

# NAG Library Routine Document

## F06ETF (DAXPYI)

**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

F06ETF (DAXPYI) adds a scaled sparse real vector, stored in compressed form, to an unscaled real vector.

### 2 Specification

```
SUBROUTINE F06ETF (NZ, A, X, INDX, Y)
  INTEGER          NZ, INDX(*)
  REAL (KIND=nag_wp) A, X(*), Y(*)
```

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

### 3 Description

F06ETF (DAXPYI) performs the operation

$$y \leftarrow \alpha x + y$$

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

### 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: | A – REAL (KIND=nag_wp)  | <i>Input</i> |
|    | <i>On entry:</i> the scalar $\alpha$ .  |              |
| 3: | 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 $x$ .  |              |
| 4: | 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 $i = 1, 2, \dots, \text{NZ}$ . |              |
|    | <i>Constraint:</i> the indices must be distinct.  |              |

5: Y(\*) – REAL (KIND=nag\_wp) array

*Input/Output*

**Note:** the dimension of the array Y must be at least  $\max_k\{\text{INDX}(k)\}$ .

*On entry:* the vector  $y$ . Only elements corresponding to indices in INDX are accessed.

*On exit:* the updated vector  $y$ .

## 6 Error Indicators and Warnings

None.

## 7 Accuracy

Not applicable.

## 8 Parallelism and Performance

F06ETF (DAXPYI) is not threaded in any implementation.

## 9 Further Comments

None.

## 10 Example

None.

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