THE KWIKPLOT PROCEDURE

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ABSTRACT

The KWIKPLOT procedure is used as an interface between SAS and the software package for Houston Instrument's COMPLOT incremental plotter. It allows users to produce one or more plots with a minimum of control statements. This procedure is designed for interactive use only. It will produce either a simple scatter diagram or a line plot as output. Options and parameters can be used to vary the line type, plot size, pen color, pen type, and the plot symbol to be used.

INTRODUCTION

Graphs and plots are frequently used in statistical analysis. PROC KWIKPLOT was written to allow access to our COMPLOT incremental plotter by statisticians with limited data processing skills. This plotter gives the user the capability of drawing line plots as well as scatter diagrams. This capability was not previously available to SAS users since plots were drawn on a line printer.

PROC KWIKPLOT allows the user freedom to create plots of various sizes and styles. If no options or parameters are specified, the graph of a solid line will be drawn connecting points. An asterisk (*) will be used as the plot symbol to mark selected points of intersection. If the NOLINE option is specified, a simple scatter diagram will be drawn using an asterisk as the plot symbol.

PLOT statement parameters allow the user to specify the page width and length. The user also has the capability of selecting the plot symbol to be used, the type of line desired, the pen color and pen type. This procedure is modeled after SAS's PROC SCATTER.

DESCRIPTION OF OUTPUT

The default output of this procedure is the graph of a solid line on a 'report size' page (6.5 x 8.75 inches). This allows the plots to be printed for publication without going through a reduction process which may cause distortion. Larger areas may be selected by using appropriate parameters.

Plots have single horizontal and vertical axes which are labeled by the LABEL statement, if present, or by the variable name. Only one set of labels is printed when the OVERLAY option of the PLOT statement is used. No bylines are printed when plots are overlayed.

KWIKPLOT can produce several types of lines. The default line type is the graph of a solid line with an event marker if an ID variable is present. The ID variable may be used to identify points to be marked. Because the plotter software is capable of only drawing a straight line from one point to a second point, the user must provide sufficient points to plot smooth curves. A simple scatter diagram may be produced by specifying the NOLINE option on the procedure statement.

PROCEDURE STATEMENT

PROC KWIKPLOT [DATA=dataname] [UNIFORM] [NOLEGEND] [U] [NOL] [NOCENTER] ;

The procedure KWIKPLOT statement is needed to call the plot program. An input data set may be selected with the PROC statement. If it is not specified, the last data set created will be used. Three options are available to the user: UNIFORM, NOLEGEND, and NOCENTER.

The UNIFORM option, which may also be written U, indicates that all plots are to be scaled identically when a BY statement is given.

The NOLEGEND option, which may also be written NOL, causes the plot legend and any labeling information normally printed at the top of the diagram to be omitted.

The NOCENTER option causes title lines not to be centered on the output. The default for this option is centered output.

PARMCARDS STATEMENTS

HEADER title

KWIKPLOT uses procedure information statements for requesting plots. They are passed from the parmcards file. Procedure information statements are of two types: PLOT statements and HEADER statements. A PLOT statement is required for execution of this procedure and a HEADER statement is optional.

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The HEADER Statement

The HEADER statement is used to provide titles for plots. Up to ten title lines may be specified on each plot request. A user should be aware that the space used for printing titles will decrease the size available for the plot. The HEADER statements associated with a plot request should precede the PLOT statement and be in the order desired for printing. Character size for titles is .14 inches in height for a page width of 22 inches or less, and .21 inches for larger page widths. The predesignated character size will be reduced, whenever titles are too long to be printed across the page, to maintain a single title line.

HEADER statements may be written as a quoted string, or an H string. The maximum number of characters for one title line is 132. A title may be continued onto 2 or more cards by placing a dollar sign ($) in column one of cards 2-n.

Example of how to write HEADER statements:

```
eg. HEADER 'first part of title line
$ second part of title line
$ last part of title line'
```

The PLOT Statement

The PLOT statement requests the plots to be produced by PROC KWIKPLOT. Any number of PLOT statements can appear and any number of plot requests can appear in a single PLOT statement. For each plot desired, a plot request of the form

```
PROC KWIKPLOT;
PARMCARDS
PLOT X*Y
```

requests a plot of X by Y. The variable X will appear on the horizontal axis, and the variable Y on the vertical axis.

PLOT statements may also be continued onto two or more cards by placing a dollar sign ($) in column one of cards 2-10.

```
eg. PLOT X*Y / list of option
$ list of parameters
```

The options and parameters listed below may appear in the PLOT statement. If one or more options or parameters appear on the PLOT statement, then the list of options and/or parameters must be preceded in the PLOT statement by a slash (/). When no options or parameters appear, the slash is not required.

