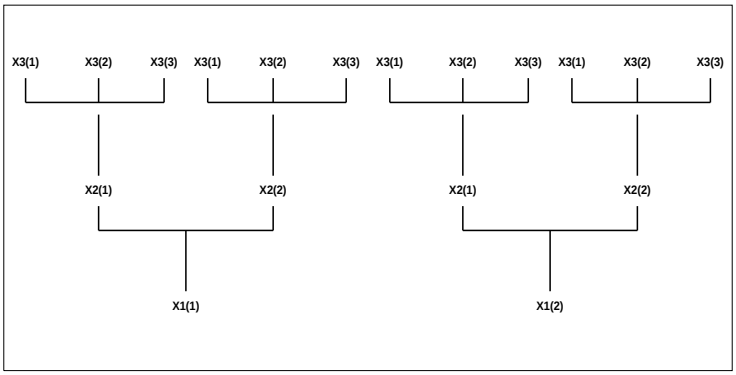
... BLOCK PLOT

PURPOSE

Generates a block plot.

DESCRIPTION

A block plot is a graphical method for representing an analysis of variance problem. The first variable is a response variable while the remaining variables (there must be at least two) represent levels of factors. These levels are typically coded as indices (e.g., 1 for process A, 2 for process B). The <x1> ... <xn> sequence of variables define where and how many blocks are drawn. If n1, n2, .. ,nk represent the number of levels of these variables, there will be n1*n2*...*n3 blocks. If n1=2, n2=2, and n3=3, the blocks will be set up on the X axis as follows (the first example program also demonstrates this):



The groups of block plots are centered around the numeric values for the levels of the x1 variable. Within each block, the levels of the <char> variable are plotted as distinct traces at the values of the corresponding response variable. The levels of <char> are identified by using the CHARACTER command (e.g., CHAR 1 2 3; LINE BL BL BL). A box is drawn around the <char> levels for each unique combination of factor levels (this is where the term block plot comes from). The command BAR EXPANSION controls the height and width of the boxes.

SYNTAX 1

BLOCK PLOT <y> <x1> ... <xn> <char> <SUBSET/EXCEPT/FOR qualification>

where <y> is the response variable in an analysis of variance problem;

<x1> ... <xn> is a sequence of factor variables that define the X axis (there must be at least one, and typically will be between one and three);

<char> represents the levels of an additional factor variable;

and where the <SUBSET/EXCEPT/FOR qualification> is optional.

This syntax case is used for the no replication case or the case when the replicates are averaged into a single value. Although it can also be used for the replication case, the second syntax is more often used with replication.

SYNTAX 2

<stat> BLOCK PLOT <y> <x1> .. <xn> <char> <SUBSET/EXCEPT/FOR qualification>

where <stat> is one of the following statistics:

MEAN, MIDMEAN, MEDIAN,TRIMMED MEAN, WINDSORIZED MEAN,
NUMBER, SUM, PRODUCT, MINIMUM, MAXIMUM,
SD, VARIANCE, RANGE, RELATIVE STANDARD DEVIATION, MIDRANGE,
AVERAGE ABSOLUTE DEVIATION (AAD), MEDIAN ABSOLUTE DEVIATION (MAD),
VARIANCE OF MEAN, STANDARD DEVIATION OF MEAN,
LOWER QUARTILE, UPPER QUARTILE, LOWER HINGE, UPPER HINGE,
<FIRST/SECOND/THIRD/FOURTH/FIFTH/SIXTH/SEVENTH/EIGTH/NINTH> DECILE,
SKEWNESS, KURTOSIS,
AUTOCORRELATION, AUTOCOVARIANCE,
SINE FREQUENCY, SINE AMPLITUDE,
TAGUCHI SN0, TAGUCHI SN+, TAGUCHI SN-, TAGUCHI SN00;

<y> is the response variable in an analysis of variance problem;

<x1> ... <xn> is a sequence of factor variables that define the X axis (there must be at least one, and typically will be between one and three);
<char> represents the levels of an additional factor variable;
and where the <SUBSET/EXCEPT/FOR qualification> is optional.

This syntax can be used when there is replication at each of the combinations of factor levels. The requested statistic is calculated for all the response values with the same levels of the factor variables. The <char> variable is plotted at the computed statistic on the vertical axis. MEAN BLOCK PLOT is the most commonly used.

EXAMPLES

BLOCK PLOT Y X1 X2
BLOCK PLOT Y X1 X2 X3
BLOCK PLOT Y X1 X2 X3 X4
MEAN BLOCK PLOT Y X1 X2 X3

NOTE 1

When there are multiple factor variables, it can sometimes be beneficial to repeat the block plot using a different variable as the <char> variable.

NOTE 2

The BLOCK PLOT command saves the internal parameters HEADS, FACES, TRIALS, TAILPROB, AVEDEL, and SDAVEDEL.

These parameters are primarily useful if the <char> variable (i.e., the last variable on the BLOCK PLOT command) has exactly 2 levels. For convenience, call these levels 1 and 2 respectively. DATAPLOT looks at the pattern of the first block (either 12 or 21 where 12 means level 1 is greater than level 2 and 21 means level 2 is greater than level 1). This pattern is designated as heads and is treated as a binomial probability. The parameter TRIALS is the number of boxes and the parameter TAILPROB is the binomial probability of obtaining the number of 12 and 21 patterns that was found in the BLOCK PLOT. The parameter AVEDEL is the average difference between level 1 and level 2 in each of the boxes. The parameter SDAVEDEL is the corresponding standard deviation. AVEDEL is in fact a least squares estimate of the difference between the levels of the factors. The parameter FACES is the number of levels of the factor corresponding to the <char> variable. If FACES is greater than 2, then a multinomial rather than a binomial probability is calculated.

