

## BOX\_COX: A Program for Computing the Box-Cox Transformations and Resulting Residual Sums of Squares

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### Description

BOX\_COX is an interactive microcomputer program that computes the Box-Cox transformations (Box & Cox, 1864; Neter, Wasserman, & Kutner, 1888), as well as the sum of squared residuals using these transformations. These transformations may be useful for correcting problems in regression models such as heteroscedasticity of error terms and nonlinearity of the regression function. In addition, such transformations may be useful to equate the mean squared residuals of groups to enable comparison of their respective slopes.

The computation of the transformations requires a two-step process. First Y (the dependent variable) is subjected to a power transform and then this transform is standardized using the geometric mean. The residuals are then computed using matrix manipulations kindly provided by R. E. Bargman (personal communication, October 1888).

The program uses ASCII space-delimited data files for input. The program prompts the user for the data file, a range of exponents for transformations, and increments of change in the exponential transformations. Output can be directed to either the screen or a printer.

The program is limited to 300 cases, and without modification will run up to 21 transformations. With modification the number of transformations can be increased, but this should be unnecessary because the user may focus on a range of transformations by rerunning the program and defining finer transformations. Users with large Y values may first have to divide these values by a power of 10 in order to stay within the limitations of extended precision set by the compiler.

### *Availability*

BOX\_COX is written in Turbo Pascal (version 5.5). It is available in both compiled and source code format and runs on microcomputers running under MS-DOS (PC-DOS) 2.0 or later. A copy of the program and sample data files may be obtained by sending a 5.25- or 3.5-inch formatted MS-DOS diskette along with a self-addressed, postage-paid mailer to William N. Dudley, Department of Psychology, University of Georgia, Athens GA 30602, U.S.A.

### *References*

Box, G. E. P., & Cox, D. R. (1964). An analysis of transformations. *Journal of the Royal Statistical Society, Series B*, 26, 211-243

Neter, J., Wasserman, W., & Kunter, M.H. (1989). *Applied linear regression models*. Homewood IL: Irwin.