

NAG Fortran Library Routine Document

F06SPF (ZHER)

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

F06SPF (ZHER) performs the Hermitian rank-1 update operation

$$A \leftarrow \alpha x x^H + A,$$

where A is an n by n complex Hermitian matrix, x is an n element complex vector, and α is a real scalar.

2 Specification

```
SUBROUTINE F06SPF (UPLO, N, ALPHA, X, INCX, A, LDA)
  INTEGER          N, INCX, LDA
  double precision ALPHA
  complex*16      X(*), A(LDA,*)
  CHARACTER*1     UPLO
```

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

3 Description

None.

4 References

None.

5 Parameters

- | | | |
|----|---|--------------|
| 1: | UPLO – CHARACTER*1 | <i>Input</i> |
| | <i>On entry:</i> specifies whether the upper or lower triangular part of A is stored as follows:
if UPLO = 'U', the upper triangular part of A is stored;
if 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 – double precision | <i>Input</i> |
| | <i>On entry:</i> the scalar α . | |
| 4: | X(*) – complex*16 array | <i>Input</i> |
| | <i>On entry:</i> the vector x . | |

- 5: INCX – INTEGER *Input*
On entry: the increment in the subscripts of X between successive elements of x .
Constraint: $\text{INCX} \neq 0$.
- 6: A(LDA,*) – **complex*16** array *Input/Output*
Note: the second dimension of the array A must be at least $\max(1, N)$.
On entry: the n by n Hermitian matrix A . If UPLO = 'U', the upper triangle of A must be stored and the elements of the array below the diagonal are not referenced; if UPLO = 'L', the lower triangle of A must be stored and the elements of the array above the diagonal are not referenced.
On exit: the updated matrix A . The imaginary parts of the diagonal elements are set to zero.
- 7: LDA – INTEGER *Input*
On entry: the first dimension of the array A as declared in the (sub)program from which F06SPF (ZHER) is called.
Constraint: $\text{LDA} \geq \max(1, N)$.

6 Error Indicators and Warnings

None.
