

NAG Library Routine Document

F06TCF

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

F06TCF performs the matrix-vector operation

$$y \leftarrow \alpha Ax + \beta y$$

where A is an n by n complex symmetric matrix stored in packed form, x and y are n -element complex vectors, and α and β are complex scalars.

2 Specification

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SUBROUTINE F06TCF (UPLO, N, ALPHA, AP, X, INCX, BETA, Y, INCY)
  INTEGER          N, INCX, INCY
  COMPLEX (KIND=nag_wp) ALPHA, AP(*), X(*), BETA, Y(*)
  CHARACTER(1)    UPLO
```

3 Description

None.

4 References

None.

5 Arguments

- | | | |
|----|---|--------------|
| 1: | UPLO – CHARACTER(1) | <i>Input</i> |
| | <i>On entry:</i> specifies whether the upper or lower triangular part of A is stored. | |
| | UPLO = 'U'
The upper triangular part of A is stored. | |
| | UPLO = 'L'
The lower triangular part of A is stored. | |
| | <i>Constraint:</i> UPLO = 'U' or 'L'. | |
| 2: | N – INTEGER | <i>Input</i> |
| | <i>On entry:</i> n , the order of the matrix A . | |
| | <i>Constraint:</i> $N \geq 0$. | |
| 3: | ALPHA – COMPLEX (KIND=nag_wp) | <i>Input</i> |
| | <i>On entry:</i> the scalar α . | |
| 4: | AP(*) – COMPLEX (KIND=nag_wp) array | <i>Input</i> |
| | Note: the dimension of the array AP must be at least $N \times (N + 1)/2$. | |
| | <i>On entry:</i> the n by n symmetric matrix A , packed by columns. | |
| | More precisely, | |

if UPLO = 'U', the upper triangle of A must be stored with element A_{ij} in $AP(i + j(j - 1)/2)$ for $i \leq j$;

if UPLO = 'L', the lower triangle of A must be stored with element A_{ij} in $AP(i + (2n - j)(j - 1)/2)$ for $i \geq j$.

5: X(*) – COMPLEX (KIND=nag_wp) array *Input*

Note: the dimension of the array X 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 $X(1 + (i - 1) \times \text{INCX})$, for $i = 1, 2, \dots, N$.

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

Intermediate elements of X are not referenced.

6: INCX – INTEGER *Input*

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

Constraint: $\text{INCX} \neq 0$.

7: BETA – COMPLEX (KIND=nag_wp) *Input*

On entry: the scalar β .

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

Note: the dimension of the array Y 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 $Y(1 + (i - 1) \times \text{INCY})$, for $i = 1, 2, \dots, N$.

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

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

9: INCY – INTEGER *Input*

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

Constraint: $\text{INCY} \neq 0$.

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Parallelism and Performance

F06TCF is not threaded in any implementation.

9 Further Comments

None.

10 Example

None.
