Subject: Re: Polar plots
Posted by rsimpson on Wed, 28 Aug 1996 07:00:00 GMT
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Don't know if this is exactly what you want, but it might help.

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;   Program Overview:  polar_plot
;   Polar_axis defines and displays a polar diagram representation, and
;   then plots the data.
;
;   J.Stupples , March 1994
;
;   parameters:  polardat   - The polar data to be displayed.
;
;   keywords:    Charsize   - The character size of the numeric data.
;                             The default is 1.
;                Color      - The color for the entire plot. The default
;                             is the foreground color.
;                Data_Range - Specifies the polar angle through which
;                             the data is to be viewed. The default
;                             is 0 - 360.
;                Degrees    - Labels the polar axis in degrees.(switch)
;                Font       - Specifies software or hardware font.
;                Gridstyle  - The gristyle pattern the axis is to be
;                             made up from.
;                Linestyle  - The linestyle in which the data is to be
;                             displayed.
;                Nodata     - Will draw an empty axis (switch)
;                Radians    - Labels the polar axis in radians.(switch)
;                Subtitle   - Prints a subtitle under th plot.
;                Tickformat - Allows axis variables to be displayed
;                             using fortran type formatting.
;                Title      - Prints a title on the plot diagram.
;                Xgridstyle - The gridstyle for the x-axis.
;                Xminor     - The number of minor tickmarks on the
;                             x-axis. The default is 36.
;                Xstyle     - Specifies style of x-axis.
;                Xticks     - The number of major tickmarks on the
;                             x-axis.The default is 8.
;                Ygridstyle - The gridsyle for the y-axis.
;                Ynozero    - Prohibits the minimum value of the y-axis
;                             from being zero.
;                Yrange     - Specifies the range of the y-axis.
;                Ystyle     - Specifies the style of the y-axis.
;                Yticks     - The number of major tick marks on the
;                             y-axis.
;
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; ************************************************************ *******

PRO Draw_labels,degrees,radians

 IF degrees or radians THEN BEGIN
   label = ['90','180','270']
   position = [64,0,-3,-66,-70,0]
    IF radians THEN BEGIN
      label = ['!4p!3/2','!4p','!33!4p!3/2']
      position = [64,0,-1,-66,-73,0]
    ENDIF

   FOR count = 0 , 4 ,2 DO BEGIN
     xyouts, position(count), position(count+1), $
            label(((count +2)/2)-1)
   ENDFOR
 ENDIF
END

 ;********************************************************** *********

FUNCTION  Find_num_of_ticks,polardat,yrange,yticks,ynozero,ystyle,ytic kv

tick_6 = 0
num_ticks = yticks
 IF yticks EQ 0 THEN BEGIN
   PLOT, polardat>(max (polardat) - 30.0),xstyle = 4,$
         ystyle = (ystyle or 4), /nodata, yrange = yrange,$
         yticks = yticks, ytickv = ytickv, ynozero = ynozero
   range = !Y.Crange(1) - !Y.Crange(0)
    IF (range lt 100) OR (range ge 1000) THEN BEGIN
      func = '/'
       IF range lt 100 THEN func='*'
      REPEAT BEGIN
        command = 'range = range' + func + '10'
        a_dummy = execute (command)
      ENDREP UNTIL (range ge 100) and (range lt 1000)
    ENDIF
   FOR i = 8, 3, -1  DO BEGIN
     IF (range mod i EQ 0) and ((range / i) mod 10 EQ 0) THEN BEGIN
         num_ticks = i
         IF num_ticks EQ 6 THEN tick_6 = 1
     ENDIF
   ENDFOR
 ENDIF

 IF tick_6 AND num_ticks EQ 3 THEN num_ticks = 6
```

```
RETURN, num_ticks

END
;************************************************************ **********

FUNCTION draw_circles, inc, num_of_circles, angle,color,$
        subtitle, title, y_gridstyle, xstyle, ygridstyle, ystyle

 IF ygridstyle NE 0 THEN y_gridstyle = ygridstyle
num_angles = 361
circle = fltarr (num_angles, /nozero)
circle (*) = inc * num_of_circles
blank_line = fltarr(2,num_of_circles)
blank_line (0,*) = 0.0
num_of_blanks = num_of_circles / 2
size_of_blank = 8
angle_of_blank = (360 * size_of_blank)/(2 * !Dpi * circle(0))
blank_circle = fltarr(361 - angle_of_blank - 1.0)
blank_circle(*) = circle(0)
blank_angle = ((findgen(360 - angle_of_blank) / 360) * 2 * !Dpi)+$
            (!Dpi / 2)+(!Dpi / (360 / angle_of_blank))
xsize = (float (!D.X_Vsize))
ysize = (float (!D.Y_Vsize))
smalldim = xsize < ysize
xdim = 0.45 * smalldim / xsize
ydim = 0.45 * smalldim / ysize

