

NAG Fortran Library Routine Document

F06SQF (ZHPR)

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

F06SQF (ZHPR) performs the Hermitian rank-1 update operation

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

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

2 Specification

```

SUBROUTINE F06SQF (UPLO, N, ALPHA, X, INCX, AP)
  INTEGER          N, INCX
  double precision ALPHA
  complex*16     X(*), AP(*)
  CHARACTER*1     UPLO

```

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

3 Description

None.

4 References

None.

5 Parameters

- 1: UPLO – CHARACTER*1 *Input*
On entry: 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.
Constraint: UPLO = 'U' or 'L'.
- 2: N – INTEGER *Input*
On entry: n , the order of the matrix A .
Constraint: $N \geq 0$.
- 3: ALPHA – **double precision** *Input*
On entry: the scalar α .
- 4: X(*) – **complex*16** array *Input*
On entry: the vector x .

- 5: INCX – INTEGER *Input*
On entry: the increment in the subscripts of X between successive elements of x .
Constraint: INCX \neq 0.
- 6: AP(*) – **complex*16** array *Input/Output*
Note: the dimension of the array AP must be at least $\max(1, N \times (N + 1)/2)$.
On entry: the n by n Hermitian 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 $i \geq j$.
On exit: the updated matrix A . The imaginary parts of the diagonal elements are set to zero.

6 Error Indicators and Warnings

None.
