YLDFAC

YLDFAC *symmetric matrix diagonal matrix triangular matrix*;

Function:

YLDFAC factors a symmetric matrix X into a triangular matrix L' and a diagonal matrix D such that X = LDL' and the diagonals of D are functions of the characteristic roots of X.

Usage:

Three required arguments to YLDFAC are: name given to the matrix to be factored (must be symmetric or an error message will be printed); name given to the diagonal matrix; and name given to the upper triangular matrix. Most symmetric matrices can be factored in this way. The elements of D are functions of the characteristic roots of the input matrix. If all the diagonal elements of D are positive, the input matrix is positive definite. If all of them are nonnegative, the input matrix is positive semidefinite. If there are some positive elements of D and some negative, the input matrix is indefinite. Zero elements on the diagonal of D imply that the input matrix is singular or near singular. The diagonal elements of L are normalized to 1.

Example:

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YLDFAC A DIAG UPPER ;
MAT ANEW = UPPER ' DIAG*UPPER ;
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generates a matrix ANEW which is identical to the original matrix A. Note that because the triangular matrix is stored as an upper triangle, it must be transposed to obtain L.

Output:

YLDFAC produces no printed output. Two matrices are stored in data storage.

Method:

A modified Choleski method of factorization is used where the diagonal element is extracted from the square root matrix as the factorization is performed. The underlying method is described in the Faddeev reference.

References:

Almon, Clopper, **Matrix Methods in Econometrics,** Addison-Wesley Publishing Company, Reading, Mass., 1967, pp. 115-120.

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Faddeev, V. N., **Computational Methods of Linear Algebra,** (trans. C. Benster), Dover, New York, 1959.

Rao, C. Radhakrishna, **Linear Statistical Inference and its Applications,** John Wiley and Sons, New York, 1965, pp. 17-20.