

NAG Library Routine Document

F16DQF

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

F16DQF computes, with respect to absolute value, the largest component of an integer vector, along with the index of that component.

2 Specification

```
SUBROUTINE F16DQF(N, X, INCX, K, I)
INTEGER          N, X(1+(N-1)*ABS(INCX)), INCX, K, I
```

3 Description

F16DQF computes, with respect to absolute value, the largest component, i , of an n -element integer vector x , and determines the smallest index, k , such that

$$i = |x_k| = \max_j |x_j|.$$

4 References

Basic Linear Algebra Subprograms Technical (BLAST) Forum (2001) *Basic Linear Algebra Subprograms Technical (BLAST) Forum Standard* University of Tennessee, Knoxville, Tennessee URL: <http://www.netlib.org/blas/blast-forum/blas-report.pdf>

5 Parameters

- | | | |
|----|---|---------------|
| 1: | N – INTEGER | <i>Input</i> |
| | <i>On entry:</i> n , the number of elements in x . | |
| 2: | $X(1 + (N - 1) \times INCX)$ – INTEGER array | <i>Input</i> |
| | <i>On entry:</i> the vector x . Element x_i is stored in $X(1 + (i - 1) \times INCX)$, for $i = 1, 2, \dots, n$. | |
| 3: | INCX – INTEGER | <i>Input</i> |
| | <i>On entry:</i> the increment in the subscripts of X between successive elements of x . | |
| | <i>Constraint:</i> $INCX \neq 0$. | |
| 4: | K – INTEGER | <i>Output</i> |
| | <i>On exit:</i> k , the index, from the set $\{1, 1 + INCX , \dots, 1 + (N - 1) \times INCX \}$, of the largest component of x with respect to absolute value. If $N \leq 0$ on input then K is returned as 0. | |
| 5: | I – INTEGER | <i>Output</i> |
| | <i>On exit:</i> i , the largest component of x with respect to absolute value. If $N \leq 0$ on input then I is returned as 0. | |

6 Error Indicators and Warnings

If $INCX = 0$, an error message is printed and program execution is terminated.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

This example computes the largest component with respect to absolute value and index of that component for the vector

$$x = (1, 10, 11, -2, 9)^T.$$

9.1 Program Text

```
*      F16DQF Example Program Text
*      Mark 22 Release. NAG Copyright 2007.
*      .. Parameters ..
      INTEGER          NIN, NOUT
      PARAMETER        (NIN=5,NOUT=6)
      INTEGER          NMAX, INCMAX
      PARAMETER        (NMAX=10,INCMAX=NMAX)
*      .. Local Scalars ..
      INTEGER          I, INCX, J, K, N
*      .. Local Arrays ..
      INTEGER          X(1+(NMAX-1)*ABS(INCMAX))
*      .. External Subroutines ..
      EXTERNAL         F16DQF
*      .. Intrinsic Functions ..
      INTRINSIC        ABS
*      .. Executable Statements ..
      CONTINUE

*      WRITE (NOUT,*) 'F16DQF Example Program Results'
*
*      Skip heading in data file
*
      READ (NIN,*)

*      Read N and INCX from data file
*
      READ (NIN,*) N, INCX
*
      IF (N.LE.NMAX .AND. ABS(INCX).LE.INCMAX) THEN
*
*         Read X from data file
*
*         READ (NIN,*) (X(J),J=1,1+(N-1)*ABS(INCX),INCX)
*
*         Find K = ARGMAX(ABS(X)) and I = MAX(ABS(X)).
*
*         CALL F16DQF(N,X,INCX,K,I)
*
*         WRITE (NOUT,*)
*         WRITE (NOUT,99999) K
*         WRITE (NOUT,99998) I
      END IF
*
      99999 FORMAT (1X,'Index of absolutely largest component of X is',I3)
      99998 FORMAT (1X,'Absolutely largest value is',I12)
      END
```

F16DQF Example Program Data

```
: N and INCX
: Array X
```

F16DQF Example Program Results

```

Index of absolutely largest component of X is 3
Absolutely largest value is 11

```