PLOT, (blank_circle + 7), blank_angle, /polar, xstyle = 5, ystyle = 5, $
      position = [0.5 - xdim, 0.5 - ydim, 0.5 + xdim, 0.5 + ydim],$
      color = color, subtitle = subtitle, title = title, /nodata
count2 = -1
FOR count = (circle(0)-(inc * num_of_circles)),$
          ((circle(0) - inc) + 0.0001), inc DO BEGIN
  count2 = count2 + 1
   IF (count2 mod 2 EQ 0) AND (num_of_blanks GT 0) THEN BEGIN
     blank_line (1,count2) = (circle(0) - count -3)
     angle_of_blank = fix((360 * size_of_blank) /$
                        (2 * !Dpi * (circle(0) - count)))
     blank_circle = fltarr(num_angles - angle_of_blank - 1)
     blank_circle(*) = circle(0)
     blank_angle =((findgen(360 - angle_of_blank) / 360) * 2 * !Dpi) +$
                (!Dpi / 2) + (!Dpi / (360 / angle_of_blank))
     OPLOT , blank_circle - count, blank_angle, /polar, color = color,$
           linestyle = y_gridstyle, nodata = (ystyle and 4)
     num_of_blanks = num_of_blanks - 1
   ENDIF else BEGIN
     blank_line (1,count2) = (circle(0) - count - inc + 3)
     OPLOT , circle - count, angle, /polar, color = color,$
```

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            linestyle = y_gridstyle, nodata = (ystyle and 4)
   ENDELSE
ENDFOR
count2 = count2 + 1
blank_line(1,(((count2 / 2) * 2) - 1)) = 0
 IF xstyle ne 4 THEN BEGIN
   FOR count = 0 , (n_elements(blank_line) / 2) - 2 , 2 DO BEGIN
     PLOTS,blank_line(*,count:count + 1),color = color,$
           linestyle = y_gridstyle
   ENDFOR
 ENDIF
RETURN , circle
END

 ;********************************************************** *********

PRO Draw_lines , num_of_lines, circle, inc, num_of_ticks, max_val,$
                 min_val, num_of_circles, color, gridstyle,$
                 xgridstyle, xstyle

 IF xgridstyle GT 0 THEN gridstyle = xgridstyle
line_angles = findgen (num_of_lines)
line_angles = line_angles * (360 / float(num_of_lines))
line_angles = (line_angles / 360) * 2 * !Dpi
lines = fltarr(2, num_of_lines * 2)
FOR count = 2, ((num_of_lines - 1) * 2), 2 DO BEGIN
  line_length = 1.05
   IF (line_angles(count / 2) + 0.1) mod (!Dpi / (num_of_ticks / 2))$
      GT 0.15 THEN BEGIN
     line_length = 1
   ENDIF
   IF (line_angles(count / 2) + 0.1) mod (!Dpi / 6) GT 0.15 THEN BEGIN
     x_centre = (circle(0) - (inc * (num_of_circles - 1))) *$
             sin(line_angles(count / 2))
     y_centre = (circle(0) - (inc * (num_of_circles - 1))) *$
             cos(line_angles(count / 2))
   ENDIF else BEGIN
     x_centre = 0.0
     y_centre = 0.0
   ENDELSE
  lines(0,count) = x_centre
  lines(1,count) = y_centre
  lines(0,count+1) = (line_length * (num_of_circles * inc)) *$
                     sin(line_angles(count / 2))
  lines(1,count+1) = (line_length * (num_of_circles * inc)) *$
                     cos(line_angles(count / 2))
   IF xstyle ne 4 THEN BEGIN
     PLOTS,lines(*,count:count+1), color = color, linestyle = gridstyle
```

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   ENDIF
ENDFOR
END

 ;************************************************************ ***********

PRO Draw_values , num_of_circles, inc, y_vals, charsize, color, font,$
                xstyle

factor = 1
if !D.Name EQ "PS" then factor = 30.5555

x_size = !D.X_size / factor
y_size = !D.Y_size / factor
x_char_size = !D.X_ch_size / factor
y_char_size = !D.Y_ch_size / factor

IF charsize EQ -10 THEN BEGIN
  charsize = float(x_size < y_size) / 470
ENDIF

y_offset = (y_char_size * charsize) / (charsize / 0.11)

num_of_values = num_of_circles / 2
for count = 0, num_of_values - 1 do begin
  x_offset = (strlen(y_vals(count)) * x_char_size /$
            (charsize / 0.15)) * charsize
  y_pos = (num_of_circles - (count * 2)) * inc
  xyouts , - x_offset, y_pos - y_offset, y_vals(count),$
          charsize = charsize
endfor

