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NBER COMPUTER RESEARCH CENTER NOTES

Following are abstracts of two recent working papers of the NBER Computer Research Center. The complete texts are available for \$1.50 per copy from: Support Staff Manager, NBER Computer Research Center, 575 Technology Square, Cambridge, MA 02139.

Golub, G., V. Klema, and G.W. Stewart, "ROSEPACK Document No. 4: Rank Degeneracy and Least Squares Problems", NBER Working Paper 165, February 1977.

This paper is concerned with least squares problems when the least squares matrix A is near a matrix that is not of full rank. A definition of numerical rank is given. It is shown that under certain conditions when A has numerical rank r there is a distinguished r -dimensional subspace of the column space of A that is insensitive to how it is approximated by r independent columns of A . The consequences of this fact for the least squares problem are examined. Algorithms are described for approximating the stable part of the column space of A .

Welsch, Roy E., and Edwin Kuh, "Linear Regression Diagnostics", NBER Working Paper 173, March 1977.

This paper attempts to provide the user of linear multiple regression with a battery of diagnostic tools to determine which, if any, data points have high leverage or influence on the estimation process and how these possibly discrepant data points differ from the patterns set by the majority of the data. The point of view taken is that when diagnostics indicate the presence of anomolous data, the choice is open as to whether these data are in fact unusual and helpful, or possibly harmful and thus in need of modifications or deletions.

The methodology developed depends on differences, derivatives, and decompositions of basic regression statistics. There is also a discussion of how these techniques can be used with robust and ridge estimators. An example is given showing the use of diagnostic methods in the estimation of a cross-country savings rate model.