NAG Library Routine Document

F06EXF (DROTI)

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

F06EXF (DROTI) applies a real plane rotation to a sparse real vector and a real vector.

2 Specification

```
SUBROUTINE F06EXF (NZ, X, INDX, Y, C, S)

INTEGER            NZ, INDX(*)
REAL (KIND=nag_wp) X(*), Y(*), C, S
```

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

3 Description

F06EXF (DROTI) applies a real plane rotation to a sparse real vector x stored in compressed form and a real vector y in full storage form:

$$\begin{pmatrix} x^{\mathrm{T}} \\ y^{\mathrm{T}} \end{pmatrix} \leftarrow \begin{pmatrix} c & s \\ -s & c \end{pmatrix} \begin{pmatrix} x^{\mathrm{T}} \\ y^{\mathrm{T}} \end{pmatrix}.$$

The plane rotation has the form generated by F06AAF (DROTG) or F06BAF.

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 Parameters

1: NZ – INTEGER *Input*

On entry: the number of nonzeros in the sparse vector x.

2: X$(*)$ – REAL (KIND=nag_wp) array *Input/Output*

Note: the dimension of the array X must be at least $\max(1, \mathrm{NZ})$.

On entry: the nonzero elements of the sparse vector x.

On exit: the transformed vector x.

3: INDX$(*)$ – INTEGER array *Input*

Note: the dimension of the array INDX must be at least $\max(1, \mathrm{NZ})$.

On entry: INDX(i) must contain the index of X(i) in the sparse vector x, for $i = 1, 2, \ldots, \mathrm{NZ}$.

Constraint: the indices must be distinct.

4: 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 the elements corresponding to indices in INDX are referenced.

On exit: the transformed vector y. Only elements corresponding to indices in INDX are altered.

5: C – REAL (KIND=nag_wp) *Input*

On entry: the value c, the cosine of the rotation.

6: S – REAL (KIND=nag_wp) *Input*

On entry: the value s, the sine of the rotation.

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

None.