

# NAG Library Routine Document

## F06RCF

**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

F06RCF 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  $n$  symmetric matrix.

### 2 Specification

```
FUNCTION F06RCF (NORM, UPLO, N, A, LDA, WORK)
REAL (KIND=nag_wp) F06RCF
INTEGER          N, LDA
REAL (KIND=nag_wp) A(LDA,*), WORK(*)
CHARACTER(1)    NORM, UPLO
```

### 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 (= 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  $N = 0$ , F06RCF returns 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  $\max(1, N)$ .  
*On entry:* the  $n$  by  $n$  symmetric matrix  $A$ .  
 If UPLO = 'U', the upper triangular part of  $A$  must be stored and the elements of the array below the diagonal are not referenced.  
 If UPLO = 'L', the lower triangular part of  $A$  must be stored and the elements of the array above the diagonal are not referenced.
- 5: LDA – INTEGER *Input*  
*On entry:* the first dimension of the array  $A$  as declared in the (sub)program from which F06RCF is called.  
*Constraint:*  $LDA \geq \max(1, N)$ .
- 6: 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

Not applicable.

## 9 Further Comments

None.

## 10 Example

None.

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