

# NAG Library Routine Document

## F06UJF

**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

F06UJF 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 complex  $m$  by  $n$  trapezoidal matrix (triangular if  $m = n$ ).

### 2 Specification

```
FUNCTION F06UJF (NORM, UPLO, DIAG, M, N, A, LDA, WORK)
REAL (KIND=nag_wp) F06UJF
INTEGER                M, N, LDA
REAL (KIND=nag_wp)    WORK(*)
COMPLEX (KIND=nag_wp) A(LDA,*)
CHARACTER(1)          NORM, UPLO, DIAG
```

### 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: UPLO – CHARACTER(1) *Input*  
*On entry:* specifies whether  $A$  is upper or lower trapezoidal.  
 UPLO = 'U'  
      $A$  is upper trapezoidal.  
 UPLO = 'L'  
      $A$  is lower trapezoidal.  
*Constraint:* UPLO = 'U' or 'L'.

- 3:    DIAG – CHARACTER(1) *Input*  
*On entry:* specifies whether  $A$  has nonunit or unit diagonal elements.  
 DIAG = 'N'  
       The diagonal elements are stored explicitly.  
 DIAG = 'U'  
       The diagonal elements are assumed to be 1, and are not referenced.  
*Constraint:* DIAG = 'N' or 'U'.
- 4:    M – INTEGER *Input*  
*On entry:*  $m$ , the number of rows of the matrix  $A$ .  
 When  $M = 0$ , F06UJF is set to zero.  
*Constraint:*  $M \geq 0$ .
- 5:    N – INTEGER *Input*  
*On entry:*  $n$ , the number of columns of the matrix  $A$ .  
 When  $N = 0$ , F06UJF is set to zero.  
*Constraint:*  $N \geq 0$ .
- 6:    A(LDA,\*) – COMPLEX (KIND=nag\_wp) array *Input*  
**Note:** the second dimension of the array  $A$  must be at least  $N$ .  
*On entry:* the  $m$  by  $n$  trapezoidal matrix  $A$ .  
       If UPLO = 'U',  $A$  is upper trapezoidal and the elements of the array below the diagonal are not referenced.  
       If UPLO = 'L',  $A$  is lower trapezoidal and the elements of the array above the diagonal are not referenced.  
       If DIAG = 'U', the diagonal elements of  $A$  are assumed to be 1, and are not referenced.
- 7:    LDA – INTEGER *Input*  
*On entry:* the first dimension of the array  $A$  as declared in the (sub)program from which F06UJF is called.  
*Constraint:*  $LDA \geq \max(1, M)$ .
- 8:    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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