NAG Library Routine Document

F06HTF

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

F06HTF applies a complex elementary reflection to a complex vector.

2 Specification

```
SUBROUTINE F06HTF (N, DELTA, Y, INCY, THETA, Z, INCZ)

INTEGER                 N, INCY, INCZ
COMPLEX (KIND=nag_wp) DELTA, Y(*), THETA, Z(*)
```

3 Description

F06HTF applies a complex elementary reflection (Householder matrix) P, as generated by F06HRF, to a given complex vector:

$$\begin{pmatrix} \delta \\ y \end{pmatrix} \leftarrow P \begin{pmatrix} \delta \\ y \end{pmatrix}$$

where y is an n-element complex vector and δ is a complex scalar.

To apply the conjugate transpose matrix P^{H}, call F06HTF with $\bar{\theta}$ in place of θ.

4 References

None.

5 Parameters

1: N – INTEGER *Input*

On entry: n, the number of elements in y and z.

2: DELTA – COMPLEX (KIND=nag_wp) *Input/Output*

On entry: the original scalar δ.

On exit: the transformed scalar δ.

3: Y$(*)$ – COMPLEX (KIND=nag_wp) array *Input/Output*

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

On entry: the original vector y.

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

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

On exit: the transformed stored in the same array elements used to supply the original vector y.

4: INCY – INTEGER *Input*

On entry: the increment in the subscripts of Y between successive elements of y.

5: THETA – COMPLEX (KIND=nag_wp) *Input*

On entry: the value θ, as returned by F06HRF.

If $\theta = 0$, P is assumed to be the unit matrix and the transformation is skipped.

Constraint: if THETA ≤ 0, $n = 0$.

6: Z$(*)$ – COMPLEX (KIND=nag_wp) array *Input*

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

On entry: the vector z, as returned by F06HRF.

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

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

7: INCZ – INTEGER *Input*

On entry: the increment in the subscripts of Z between successive elements of z.

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

None.