NAG Fortran Library Routine Document

F06ULF

Note: before using this routine, please read the Users' Note for your implementation to check the interpretation of ***bold italicised*** terms and other implementation-dependent details.

1 Purpose

F06ULF returns, via the function name, the value of the 1-norm, the ∞-norm, the Frobenius norm, or the maximum absolute value of the elements of a complex n by n triangular band matrix.

2 Specification

double precision `FUNCTION F06ULF (NORM, UPLO, DIAG, N, K, AB, LDAB, WORK)`

```
INTEGER                          N, K, LDAB
double precision                 WORK(*)
complex*16                       AB(LDAB,*)
CHARACTER*1                      NORM, UPLO, DIAG
```

3 Description

None.

4 References

None.

5 Parameters

1: NORM – CHARACTER*1 *Input*

On entry: specifies the value to be returned:

if NORM = '1' or 'O', the 1-norm;
if NORM = 'I', the ∞-norm;
if NORM = 'F' or 'E', the Frobenius (or Euclidean) norm;
if NORM = 'M', the value $\max_{i,j}|a_{ij}|$ (not a norm).

Constraint: NORM = '1', 'O', 'I', 'F', 'E' or 'M'.

2: UPLO – CHARACTER*1 *Input*

On entry: specifies whether A is upper or lower triangular as follows:

if UPLO = 'U', A is upper triangular;
if UPLO = 'L', A is lower triangular.

Constraint: UPLO = 'U' or 'L'.

3: DIAG – CHARACTER*1 *Input*

On entry: specifies whether A has non-unit or unit diagonal elements, as follows:

if DIAG = 'N', the diagonal elements are stored explicitly;
if DIAG = 'U', the diagonal elements are assumed to be 1, and are not referenced.

Constraint: DIAG = 'N' or 'U'.

4: N – INTEGER *Input*

On entry: n, the order of the matrix A.

Constraint: $\mathrm{N} \geq 0$.

5: K – INTEGER *Input*

On entry: k, the number of sub-diagonals or super-diagonals of the matrix A.

Constraint: $\mathrm{K} \geq 0$.

6: AB(LDAB,$*$) – ***complex*16*** array *Input*

Note: the second dimension of the array AB must be at least $\max(1, \mathrm{N})$.

On entry: the n by n triangular band matrix A, stored in rows 1 to $k+1$. More precisely, if UPLO $=$ 'U', the elements of the upper triangle of A within the band must be stored with element a_{ij} in $\mathrm{AB}(k+1+i-j, j)$ for $\max(1, j-k) \leq i \leq j$; if UPLO $=$ 'L', the elements of the lower triangle of A within the band must be stored with element a_{ij} in $\mathrm{AB}(1+i-j, j)$ for $j \leq i \leq \min(n, j+k)$. If DIAG $=$ 'U', the diagonal elements of A are assumed to be 1, and are not referenced.

7: LDAB – INTEGER *Input*

On entry: the first dimension of the array AB as declared in the (sub)program from which F06ULF is called.

Constraint: $\mathrm{LDAB} \geq \mathrm{K}+1$.

8: WORK($*$) – ***double precision*** array *Workspace*

Note: the dimension of the array WORK must be at least $\max(1, \mathrm{N})$ if NORM $=$ 'I' and at least 1 otherwise.

6 Error Indicators and Warnings

None.