

# 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  $\infty$ -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: NORM – CHARACTER(1) *Input*  
*On entry:* specifies the value to be returned.  
 NORM = '1' or 'O'  
     The 1-norm.  
 NORM = 'I'  
     The  $\infty$ -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: N – INTEGER *Input*  
*On entry:*  $n$ , the order of the matrix  $A$ .  
 When  $N = 0$ , F06RBF returns zero.  
*Constraint:*  $N \geq 0$ .
- 3: KL – INTEGER *Input*  
*On entry:*  $k_l$ , the number of subdiagonals within the band of  $A$ .  
*Constraint:*  $KL \geq 0$ .

- 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.

---