NAG C Library Function Document

zhpr2 (f06ssc)

1 Purpose

zhpr2 (f06ssc) performs the Hermitian rank-2 update operation

$$A \leftarrow \alpha x y^H + \bar{\alpha} y x^H + A$$

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

2 Specification

```
#include <nag.h>
#include <nagf06.h>
void zhpr2 (MatrixTriangle uplo, Integer n, Complex alpha, const Complex x[],
     Integer incx, const Complex y[], Integer incy, Complex ap[])
```

3 Arguments

1: **uplo** – MatrixTriangle *Input*

On entry: specifies whether the upper or lower triangular part of A is stored as follows:

if **uplo** = **UpperTriangle**, the upper triangular part of A is stored;
if **uplo** = **LowerTriangle**, the lower triangular part of A is stored.

Constraint: **uplo** = **UpperTriangle** or **LowerTriangle**.

2: **n** – Integer *Input*

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

Constraint: **n** ≥ 0.

3: **alpha** – Complex *Input*

On entry: the scalar α.

4: **x**[**n**] – const Complex *Input*

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: **incx** $\neq 0$.

6: **y**[**n**] – const Complex *Input*

On entry: the incremented array **y** must contain the n element vector y.

7: **incy** – Integer *Input*

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

Constraint: **incy** $\neq 0$.

8: **ap**[dim] – Complex *Input/Output*

Note: the dimension, *dim*, of the array **ap** must be at least **n**(**n** + 1)/2.

On entry: the n by n Hermitian matrix A, packed by rows. More precisely,

if **uplo** = **UpperTriangle**, the upper triangle of A must be stored with element a_{ij} in **ap**$[j-1+(2n-i)(i-1)/2]$ for $i \leq j$;
if **uplo** = **LowerTriangle**, the lower triangle of A must be stored with element a_{ij} in **ap**$[j-1+i(i-1)/2]$ for $j \leq i$.

On exit: the updated matrix A.

4 Error Indicators and Warnings

If a function is called with an invalid argument then an error message is output on stderr, giving the name of the function and the number of the first invalid argument, and execution is terminated.