BOX-COX LINEARITY PLOT

PURPOSE
Generates a Box-Cox linearity plot.

DESCRIPTION
A Box-Cox linearity plot is a graphical technique for determining the Box-Cox transformation that yields the maximum correlation between two variables. The Box-Cox transformation family is essentially the power-transformation family (adjusted to include log transformations). The form for the family is:

\[ T(y) = \sqrt[\lambda]{y} - 1 \]  

(EQ 2-2)

The horizontal axis is the lambda parameter. The vertical axis is the computed correlation coefficient between \(y_1\) and the transformed \(y_2\). The lambda corresponding to the highest correlation is the appropriate transformation to use in linearizing the relationship between \(y_1\) and \(y_2\).

SYNTAX
BOX-COX LINEARITY PLOT \(<y_1> <y_2> <\text{SUBSET/EXCEPT/FOR qualification}>\)

where \(<y_1>\) is the first response variable; \(<y_2>\) is the second response variable; and where the \(<\text{SUBSET/EXCEPT/FOR qualification}>\) is optional.

EXAMPLES
BOX-COX LINEARITY PLOT Y1 Y2

NOTE
The number of observations in the 2 response variables must be equal.

DEFAULT
None

SYNONYMS
BOX COX LINEARITY PLOT

RELATED COMMANDS
LINES = Sets the types for plot lines.
CHARACTERS = Sets the types for plot characters.
BOX-COX NORMALITY PLOT = Generates a Box-Cox normality plot.
BOX-COX HOMOSCED PLOT = Generates a Box-Cox homoscedasticity plot.
PLOT = Generates a data or function plot.

APPLICATION
Exploratory Data Analysis

IMPLEMENTATION DATE
87/5
PROGRAM
    SKIP 25
    READ BERGER1.DAT Y X

    MULTIPLY 2 2; MULTIPLY CORNER COORDINATES 0 0 100 100
    FIT Y X
    LINE SOLID BLANK
    CHARACTER BLANK X
    TITLE LINEAR FIT OF RAW DATA
    PLOT PRED Y VS X

    TITLE BOX-COX LINEARITY PLOT
    X1LABEL LAMBDA
    Y1LABEL CORRELATION COEFFICIENT
    BOX-COX LINEARITY PLOT Y X

    LET LAMBDA = 0.5
    LET Y2 = (Y**LAMBDA - 1)/LAMBDA
    FIT Y2 X
    TITLE LINEAR FIT OF TRANSFORMED DATA
    X1LABEL
    Y1LABEL
    PLOT PRED Y2 VS X
END OF MULTIPLY