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

LINES	=	Sets the type for plot lines.
CHARACTER	=	Sets the type for plot characters
BAR EXPANSION	=	Sets the bar expansion factors.
BOX PLOT	=	Generates a box plot
YOUDEN PLOT	=	Generates a Youden plot.
ANOVA	=	Carries out an ANOVA.
PLOT	=	Generates a data or function plot.
DEX PLOT	=	Generates a design of experiments plot.

APPLICATIONS

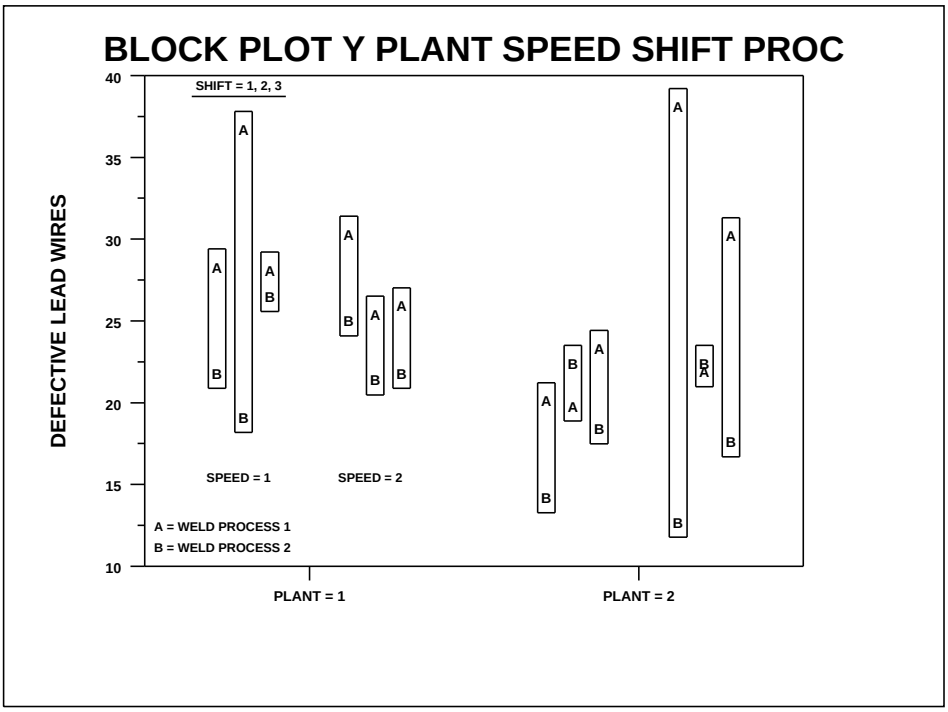
Analysis of Variance

IMPLEMENTATION DATE

92/5

PROGRAM 1

```
SKIP 25
READ SHEESLE2.DAT Y PROC PLANT SPEED SHIFT PROC
.
CHARACTERS A B
LINE BLANK BLANK
.
XLIMITS 1 2
XTIC OFFSET 0.5 0.5
MAJOR XTIC MARK NUMBER 2
MINOR XTIC MARK NUMBER 0
XTIC LABEL FORMAT ALPHA
XTIC LABEL CONTENT PLANTSP()=SP()1 PLANTSP()=SP()2
.
LEGEND JUSTIFICATION CENTER
LEGEND SIZE 1.8
LEGEND 1 SPEED = 1; LEGEND 1 COORDINATES 25 32
LEGEND 2 SPEED = 2; LEGEND 2 COORDINATES 39 32
LEGEND 3 SHIFT = 1, 2, 3; LEGEND 3 COORDINATES 25 88
LEGEND 4 A = WELD PROCESS 1; LEGEND 4 COORDINATES 16 25
LEGEND 5 B = WELD PROCESS 2; LEGEND 5 COORDINATES 16 22
LEGEND 4 JUSTIFICATION LEFT
LEGEND 5 JUSTIFICATION LEFT
SEGMENT 1 COORDINATES 20 87 30 87
Y1LABEL DEFECTIVE LEAD WIRES
BLOCK PLOT Y PLANT SPEED SHIFT PROC
```



PROGRAM 2

```
. STEP 1--READ IN THE DATA
.
SKIP 25
READ BOXCAKE.DAT Y X1 X2 X3 X4 X5
DELETE Y X1 X2 X3 X4 X5 FOR I = 1 1 5
.
MULTIPLOT CORNER COORDINATES 0 0 100 100; MULTIPLOT 2 2
CHAR BLANK ALL
CHAR 1 2
LINES SOLID ALL; LINES BL BL
CHAR SIZE 4 ALL
BAR EXPANSION FACTOR 2 1.5
MEAN BLOCK PLOT Y X4 X5 X1
MEAN BLOCK PLOT Y X4 X5 X2
MEAN BLOCK PLOT Y X4 X5 X3
MULTIPLOT OFF
```