

NAG Library Routine Document

F06RLF

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

F06RLF 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 real n by n triangular band matrix.

2 Specification

```
FUNCTION F06RLF (NORM, UPLO, DIAG, N, K, AB, LDAB, WORK)
REAL (KIND=nag_wp) F06RLF
INTEGER           N, K, LDAB
REAL (KIND=nag_wp) AB(LDAB,*), WORK(*)
CHARACTER(1)     NORM, UPLO, DIAG
```

3 Description

None.

4 References

None.

5 Arguments

- 1: NORM – CHARACTER(1) *Input*
On entry: specifies the value to be returned.
 NORM = '1' or 'O'
 The 1-norm.
 NORM = 'I'
 The ∞ -norm.
 NORM = 'F' or 'E'
 The Frobenius (or Euclidean) norm.
 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.
 UPLO = 'U'
 A is upper triangular.
 UPLO = 'L'
 A is lower triangular.
Constraint: UPLO = 'U' or 'L'.

- 3: DIAG – CHARACTER(1) *Input*
On entry: specifies whether A has nonunit or unit diagonal elements.
 DIAG = 'N'
 The diagonal elements are stored explicitly.
 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 .
 When $N = 0$, F06RLF returns zero.
Constraint: $N \geq 0$.
- 5: K – INTEGER *Input*
On entry: k , the number of subdiagonals or superdiagonals of the matrix A .
Constraint: $K \geq 0$.
- 6: AB(LDAB,*) – REAL (KIND=nag_wp) array *Input*
Note: the second dimension of the array AB must be at least N .
On entry: the n by n triangular band matrix A
 The matrix is 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 $AB(k + 1 + i - j, j)$ 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 $AB(1 + i - j, j)$ 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
 F06RLF is called.
Constraint: LDAB \geq K + 1.
- 8: WORK(*) – REAL (KIND=nag_wp) array *Workspace*
Note: the dimension of the array WORK must be at least $\max(1, N)$ if NORM = 'I', and at least 1
 otherwise.

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Parallelism and Performance

F06RLF is not threaded in any implementation.

9 Further Comments

None.

10 Example

None.
