (denominator eq 0) =>line in plane => t=1
=> (numerator ne 0) AND (denominator eq 0) => no intersection

intersections = p1 + t(p2-p1)
=> keep only those with 0<=t<=1

see http://local.wasp.uwa.edu.au/~pbourke/geometry/planeline/

4. Sort the resulting intersections and make an IDLgrPolygon object
with them and set alpha=0.5 for transparency. Add also an
IDLgrPolyline with the same intersection points to emphasize the plane
boarder. Make 12 IDLgrPolylines for the box.

5. Make an IDLgrPolyline with your datapoints (x,y,z) and set
linestyle=6 and use a symbol.

6. Plotting: see below. It's rather complicated, but it might be
worthwhile to learn about object graphics. In this case you need it
because of the transparent plane. If you want to use direct graphics,
check http://www.dfanning.com/tips/transparent.html

```
; ----Create App----
base=widget_base(/column)
draw=widget_draw(base,xsize=500,ysize=500,GRAPHICS_LEVEL=2)
WIDGET_CONTROL, base, /REALIZE
```

```
widget_control,draw,get_value=oWindow

; ----Create view----
myview=[-0.5,-0.5,2,2]
oView = OBJ_NEW('IDLgrView',PROJECTION=1,$
EYE=3,$ ; coord as for zclip (doesn't change anything for PROJ=1)
ZCLIP=[2.,-2.],$; normal. coord. relative to surface plot range (x, y
or z)
VIEWPLANE_RECT=myview ,$; normal. coord. relative to surface plot x
and y range
LOCATION=[0,0],dimensions=[1,1],$; Occupy whole window if units=3
units=3); 3: normalised relative to the graphics destination's rect

; ----Create model----
oTop = OBJ_NEW('IDLgrModel')
oGroup = OBJ_NEW('IDLgrModel')
oTop->Add, oGroup

; ----Create axis----
otitlefont= OBJ_NEW('IDLgrFont','times',size=8)
oticfont = OBJ_NEW('IDLgrFont','times',size=7)
if not keyword_set(xtitle) then xtitle='X'
if not keyword_set(ytitle) then ytitle='Y'
if not keyword_set(ztitle) then ztitle='Z'
oXtitle=OBJ_NEW('IDLgrText',xtitle,FONT=otitlefont,
Recompute_Dimensions=2)
oYtitle=OBJ_NEW('IDLgrText',ytitle,FONT=otitlefont,
Recompute_Dimensions=2)
oZtitle=OBJ_NEW('IDLgrText',ztitle,FONT=otitlefont,
Recompute_Dimensions=2)

ticklen=bytarr(3)
oXAxis = OBJ_NEW('IDLgrAxis', 0, RANGE=xrange,TICKLEN=ticklen[0],$
title=oXtitle,/exact,TEXTPOS=0)
oYAxis = OBJ_NEW('IDLgrAxis', 1, RANGE=yrange,TICKLEN=ticklen[1],$
title=oYtitle,/exact,TEXTPOS=0)
oZAxis = OBJ_NEW('IDLgrAxis', 2, RANGE=zrange,TICKLEN=ticklen[2],$
title=oZtitle,/exact,TEXTPOS=0)

oXAxis->GetProperty, TICKTEXT = xtick_text
oYAxis->GetProperty, TICKTEXT = ytick_text
oZAxis->GetProperty, TICKTEXT = ztick_text
xtick_text->SetProperty, font=oticfont, Recompute_Dimensions=2
ytick_text->SetProperty, font=oticfont, Recompute_Dimensions=2
ztick_text->SetProperty, font=oticfont, Recompute_Dimensions=2

oGroup->Add, oXAxis
oGroup->Add, oYAxis
```

```
oGroup->Add, oZAxis

; ----Add your objects here----
oGroup->Add, oPlane ; this is a polygon
oGroup->Add, oPlaneBoarder ; polyline
oGroup->Add, oBox ; polyline
oGroup->Add, oDatapoints ; polyline

; ----Create some lights----
oLight1 = OBJ_NEW('IDLgrLight', LOCATION=[2,2,2], TYPE=1)
oTop->Add, oLight1
oLight2 = OBJ_NEW('IDLgrLight', TYPE=0, INTENSITY=0.5)
oTop->Add, oLight2

; ----Place the model in the view----
oView->Add, oTop

; ----Rotate to standard view for first draw----
SURFR,ax=30,az=-30
oGroup -> SetProperty, TRANSFORM =!p.t

; ----Create a holder object for easy destruction----
oHolder = OBJ_NEW('IDL_Container')
oHolder->Add, oView
oHolder->Add, oXtitle
oHolder->Add, oYtitle
oHolder->Add, oZtitle
oHolder->Add, otitlefont
oHolder->Add, oticfont

oWindow->draw, oView

; ----Destroy everything with you don't need it anymore----
obj_destroy,oHolder
```