NAG C Library Function Document

zher2 (f06src)

1 Purpose

zher2 (f06src) 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, x and y are n element complex vectors, and α is a complex scalar.

2 Specification

```
#include <nag.h>
#include <nagf06.h>

void zher2 (MatrixTriangle uplo, Integer n, Complex alpha, const Complex x[],
     Integer incx, const Complex y[], Integer incy, Complex a[], Integer tda)
```

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: **a**[**n** × **tda**] – Complex *Input/Output*

On entry: the n by n Hermitian matrix A.

uplo = **UpperTriangle**

The upper triangle of A must be stored and the elements of the array below the diagonal are not referenced.

uplo = **LowerTriangle**

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.

9: **tda** – Integer *Input*

On entry: the second dimension of the array **a** as declared in the function from which zher2 (f06src) is called.

Constraint: **tda** $\geq \max(1, \mathbf{n})$.

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.