

NAG Library Routine Document

F06HMF (ZROT)

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

F06HMF (ZROT) applies a plane rotation with a real cosine and complex sine to two complex vectors.

2 Specification

```
SUBROUTINE F06HMF (N, CX, INCX, CY, INCY, C, S)
  INTEGER          N, INCX, INCY
  REAL (KIND=nag_wp)  C
  COMPLEX (KIND=nag_wp) CX(*), CY(*), S
```

The routine may be called by its LAPACK name *zrot*.

3 Description

F06HMF (ZROT) applies a plane rotation, where the cosine is real and the sine is complex, to two n -element complex vectors x and y :

$$\begin{pmatrix} x^T \\ y^T \end{pmatrix} \leftarrow \begin{pmatrix} c & s \\ -\bar{s} & c \end{pmatrix} \begin{pmatrix} x^T \\ y^T \end{pmatrix}.$$

4 References

None.

5 Arguments

- 1: N – INTEGER *Input*
On entry: n , the number of elements in x and y .
- 2: CX(*) – COMPLEX (KIND=nag_wp) array *Input/Output*
Note: the dimension of the array CX must be at least $\max(1, 1 + (N - 1) \times |\text{INCX}|)$.
On entry: the n -element vector x .
 If $\text{INCX} > 0$, x_i must be stored in $\text{CX}(1 + (i - 1) \times \text{INCX})$, for $i = 1, 2, \dots, N$.
 If $\text{INCX} < 0$, x_i must be stored in $\text{CX}(1 - (N - i) \times \text{INCX})$, for $i = 1, 2, \dots, N$.
 Intermediate elements of CX are not referenced.
On exit: the transformed vector x stored in the array elements used to supply the original vector x .
 Intermediate elements of CX are unchanged.
- 3: INCX – INTEGER *Input*
On entry: the increment in the subscripts of CX between successive elements of x .

- 4: CY(*) – COMPLEX (KIND=nag_wp) array *Input/Output*
Note: the dimension of the array CY must be at least $\max(1, 1 + (N - 1) \times |\text{INCY}|)$.
On entry: the n -element vector y .
 If $\text{INCY} > 0$, y_i must be stored in $\text{CY}(1 + (i - 1) \times \text{INCY})$, for $i = 1, 2, \dots, N$.
 If $\text{INCY} < 0$, y_i must be stored in $\text{CY}(1 - (N - i) \times \text{INCY})$, for $i = 1, 2, \dots, N$.
 Intermediate elements of CY are not referenced.
On exit: the transformed vector y .
 Intermediate elements of CY are unchanged.
- 5: INCY – INTEGER *Input*
On entry: the increment in the subscripts of CY between successive elements of y .
- 6: C – REAL (KIND=nag_wp) *Input*
On entry: the value c , the cosine of the rotation.
- 7: S – COMPLEX (KIND=nag_wp) *Input*
On entry: the value s , the sine of the rotation.

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Parallelism and Performance

F06HMF (ZROT) is not threaded in any implementation.

9 Further Comments

None.

10 Example

None.
