

NAG 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 | <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 – double precision | <i>Input</i> |
| | <i>On entry:</i> the scalar α . | |

- 4: $X(*)$ – **complex*16** array *Input*
Note: the dimension of the array X must be at least $1 + (N - 1)|\text{INCX}|$.
On entry: the incremented array X must contain the n element 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: $\text{AP}(*)$ – **complex*16** array *Input/Output*
Note: the dimension of the array AP must be at least $N \times (N + 1)/2$.
On entry: the n by n Hermitian matrix A , packed by columns.
More precisely,
if $\text{UPLO} = 'U'$, the upper triangle of A must be stored with element A_{ij} in $\text{AP}(i + j(j - 1)/2)$ for $i \leq j$;
if $\text{UPLO} = 'L'$, the lower triangle of A must be stored with element A_{ij} in $\text{AP}(i + (2n - j)(j - 1)/2)$ 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.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

None.
