

NAG Library Routine Document

F06RBF

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

F06RBF 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 band matrix.

2 Specification

```
FUNCTION F06RBF (NORM, N, KL, KU, AB, LDAB, WORK)
REAL (KIND=nag_wp) F06RBF
INTEGER              N, KL, KU, LDAB
REAL (KIND=nag_wp) AB(LDAB,*), WORK(*)
CHARACTER(1)         NORM
```

3 Description

None.

4 References

None.

5 Arguments

- | | | |
|----|---|--------------|
| 1: | <p>NORM – CHARACTER(1)</p> <p><i>On entry:</i> specifies the value to be returned.</p> <p>NORM = '1' or 'O'
The 1-norm.</p> <p>NORM = 'I'
The ∞-norm.</p> <p>NORM = 'F' or 'E'
The Frobenius (or Euclidean) norm.</p> <p>NORM = 'M'
The value $\max_{i,j} a_{ij}$ (not a norm).</p> <p><i>Constraint:</i> NORM = '1', 'O', 'I', 'F', 'E' or 'M'.</p> | <i>Input</i> |
| 2: | <p>N – INTEGER</p> <p><i>On entry:</i> n, the order of the matrix A.</p> <p>When $N = 0$, F06RBF returns zero.</p> <p><i>Constraint:</i> $N \geq 0$.</p> | <i>Input</i> |
| 3: | <p>KL – INTEGER</p> <p><i>On entry:</i> k_l, the number of subdiagonals within the band of A.</p> <p><i>Constraint:</i> $KL \geq 0$.</p> | <i>Input</i> |

- 4: KU – INTEGER *Input*
On entry: k_u , the number of superdiagonals within the band of A .
Constraint: $KU \geq 0$.
- 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 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

$$AB(k_u + 1 + i - j, j) \quad \text{for } \max(1, j - k_u) \leq i \leq \min(n, j + k_l).$$
- 6: LDAB – INTEGER *Input*
On entry: the first dimension of the array AB as declared in the (sub)program from which F06RBF 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 $\max(1, N)$ if NORM = 'I', and at least 1 otherwise.

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Parallelism and Performance

F06RBF is not threaded in any implementation.

9 Further Comments

None.

10 Example

None.
