

# NAG Library Routine Document

## F06RAF

**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

F06RAF 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  $m$  by  $n$  matrix.

### 2 Specification

```
FUNCTION F06RAF (NORM, M, N, A, LDA, WORK)
```

```
REAL (KIND=nag_wp) F06RAF
```

```
INTEGER           M, N, LDA
```

```
REAL (KIND=nag_wp) A(LDA,*), WORK(*)
```

```
CHARACTER(1)     NORM
```

### 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  $\infty$ -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: M – INTEGER *Input*

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

When  $M = 0$ , F06RAF is set to zero.

*Constraint:*  $M \geq 0$ .

3: N – INTEGER *Input*

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

When  $N = 0$ , F06RAF is set to zero.

*Constraint:*  $N \geq 0$ .

4: 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  $n$  matrix  $A$ .

5: LDA – INTEGER *Input*

*On entry:* the first dimension of the array A as declared in the (sub)program from which F06RAF is called.

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

6: 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 Further Comments

None.

## 9 Example

None.

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