1 SUMMARY

Appends an \( n+1 \) vector to an \( n \times n \) triangular matrix to form an \( (n+1) \times (n+1) \) triangular matrix, i.e. given an upper triangular matrix \( U = \{u_{ij}\}_{n \times n} \) and a vector \( \mu = \mu_1, \mu_2, \ldots, \mu_n \), this subroutine forms the triangular matrix

\[
\tilde{U} = \begin{pmatrix}
U \\
\vdots \\
0 & \mu
\end{pmatrix}
\]

Both \( \tilde{U} \) and \( U \) are stored in compact form.


2 HOW TO USE THE PACKAGE

2.1 The argument list

The single precision version

\[
\text{CALL MC16A}(A,N,\text{COL})
\]

The double precision version

\[
\text{CALL MC16AD}(A,N,\text{COL})
\]

\( A \) is a REAL (DOUBLE PRECISION in the D version) one dimensional array of length at least \( (n+1)(n+2)/2 \), whose first \( n(n+1)/2 \) elements represent \( U \). It is convenient to use the notation \( d_1, l_{21}, l_{31}, \ldots, l_{n1}, d_2, l_{32}, \ldots, l_{n2}, \ldots, d_n \) for these elements, to let \( D \) be the diagonal matrix whose diagonal elements are \( d_1, d_2, \ldots, d_n \), and to let \( L \) be the lower triangular matrix with ones on the diagonal whose other non-zero elements are \( l_{ij} \) \( (i \geq j) \). Then \( D \) and \( L \) are related to \( U \) by the equation \( U' = LDL' \). On exit from the subroutine the first \( (n+1)(n+2)/2 \) elements of \( \lambda \) represent the required upper triangular matrix, in the \( \text{D-L} \) form that is used for input.

\( N \) is an INTEGER that is initially set to the dimension of \( U \). The subroutine increases its value by one to correspond to the dimension of the new matrix. Restriction: \( n>0 \).

\( \text{COL} \) is REAL (DOUBLE PRECISION in the D version) one dimensional array, whose first \( n+1 \) elements are the components of the vector that is appended to \( U \). It is unchanged by the subroutine.

3 GENERAL INFORMATION

Workspace: The total amount of work is a small multiple of \( n^3 \), due to shifting the information in the array \( A \).

Use of common: None.

Other routines called directly: None.

Input/output: Other.

Restrictions: \( n>0 \). There is no upper bound on the value of \( n \).