Options of the PLOT Statement

There are four options available to the user of this procedure: OVERLAY, NOLINE, DARK, and ANGLE.

When the OVERLAY option appears on a PLOT statement, all the plot requests are printed on one page. The axes are scaled for all variables, and all variable labels are printed at the top of the page instead of on the axes. Variables in the first plot request identify the axes.

When the NOLINE option is specified, only event markers will appear for plots created by that PLOT statement. These markers may be determined by an ID variable. The default marker is the asterisk (*).

The DARK option is used to select dark print for the special line types. This is accomplished by moving the pen one increment and then redrawing the line.

The ANGLE option is used to change the positions of the axes. If this option is specified, the plot will be rotated so that the positions of the X and Y axes are reversed. This allows the user to specify a horizontal axis length which is longer than the width of the plotter bed (22 inches).

Parameters of the PLOT Statement

The LINE (1) parameter designates the type of line desired for a plot. The type is specified as an integer value (0 to 5). The default for this parameter is LINE=0. The valid values and their corresponding line types are:

```
0 = 
1 = 
2 = 
3 = 
4 = 
5 = 
```

The REF and VREF parameters indicate where horizontal and vertical reference lines are to appear on the plot. Up to five values, separated by a blank or a comma, can be listed for each of the parameters. Horizontal lines will appear on the plot at the points on the vertical axis corresponding to each of the values for HREF. Vertical lines will appear on the plot at the points on the horizontal axis corresponding to each of the values for VREF.

The HREFLINE and VREFLINE parameters determine the line type to be used for drawing reference lines. Only one value may be specified for each of these parameters. The default value is line type five.(1)

Procedure KWIKPLOT will automatically scale both axes. However, the user may wish to specify the minimum and maximum values to be used. The HMIN and VMIN parameters allow the user to select the minimum value to appear on the horizontal and vertical axes. The EMAX and VMAX parameters can be used to specify the maximum values to be used on the axes. HINC and VINC parameters are used to indicate the increment to be used between tic marks on the axes.

Paper size may be increased from the default size of 6.5 inches by 8.75 inches through the use of the HDIR and VDIR parameters. The maximum value allowed for the HDIR parameter is 22.0 inches, which is the width of the plotter bed, and the...

(1) See the list of line types listed under the LINE parameter.
minimum value is the default page width of 6.5 inches. The maximum value allowed for the VDIR parameter is 60.0 inches, and the minimum value is the default page length of 8.75 inches.

The PER TYPE parameter allows the user to select one of three types of pens available with the Complot plotter. The types available are:

1=Ballpoint  
2=Fibre Tip  
3=Liquid Ink

The PENCOLOR parameter allows the user to select one of four colors available. These colors are:

0=Black (default)  
1=Red  
2=Blue  
3=Green

OPERATIONS

Scaling, which is done internally, is based on plot dimensions. The user may select minimum and maximum values for the scaling of the horizontal and vertical axes. These values are adjusted by the program and used to set the scale. If the user does not specify both the maximum and minimum values to be plotted, KWIKPLOT will scan the data set to find the largest and smallest data values. The scale is then set based on these values and the plot dimensions. The smallest value to be plotted on the axes is the floor() of the minimum value in the data set. The increment for axis labeling is based on plot dimensions. The formula for determining this increment is:

\[ INC = \frac{K \times m \times \text{length}}{10} \]

where \( K \) is 1, 2, 4, 5, 8, 10, or 20; and \( m \) is the order of the magnitude of \( (XMAX-XMIN)/S \) (\( S \) is the length, in inches, of the axis against which the data are to be plotted).

PROCEDURE INFORMATION STATEMENTS

There are two procedure information statements which are valid with this procedure. They are BY statements and ID statements.

Using BY Statements

Plots accompanied with BY statements will produce, by default, separate plots for each BY group unless the OVERLAY option is specified. These plots are scaled independently if the UNIFORM option is not invoked.

Scaling on plots which have the OVERLAY option turned on will be determined from the first BY group processed. Any data values outside of the range of the minimum or maximum values of the first BY

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Using an ID Statement

An ID variable may be used to select points to be identified by a plot symbol. If the value of the ID variable is zero, no marker is drawn for that point. If the value of the variable is greater than zero, a symbol is drawn corresponding to the value of the variable. These symbols are generated by a call to COMPLOT's MARKER subroutine. Valid values and their corresponding symbols are:

1+  
2x  
3△  
4□  
5◆  
6○  
7◆  
8▲  
9◆  
10▲  
11◆  
12▲  
13◆  
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(2) Scaling of data sets containing BY groups is discussed in the section on BY statements.  
(3) The floor of a value is the largest integer less than or equal to that value.