NAG Fortran Library Routine Document

F06SHF (ZTPMV)

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

F06SHF (ZTPMV) performs one of the matrix-vector operations

$$x \leftarrow Ax, \quad x \leftarrow A^T x \quad \text{or} \quad x \leftarrow A^H x,$$

where A is an n by n complex triangular matrix, stored in packed form, and x is an n element complex vector.

2   Specification

```
SUBROUTINE F06SHF (UPLO, TRANS, DIAG, N, AP, X, INCX)
INTEGER           N, INCX
complex*16        AP(*), X(*)
CHARACTER*1       UPLO, TRANS, DIAG
```

The routine may be called by its BLAS name **ztpmv**.

3   Description

None.

4   References

None.

5   Parameters

1:    UPLO – CHARACTER*1   *Input*

On entry: specifies whether A is upper or lower triangular as follows:

>   if UPLO = 'U', A is upper triangular;
>   if UPLO = 'L', A is lower triangular.

Constraint: UPLO = 'U' or 'L'.

2:    TRANS – CHARACTER*1   *Input*

On entry: specifies the operation to be performed as follows:

>   if TRANS = 'N', $x \leftarrow Ax$;
>   if TRANS = 'T', $x \leftarrow A^T x$;
>   if TRANS = 'C', $x \leftarrow A^H x$.

Constraint: TRANS = 'N', 'T' or 'C'.

3:    DIAG – CHARACTER*1   *Input*

On entry: specifies whether A has non-unit or unit diagonal elements, as follows:

>   if DIAG = 'N', the diagonal elements are stored explicitly;
>   if DIAG = 'U', the diagonal elements are assumed to be 1, and are not referenced.

Constraint: DIAG = 'N' or 'U'.

4: N – INTEGER *Input*

On entry: n, the order of the matrix A.

Constraint: $N \geq 0$.

5: AP($*$) – **complex*16** array *Input*

Note: the dimension of the array AP must be at least $\max(1, N \times (N + 1)/2)$.

On entry: the n by n triangular 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 $i \geq j$. If DIAG = 'U', the diagonal elements of A are assumed to be 1, and are not referenced; the same storage scheme is used whether DIAG = 'N' or 'U'.

6: X($*$) – **complex*16** array *Input/Output*

On entry: the vector x.

On exit: the updated vector x.

7: INCX – INTEGER *Input*

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

Constraint: INCX $\neq$ 0.

6 Error Indicators and Warnings

None.