REGION BASE

PURPOSE
        Specifies the base location for regions on plots.

DESCRIPTION
        On a plot, a region is defined as the figure formed by the line connecting points belonging to a common trace and a region base (typically zero). The REGION FILL command can be used to generate a solid fill or a cross-hatch fill of this region. The attributes of the fill are set with additional REGION commands (see the RELATED COMMANDS section below). The attributes of the region border are set with LINE, LINE COLOR, and LINE THICKNESS commands.

        There are 3 special cases for the region base. Specifying REGION BASE POLYGON specifies that the points in the trace form a closed polygon. DATAPLOT automatically connects the first and last point if they are not already the same. This option is useful for drawing filled 2d polygons with the standard PLOT command. Drawing statistical maps is one application of this. The PROGRAM 2 example demonstrates this case.

        The REGION BASE AUTOMATIC and REGION BASE INTERPOLATE commands are typically used together to fill in the area between 2 curves. The REGION BASE AUTOMATIC command specifies a variable to be used as arguments for the REGION BASE command which allows a moving region base between points. However, in the case of filling the area between curves, the base is not horizontal between points. The REGION BASE INTERPOLATE command specifies that the base should be drawn to connect pairs of base points. The PROGRAM 3 example shows how these two commands can be used to draw two curves with the area between them filled. The key trick in this macro is to define each consecutive pair of points on the second curve as a single trace. Generally, it is better practice to explicitly plot differences than it is to draw filled area curves.

        The REGION BASE AUTOMATIC and REGION BASE INTERPOLATE commands are actually not needed because the REGION BASE POLYGON command supports the capability they provide in a simpler manner. The PROGRAM 4 example generates the same plot as the PROGRAM 3 example, but it uses the REGION BASE POLYGON command.

SYNTAX 1
        REGION BASE <number> <number> <number> etc.
        where <number> is a decimal number or parameter that specifies the desired region base. Up to 100 region bases can be specified.

SYNTAX 2
        REGION BASE POLYGON <ON/OFF> <ON/OFF> etc.
        where ON specifies that the trace is treated as a closed polygon while OFF specifies that it is not. Up to 100 region bases can be
                specified.

SYNTAX 3
        REGION BASE AUTOMATIC <var>
        where <var> is a variable whose elements are used as arguments to the REGION BASE command.

SYNTAX 4
        REGION BASE INTERPOLATE <ON/OFF> <ON/OFF> etc.
        where ON specifies that the region base is drawn between the entered values for 2 consecutive bases while OFF specifies that it is not.
                Up to 100 region bases can be specified.

EXAMPLES
        REGION BASES 0. 0. 10.
        REGION BASES 20. 20. 20.
        REGION BASES 0. ALL
        REGION BASES ALL 0.
        REGION BASES
        REGION BASE POLYGON ON
        REGION BASE INTERPOLATE ON
        REGION BASE AUTOMATIC Y1

NOTE 1
        The REGION BASE command with no arguments sets the region base to zero for all regions. The REGION BASE command with the word ALL before or after the specified base assigns that region base to all regions; thus REGION BASE 0. ALL or REGION BASE

ALL 0. uses a base of 0. for all regions. The REGION, BAR, SPIKE, CHARACTER, and LINE switch all work independently of each other. That is, a plot point can be a line, a character, a region, a spike or a bar or any combination of the above.

NOTE 2

Traces plotted with the REGION BASE POLYGON switch set to ON do not pre-sort the data points by the horizontal axis variable (i.e., the equivalent of a PRE-SORT OFF).

DEFAULT

All region bases are 0.

SYNONYMS

None

RELATED COMMANDS

PLOT	=	Generates a data or function plot.
REGION FILL	=	Sets the on/off switches for region fills.
REGION FILL COLOR	=	Sets the color for region solid fills.
REGION PATTERN	=	Sets the types for region fill patterns.
REGION PATTERN COLOR	=	Sets the color for region hatched fills.
REGION PATTERN LINE	=	Sets the line types for region fill patterns.
REGION PATTERN SPACING	=	Sets the line spacing for region fill patterns.
REGION PATTERN THICKNESS	=	Sets the line thickness for region fill patterns.
LINE COLOR	=	Sets the color for region border lines.
LINE	=	Sets the types for region border lines.
LINE THICKNESS	=	Sets the line thickness for region border lines.

APPLICATIONS

Presentation Graphics, statistical maps, filled area charts

IMPLEMENTATION DATE

Pre-1987

The REGION BASE AUTOMATIC and REGION BASE INTERPOLATE commands and the ability to do hatch fills of non-rectangular regions were added 93/10.

The REGION BASE POLYGON option was added 94/4.

