

NAG Library Routine Document

F16JQF (BLAS_DAMAX_VAL)

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

F16JQF (BLAS_DAMAX_VAL) computes, with respect to absolute value, the largest component of a real vector, along with the index of that component.

2 Specification

```
SUBROUTINE F16JQF(N, X, INCX, K, R)
  INTEGER          N, INCX, K
  double precision X(1+(N-1)*ABS(INCX)), R
```

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

3 Description

F16JQF (BLAS_DAMAX_VAL) computes, with respect to absolute value, the largest component, r , of an n -element real vector x , and determines the smallest index, k , such that

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

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 *Input*
On entry: n , the number of elements in x .
- 2: X(1 + (N – 1) × |INCX|) – ***double precision*** array *Input*
On entry: the vector x . Element x_i is stored in X(1 + (i – 1) × |INCX|), for $i = 1, 2, \dots, n$.
- 3: INCX – INTEGER *Input*
On entry: the increment in the subscripts of X between successive elements of x .
Constraint: INCX $\neq$ 0.
- 4: K – INTEGER *Output*
On exit: 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: R – ***double precision*** *Output*
On exit: r , the largest component of x with respect to absolute value. If $N \leq 0$ on input then R is returned as 0.0.

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

```
*      F16JQF 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 ..
      DOUBLE PRECISION R
      INTEGER          I, INCX, K, N
*      .. Local Arrays ..
      DOUBLE PRECISION X(1+(NMAX-1)*ABS(INCMAX))
*      .. External Subroutines ..
      EXTERNAL         BLAS_DAMAX_VAL
*      .. Intrinsic Functions ..
      INTRINSIC        ABS
*      .. Executable Statements ..
      CONTINUE

*      WRITE (NOUT,*) 'F16JQF/BLAS_DAMAX_VAL 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(I),I=1,1+(N-1)*ABS(INCX),INCX)
*
*          Find K = ARGMAX(ABS(X)) and R = MAX(ABS(X)).
*
          CALL BLAS_DAMAX_VAL(N,X,INCX,K,R)
*
          WRITE (NOUT,*)
          WRITE (NOUT,99999) K
          WRITE (NOUT,99998) R

```

9.2 Program Data

```
5 2 1 : N and INCX
1.0 10.0 11.0 -2.0 9.0 : Array X
```

F16JQF/BLAS_DAMAX_VAL Example Program Results

```
Index of absolutely largest component of X is 3
Absolutely largest value is      11.00000
```