NAG Library Routine Document

F06RJF

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

F06RJF 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 m by n trapezoidal matrix (triangular if $m = n$).

2 Specification

```
FUNCTION F06RJF (NORM, UPLO, DIAG, M, N, A, LDA, WORK)
REAL (KIND=nag_wp) F06RJF
INTEGER            M, N, LDA
REAL (KIND=nag_wp) A(LDA,*), WORK(*)
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.

NORM = '1' or 'O'
The 1-norm.

NORM = 'I'
The ∞-norm.

NORM = 'F' or 'E'
The Frobenius (or Euclidean) norm.

NORM = 'M'
The value $\max_{i,j} \left|a_{ij}\right|$ (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 trapezoidal.

UPLO = 'U'
A is upper trapezoidal.

UPLO = 'L'
A is lower trapezoidal.

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: M – INTEGER *Input*

On entry: m, the number of rows of the matrix A.

When M = 0, F06RJF is set to zero.

Constraint: M $\geq$ 0.

5: N – INTEGER *Input*

On entry: n, the number of columns of the matrix A.

When N = 0, F06RJF is set to zero.

Constraint: N $\geq$ 0.

6: A(LDA, $*$) – REAL (KIND=nag_wp) array *Input*

Note: the second dimension of the array A must be at least N.

On entry: the m by n trapezoidal matrix A.

If UPLO = 'U', A is upper trapezoidal and the elements of the array below the diagonal are not referenced.

If UPLO = 'L', A is lower trapezoidal and the elements of the array above the diagonal are not referenced.

If DIAG = 'U', the diagonal elements of A are assumed to be 1, and are not referenced.

7: LDA – INTEGER *Input*

On entry: the first dimension of the array A as declared in the (sub)program from which F06RJF is called.

Constraint: LDA $\geq$ max(1, M).

8: WORK($*$) – REAL (KIND=nag_wp) array *Workspace*

Note: the dimension of the array WORK must be at least max(1, M) if NORM = 'I', and at least 1 otherwise.

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Parallelism and Performance

Not applicable.

9 Further Comments

None.

10 Example

None.