NAG C Library Function Document

dsyr2 (f06prc)

1 Purpose

dsyr2 (f06prc) performs the symmetric rank-2 update operation

$$A \leftarrow \alpha x y^{\mathrm{T}} + \alpha y x^{\mathrm{T}} + A,$$

where A is an n by n real symmetric matrix, x and y are n element real vectors, and α is a real scalar.

2 Specification

```
#include <nag.h>
#include <nagf06.h>
void dsyr2 (MatrixTriangle uplo, Integer n, double alpha, const double x[],
     Integer incx, const double y[], Integer incy, double 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** – double *Input*

On entry: the scalar α.

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

On entry: the vector x of length n.

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 double *Input*

On entry: the vector y of length n.

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**] – double *Input/Output*

On entry: the n by n symmetric 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.

9: **tda** – Integer *Input*

On entry: the second dimension of the array **a** as declared in the function from which dsyr2 (f06prc) 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.