PROGRAM 1

```
LET FUNCTION F = SHIFT + AMPL*SIN(PERIOD*X+PHASE)
LET SHIFT = 3
LET AMPL = 2
LET PERIOD = 0.5
LET PHASE = PI
.
REGION FILL ON
REGION BASE SHIFT
.
TITLE SINE WAVE
TITLE SIZE 5
LET MIN = -2*PI
LET MAX = 2*PI
XLIMITS -7 7
PLOT F FOR X = MIN 0.1 MAX
```
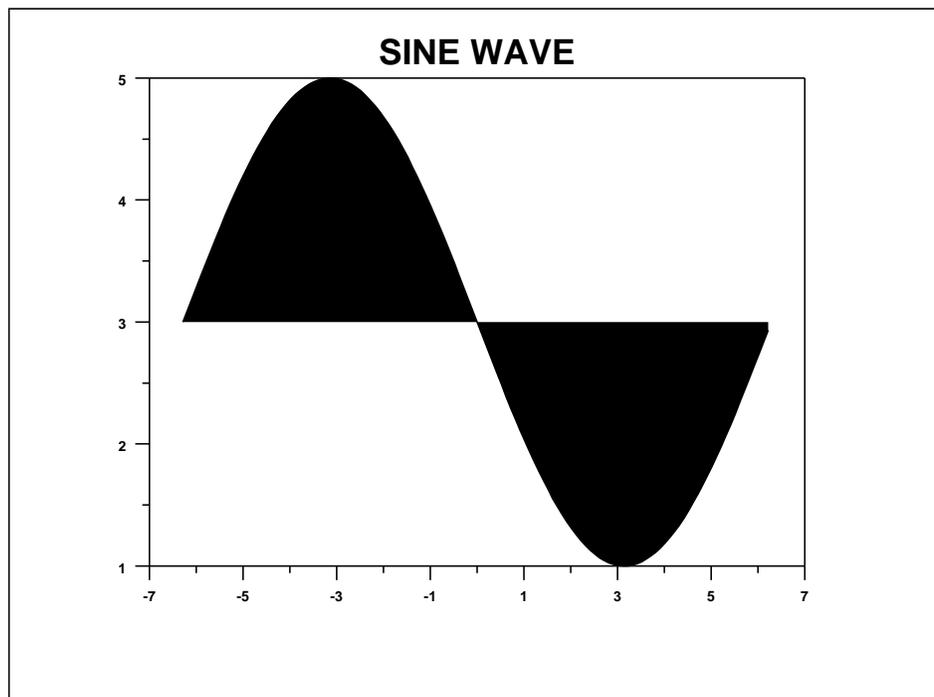
PROGRAM 2
        SKIP 25
        READ TEXAS.DAT X Y
        .
        FRAME OFF
        FRAME CORNER COORDINATES 5 5 95 95
        MULTIPLOT 2 2; MULTIPLOT CORNER COORDINATES 0 0 100 100
        PRE-SORT OFF
        PLOT Y X
        PRE-SORT ON
        REGION BASE POLYGON
        REGION FILL ON
        PLOT Y X
        REGION FILL COLOR G50
        PLOT Y X
        REGION PATTERN D1D2
        REGION PATTERN SPACING 5
        PLOT Y X
        END OF MULTIPLOT
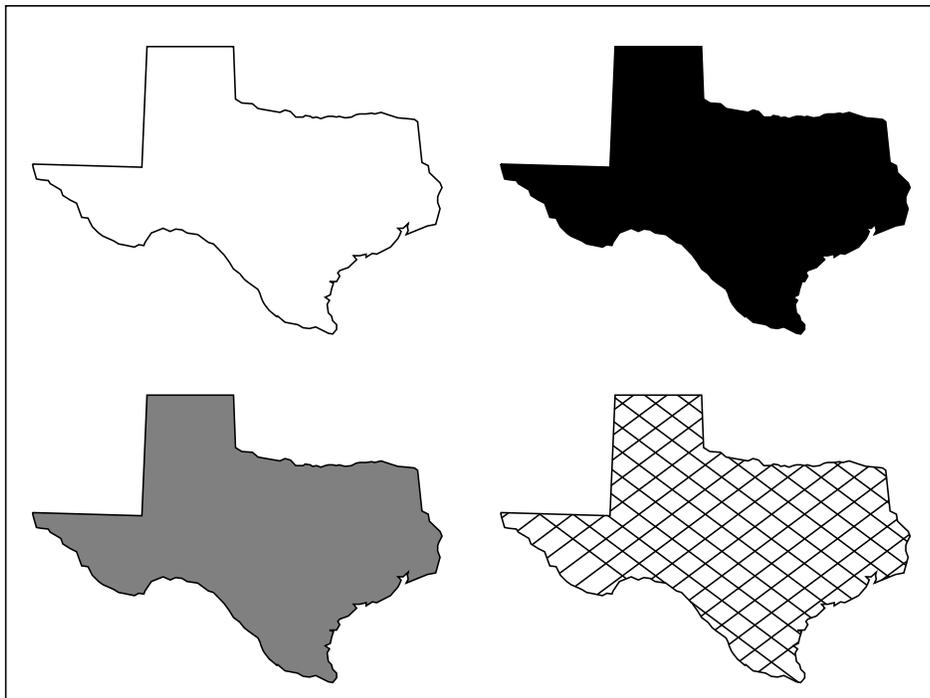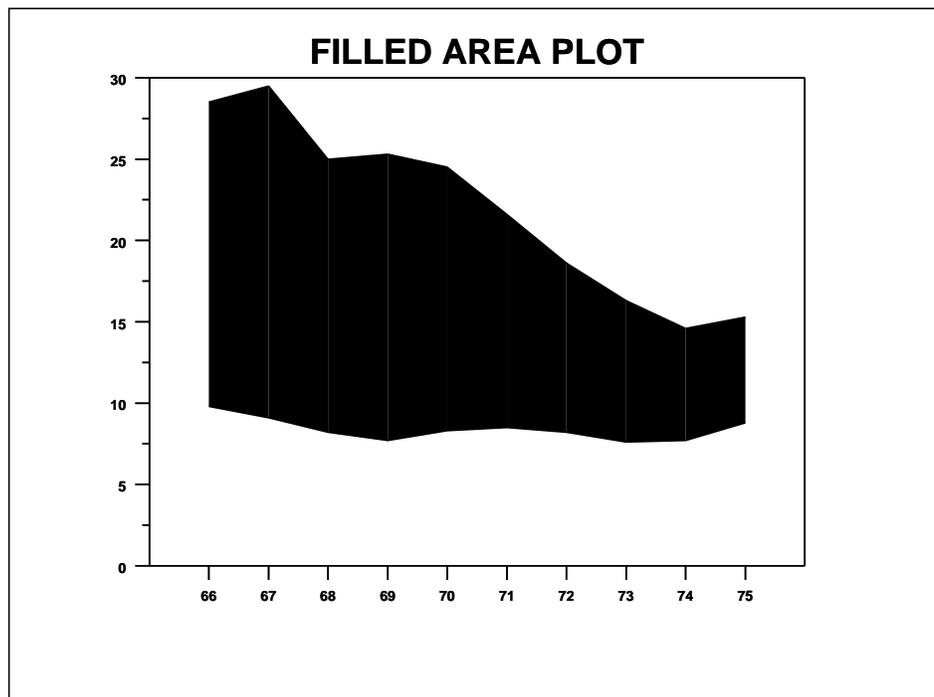
PROGRAM 3
```
      . PERCENTAGE BELOW POVERTY LEVEL
      . SOURCE: "SOCIAL INDICATORS 1976", US CENSUS BUREAU
      . Y1 = AGES 22-42 Y2 = AGES 65+
      .
      LET Y1 = DATA 9.8 9.1 8.2 7.7 8.3 8.5 8.2 7.6 7.7 8.8
      LET Y2 = DATA 28.5 29.5 25.0 25.3 24.5 21.6 18.6 16.3 14.6 15.3
      LET N = SIZE Y1
      .
      XLIMITS 1 N; XTIC OFFSET 1 1
      MAJOR X1TIC MARK NUMBER N; MINOR X1TICMARK NUMBER 0
