Subject: Polyfill between two intersecting lines
Posted by jecca.baker on Mon, 18 Apr 2016 17:09:34 GMT
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Hello helpful IDL experts!

I have been struggling with this for the past couple of days so hope someone on here might be able to put me straight!

I am trying to plot monthly temperature and rainfall in a Walter & Lieth style climate diagram. I am struggling to work out how to accurately define the polygons of the intersecting lines, as seen in this example R plot: http://www.sisef.it/forest@/papers//no19/Bagnato_679@image00 2.jpg

It is made problematic by the scale change part way up the graph. The code I have so far is copied below - many thanks in advance for any suggestions!

Jess

```
set_plot, 'x'
!p.multi=[0,2,1]
 mean_temp=[26.8,26.8,27.0,27.0,26.1,25.4,25.6,26.2,27.4,27.8 ,27.1,26.8]
 mean_precip=[277.9,260.4,257.6,169.0,89.3,31.7,18.9,23.2,79. 6,163.4,207.6,255.5]

;define monthly series
months=TIMEGEN(12, START=JULDAY(1,1,2003,0,0,0),UNITS="Month")
xr1=months[0]
xr2=months[-1]
;top section of plot
 cgplot,months,findgen(12),xrange=[xr1,xr2],yrange=[100,300],
xstyle=5,ystyle=5,position=[0.05,0.80,0.95,0.95],/nodata
cgaxis, yaxis=1, yrange=[100,300],yminor=1,yticks=1,YTICKFORMAT="(A1)",color='grey',/save
cgtext,xr2+3,450,'300', /data, charsize=1.5,color='dodger blue'
cgoplot,months,mean_precip,color='dodger blue'
;------------------ fill in polygon below precipitation line in top section
 aboveColor='blu5'
  FOR j=0,N_Elements(months)-2 DO BEGIN
   data=mean_precip
   yfit=intarr(12)+100
      ; Set initial coordinates.
      x0 = months[j]
      x1 = months[j+1]
      y0 = data[j]
      y1 = data[j+1]
      f0 = yfit[j]
      f1 = yfit[j+1]
      xcoords = [x0, x0, x1, x1, x0]
      ycoords = [f0, y0, y1, f1, f0]
  CASE 1 OF
```

```
        (y0 GE f0) && (y1 GE f1): cgColorfill, xcoords, ycoords, Color=aboveColor

        (y0 LT f0) && (y1 GT f1): BEGIN
           theta = ATan( (y1-y0)/(x1-x0) )
           x2 = (f0-y0) / Tan(theta) + x0
           xcoords = [x2, x1, x1, x2]
           ycoords = [f0, y1, f1, f0]
           cgColorfill, xcoords, ycoords, Color=aboveColor
           END

        (y0 GT f0) && (y1 LT f1): BEGIN
           theta = ATan( (y1-y0)/(x1-x0) )
           x2 = (f0-y0) / Tan(theta) + x0
           xcoords = [x0, x0, x2, x0]
           ycoords = [f0, y0, f1, f0]
           cgColorfill, xcoords, ycoords, Color=aboveColor
           END

         ELSE:

      ENDCASE

   ENDFOR
cgaxis,xaxis=0,xrange=[xr1,xr2],XTICKFORMAT="(A1)",color='grey',xstyle=1,xticks=1,xminor=1
cgaxis, yaxis=0, yrange=[50,65],YTICKFORMAT="(A1)",yminor=1,yticks=1,color='grey',/save
;lower section of plot
cgplot,months,mean_temp,xrange=[xr1,xr2],$
       xstyle=5,ystyle=5,position=[0.05,0.05,0.95,0.80],/nodata
 cgaxis,xaxis=0,xrange=[xr1,xr2],XTICKUNITS=['Months'],xticki
nterval=1,xminor=1,xstyle=1,color='grey'
cgaxis, yaxis=0, yrange=[0,50],yticks=5,yminor=1,ystyle=1,color='red'
cgaxis, yaxis=0,  yrange=[0,50],yticks=5,yminor=1,ystyle=1,color='grey',YTICKF ORMAT=
"(A1)",/save
cgoplot,months,mean_temp,color='red'
cgaxis,  yaxis=1,yrange=[0,100],yticks=5,yminor=1,ystyle=1,color='dod ger blue',/save
cgoplot,months,mean_precip,color='dodger blue'
cgaxis,  yaxis=1,yrange=[0,100],yticks=5,yminor=1,ystyle=1,color='gre y',YTICKFORMAT= "(A1)"
end

;;Up to this point the plot looks ok!! Then I try to fill in above and below the line with the following
code and it fails miserably...

  FOR j=0,N_Elements(months)-2 DO BEGIN
   data=mean_precip
   yfit=mean_temp*2
      ; Set initial coordinates.
      x0 = months[j]
```

```
x1 = months[j+1]
y0 = data[j]
y1 = data[j+1]
f0 = yfit[j]
f1 = yfit[j+1]
xcoords = [x0, x0, x1, x1, x0]
ycoords = [f0, y0, y1, f1, f0]
;if (data[j] gt 100.) then y0=100
;if (data[j+1] gt 100.) then y1=100
f0 = yfit[j]
f1 = yfit[j+1]
xcoords = [x0, x0, x1, x1, x0]
ycoords = [f0, y0, y1, f1, f0]

; Is this a below the line polygon?
CASE 1 OF
    (y0 LE f0) && (y1 LE f1): cgColorfill, xcoords, ycoords, Color=belowColor
    (y0 LE f0) && (y1 GT f1): BEGIN
       theta = ATan( (y1-y0)/(x1-x0) )
       x2 = (f0-y0) / Tan(theta) + x0
       xcoords = [x0, x0, x2, x0]
       ycoords = [y0, f0, f0, y0]
       cgColorfill, xcoords, ycoords, Color=belowColor
       END
    (y0 GT f0) && (y1 LT f1): BEGIN
       theta = ATan( (y1-y0)/(x1-x0) )
       x2 = (f0-y0) / Tan(theta) + x0
       xcoords = [x2, x1, x1, x2]
       ycoords = [f0, f1, y1, f0]
       cgColorfill, xcoords, ycoords, Color=belowColor
       END
    ELSE:
ENDCASE
; Is this an above the line polygon?
CASE 1 OF
    (y0 GE f0) && (y1 GE f1): cgColorfill, xcoords, ycoords, Color=aboveColor
    (y0 LT f0) && (y1 GT f1): BEGIN
       theta = ATan( (y1-y0)/(x1-x0) )
       x2 = (f0-y0) / Tan(theta) + x0
       xcoords = [x2, x1, x1, x2]
       ycoords = [f0, y1, f1, f0]
       cgColorfill, xcoords, ycoords, Color=aboveColor
       END
    (y0 GT f0) && (y1 LT f1): BEGIN
       theta = ATan( (y1-y0)/(x1-x0) )
       x2 = (f0-y0) / Tan(theta) + x0
       xcoords = [x0, x0, x2, x0]
       ycoords = [f0, y0, f1, f0]
```

```
            cgColorfill, xcoords, ycoords, Color=aboveColor
            END
          ELSE:
      ENDCASE
  ENDFOR
```