NAG Library Routine Document

F06HCF

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

F06HCF multiplies a complex vector by a complex diagonal matrix.

2 Specification

```
SUBROUTINE F06HCF (N, D, INCD, X, INCX)

INTEGER                 N, INCD, INCX
COMPLEX (KIND=nag_wp) D(*), X(*)
```

3 Description

F06HCF performs the operation

$$x \leftarrow Dx$$

where x is an n-element complex vector and $D = \mathrm{diag}(d)$ is a complex diagonal matrix.

Equivalently, the routine performs the element-by-element product of the vectors x and d

$$x_i = d_i x_i, \qquad i = 1, 2, \ldots, n.$$

4 References

None.

5 Parameters

1: N – INTEGER *Input*

On entry: n, the number of elements in d and x.

2: D($*$) – COMPLEX (KIND=nag_wp) array *Input*

Note: the dimension of the array D must be at least $\max(1, 1 + (\mathrm{N} - 1) \times |\mathrm{INCD}|)$.

On entry: the vector d.

If INCD > 0, d_i must be stored in D$(1 + (i - 1) \times \mathrm{INCD})$, for $i = 1, 2, \ldots, \mathrm{N}$.

If INCD < 0, d_i must be stored in D$(1 - (\mathrm{N} - i) \times \mathrm{INCD})$, for $i = 1, 2, \ldots, \mathrm{N}$.

3: INCD – INTEGER *Input*

On entry: the increment in the subscripts of D between successive elements of d.

4: X($*$) – COMPLEX (KIND=nag_wp) array *Input/Output*

Note: the dimension of the array X must be at least $\max(1, 1 + (\mathrm{N} - 1) \times |\mathrm{INCX}|)$.

On entry: the array X must contain the n-element vector x.

If INCX > 0, x_i must be stored in X$(1 + (i - 1) \times \mathrm{INCX})$, for $i = 1, 2, \ldots, \mathrm{N}$.

If INCX < 0, x_i must be stored in X$(1 - (\mathrm{N} - i) \times \mathrm{INCX})$, for $i = 1, 2, \ldots, \mathrm{N}$.

On exit: the updated vector x stored in the array elements used to supply the original vector x. Intermediate elements of X are unchanged.

5: INCX – INTEGER *Input*

On entry: the increment in the subscripts of X between successive elements of x.

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

None.