END

 ;************************************************************ ***********

FUNCTION extract_y_vals,y_vals, tickformat

dummy = y_vals
count1 = -1
FOR count = n_elements(y_vals) , 1, -2 DO BEGIN
  count1 = count1 +1
  dummy(count1) = y_vals(count - 1)
ENDFOR
polar_vals = dummy(0:count1 - 1)
polar_vals = string (polar_vals , format = tickformat)
RETURN , polar_vals
END
```

```
;********************************************************** **********

PRO polar, polardat, charsize = charsize, color = color, font = font,$
        gridstyle = gridstyle, linestyle = linestyle, $
        nodata = nodata, subtitle = subtitle, title = title,$
        xgridstyle = xgridstyle,xminor = xminor, xstyle = xstyle,$
        xticks = xticks, ygridstyle = ygridstyle, ynozero = ynozero,$
        yrange = yrange, ystyle = ystyle, yticks = yticks,$
        ytickv = ytickv, degrees = degrees, radians = radians,$
        data_range = data_range, tickformat = tickformat

IF (not keyword_set(charsize)) THEN charsize = -10
IF (not keyword_set(color)) THEN color = !P.Color
IF (not keyword_set(font)) THEN font = 0
IF (not keyword_set(gridstyle)) THEN gridstyle = 0
IF (not keyword_set(linestyle)) THEN linestyle = 0
IF (not keyword_set(nodata)) THEN nodata = 0
IF (not keyword_set(subtitle)) THEN subtitle = ''
IF (not keyword_set(title)) THEN title = ''
IF (not keyword_set(xgridstyle)) THEN xgridstyle = 0
IF (not keyword_set(xminor)) THEN xminor = 36
IF (not keyword_set(xstyle)) THEN xstyle = 0
IF (not keyword_set(xticks)) THEN xticks = 8
IF (not keyword_set(ygridstyle)) THEN ygridstyle = 0
IF (not keyword_set(ynozero)) THEN ynozero = 0
IF (not keyword_set(yrange)) THEN yrange = [0,0]
IF (not keyword_set(ystyle)) THEN ystyle = 0
IF (not keyword_set(yticks)) THEN yticks = 0
IF (not keyword_set(ytickv)) THEN ytickv = [0,0]
IF (not keyword_set(degrees)) THEN degrees = 0
IF (not keyword_set(radians)) THEN radians = 0
IF (not keyword_set(data_range)) THEN data_range = [0,360]
IF (not keyword_set(tickformat)) THEN tickformat = ''


PLOT, polardat>(max (polardat) - 30.0), ystyle = (ystyle or 4),$
     xstyle = 4, yticks = yticks, yrange = yrange, ytickv = ytickv,$
     /nodata, ynozero = ynozero

polardat1 = polardat - !Y.Crange(0)
min_val = !Y.Crange(0)
max_val = !Y.Crange(1)
start = data_range(0)
finish = data_range(1)
data_angle = (reverse(findgen(n_elements (polardat))) /$
          n_elements (polardat) * (finish-start)) + 90 - finish
data_angle = (data_angle / 360) * 2 * !Dpi
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angle = (findgen (360) / (361) * 2.0 * !Dpi) + (!Dpi / 2)
angle = reverse(angle)

num_y_ticks = Find_num_of_ticks (polardat, yrange, yticks, ynozero,$
                        ystyle,ytickv)

y_step = fix(((max_val - min_val) / (num_y_ticks)))
y_vals = strtrim (string (fix (findgen (num_Y_ticks + 1)) * y_step), 2)
y_vals = strtrim (fix ((y_vals + min_val)), 2)

polar_vals = Extract_y_vals(y_vals, tickformat)

num_of_circles = num_y_ticks
inc = (max_val - min_val) / num_of_circles
scale_factor = float(60 / (inc * num_of_circles))
inc = inc * scale_factor
xstyle = xstyle and 4
line_gridstyle = gridstyle

circle = Draw_circles(inc, num_of_circles, angle, color,subtitle,$
                title, gridstyle, xstyle, ygridstyle, ystyle)

Draw_lines , xminor, circle, inc, xticks, max_val, min_val,$
          num_of_circles, color, line_gridstyle, xgridstyle, xstyle
Draw_values , num_of_circles, inc, polar_vals, charsize, color, font,$
           xstyle

Draw_labels , degrees, radians

OPLOT , (polardat1 * scale_factor) > 0.0, data_angle, /polar,$
       color = color, linestyle = linestyle, nodata = nodata
END
```

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