

# NAG Fortran Library Routine Document

## F06UHF

**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

F06UHF 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  $n$  by  $n$  symmetric band matrix.

### 2 Specification

```
double precision FUNCTION F06UHF (NORM, UPLO, N, K, AB, LDAB, WORK)
INTEGER                                N, K, LDAB
double precision                     WORK(*)
complex*16                           AB(LDAB,*)
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:  
     if NORM = '1' or 'O', the 1-norm;  
     if NORM = 'I', the  $\infty$ -norm (= the 1-norm for a symmetric matrix);  
     if NORM = 'F' or 'E', the Frobenius (or Euclidean) norm;  
     if 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 as follows:  
     if UPLO = 'U', the upper triangular part of  $A$  is stored;  
     if 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  $A$ .  
*Constraint:*  $N \geq 0$ .
- 4: K – INTEGER *Input*  
*On entry:*  $k$ , the number of sub-diagonals or super-diagonals of the matrix  $A$ .  
*Constraint:*  $K \geq 0$ .

- 5: AB(LDAB,\*) – **complex\*16** array *Input*

**Note:** the second dimension of the array AB must be at least  $\max(1, N)$ .

*On entry:* the  $n$  by  $n$  symmetric band matrix  $A$ , stored in rows 1 to  $k + 1$ . More precisely, if UPLO = 'U', the elements of the upper triangle of  $A$  within the band must be stored with element  $a_{ij}$  in  $AB(k + 1 + i - j, j)$  for  $\max(1, j - k) \leq i \leq j$ ; if UPLO = 'L', the elements of the lower triangle of  $A$  within the band must be stored with element  $a_{ij}$  in  $AB(1 + i - j, j)$  for  $j \leq i \leq \min(n, j + k)$ .

- 6: LDAB – INTEGER *Input*

*On entry:* the first dimension of the array AB as declared in the (sub)program from which F06UHF is called.

*Constraint:*  $LDAB \geq K + 1$ .

- 7: WORK(\*) – **double precision** 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.

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