

NAG Library Routine Document

F06REF

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

F06REF 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 symmetric band matrix.

2 Specification

```
FUNCTION F06REF (NORM, UPLO, N, K, AB, LDAB, WORK)
REAL (KIND=nag_wp) F06REF
INTEGER           N, K, LDAB
REAL (KIND=nag_wp) AB(LDAB,*), WORK(*)
CHARACTER(1)     NORM, UPLO
```

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 (= the 1-norm for a symmetric matrix).
 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 the upper or lower triangular part of A is stored.
 UPLO = 'U'
 The upper triangular part of A is stored.
 UPLO = 'L'
 The lower triangular part of A is stored.
Constraint: UPLO = 'U' or 'L'.

- 3: N – INTEGER *Input*
On entry: n , the order of the matrix A .
 When $N = 0$, F06REF returns zero.
Constraint: $N \geq 0$.
- 4: K – INTEGER *Input*
On entry: k , the number of subdiagonals or superdiagonals of the matrix A .
Constraint: $K \geq 0$.
- 5: 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 symmetric 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 $j \leq i \leq \min(n, j + k)$.
- 6: LDAB – INTEGER *Input*
On entry: the first dimension of the array AB as declared in the (sub)program from which
 F06REF is called.
Constraint: $LDAB \geq K + 1$.
- 7: WORK(*) – REAL (KIND=nag_wp) array *Workspace*
Note: the dimension of the array WORK must be at least $\max(1, N)$ if NORM = '1', 'O' or 'I', and
 at least 1 otherwise.

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Parallelism and Performance

F06REF is not threaded in any implementation.

9 Further Comments

None.

10 Example

None.
