

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:

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

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 Arguments

- 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 $\max(1, \text{NZ})$.
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 $\max(1, \text{NZ})$.
On entry: $\text{INDX}(i)$ must contain the index of $X(i)$ in the sparse vector x , for $i = 1, 2, \dots, \text{NZ}$.
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 Parallelism and Performance

F06EXF (DROTI) is not threaded in any implementation.

9 Further Comments

None.

10 Example

None.
