

# NAG Library Routine Document

## F06ERF (DDOTI)

**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

F06ERF (DDOTI) computes the scalar product of a sparse real vector, stored in compressed form, with a real vector.

### 2 Specification

```
FUNCTION F06ERF (NZ, X, INDX, Y)
REAL (KIND=nag_wp) F06ERF
INTEGER           NZ, INDX(*)
REAL (KIND=nag_wp) X(*), Y(*)
```

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

### 3 Description

F06ERF (DDOTI) returns, via the function name, the value of the scalar product

$$x^T y = x(1) \times y(\text{indx}(1)) + x(2) \times y(\text{indx}(2)) + \dots + x(\text{nz}) \times y(\text{indx}(\text{nz}))$$

where  $x$  is a sparse real vector, stored in compressed form and  $y$  is a real vector in full storage format.

### 4 References

Dodson D S, Grimes R G and Lewis J G (1991) Sparse extensions to the Fortran basic linear algebra subprograms *ACM Trans. Math. Software* **17** 253–263

### 5 Arguments

- |    |   |              |
|----|---|--------------|
| 1: | NZ – INTEGER  | <i>Input</i> |
|    | <i>On entry:</i> the number of nonzeros in the sparse vector $x$ .  |              |
| 2: | X(*) – REAL (KIND=nag_wp) array   | <i>Input</i> |
|    | <b>Note:</b> the dimension of the array X must be at least $\max(1, \text{NZ})$ .   |              |
|    | <i>On entry:</i> the nonzero elements of the sparse vector $x$ .  |              |
| 3: | INDX(*) – INTEGER array   | <i>Input</i> |
|    | <b>Note:</b> the dimension of the array INDX must be at least $\max(1, \text{NZ})$ .  |              |
|    | <i>On entry:</i> INDX( $i$ ) must contain the index of X( $i$ ) in the sparse vector $x$ , for $i = 1, 2, \dots, \text{NZ}$ . |              |
| 4: | Y(*) – REAL (KIND=nag_wp) array   | <i>Input</i> |
|    | <b>Note:</b> the dimension of the array Y must be at least $\max_k \{\text{INDX}(k)\}$ .                                      |              |
|    | <i>On entry:</i> the vector $y$ . Only elements corresponding to indices in INDX are accessed.                                |              |

## **6 Error Indicators and Warnings**

None.

## **7 Accuracy**

Not applicable.

## **8 Parallelism and Performance**

F06ERF (DDOTI) is not threaded in any implementation.

## **9 Further Comments**

None.

## **10 Example**

None.

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