      X1TIC MARK FORMAT ALPHA
      X1TIC MARK CONTENT 66 67 68 69 70 71 72 73 74 75
      YLIMITS 0 30
      TITLE FILLED AREA PLOT
      PLOT Y1
      PRE-ERASE OFF
      LET N1 = N - 1; LET N2 = N + 1
      .
      REGION BASE INTERPOLATE ON
      REGION BASE AUTOMATIC Y1
      REGION FILL ON ALL
      . CREATE X AND TAG VARIABLES
      LET X = SEQUENCE 1 1 N1; LET NLAST = 2*N1
      LET X = SEQUENCE 2 1 N FOR I = N 1 NLAST
      LET TAG = SEQUENCE 1 1 N1 FOR I = 1 1 NLAST
      . CREATE Y VARIABLE
      LET JUNK = Y2; DELETE JUNK(1)
      DELETE Y2(^N); EXTEND Y2 JUNK
      PLOT Y2 X TAG
```


FILLED AREA PLOT

PROGRAM 4

    . PERCENTAGE BELOW POVERTY LEVEL
    . SOURCE: "SOCIAL INDICATORS 1976", US CENSUS BUREAU
    . Y1 = 22-42 Y2 = 65+
    .
    LET Y1 = DATA 9.8 9.1 8.2 7.7 8.3 8.5 8.2 7.6 7.7 8.8
    LET Y2 = DATA 28.5 29.5 25.0 25.3 24.5 21.6 18.6 16.3 14.6 15.3
    LET X = SEQUENCE 1966 1 1975
    LET XREV = X
    LET N = SIZE Y1
    LET INDX = SEQUENCE N -1 1
    LET INDX = SORTC INDX XREV Y2
    .
    EXTEND Y1 Y2
    EXTEND X XREV
    REGION BASE POLYGON
    REGION FILL ON ALL
    XLIMITS 1966 1975
    XTIC OFFSET 1 1
    MAJOR X1TIC MARK NUMBER N
    MINOR X1TICMARK NUMBER 0
    TITLE FILLED AREA PLOT
    PLOT Y1 X