NAG Library Routine Document

F06UBF

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

F06UBF 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 band matrix.

2 Specification

```
FUNCTION F06UBF (NORM, N, KL, KU, AB, LDAB, WORK)
REAL (KIND=nag_wp) F06UBF
INTEGER                 N, KL, KU, LDAB
REAL (KIND=nag_wp)      WORK(*)
COMPLEX (KIND=nag_wp)   AB(LDAB,*)
CHARACTER(1)            NORM
```

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 $\max_{i,j} \left|a_{ij}\right|$ (not a norm).

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

2: N – INTEGER *Input*

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

When N = 0, F06UBF returns zero.

Constraint: N $\geq$ 0.

3: KL – INTEGER *Input*

On entry: k_l, the number of subdiagonals within the band of A.

Constraint: KL ≥ 0.

4: KU – INTEGER *Input*

On entry: k_u, the number of superdiagonals within the band of A.

Constraint: KU ≥ 0.

5: AB(LDAB, $*$) – COMPLEX (KIND=nag_wp) array *Input*

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

On entry: the n by n band matrix A.

The matrix is stored in rows 1 to $k_l + k_u + 1$, more precisely, the element A_{ij} must be stored in

$$\text{AB}(k_u + 1 + i - j, j) \quad \text{for } \max(1, j - k_u) \leq i \leq \min(n, j + k_l).$$

6: LDAB – INTEGER *Input*

On entry: the first dimension of the array AB as declared in the (sub)program from which F06UBF is called.

Constraint: LDAB $\geq$ KL + KU + 1.

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

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

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Parallelism and Performance

F06UBF is not threaded in any implementation.

9 Further Comments

None.

10 Example

None.