

NAG Toolbox

nag_blast_damax_val (f16jq)

1 Purpose

nag_blast_damax_val (f16jq) computes, with respect to absolute value, the largest component of a real vector, along with the index of that component.

2 Syntax

```
[k, r] = nag_blast_damax_val(n, x, incx)
```

```
[k, r] = f16jq(n, x, incx)
```

3 Description

nag_blast_damax_val (f16jq) 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 <http://www.netlib.org/blas/blast-forum/blas-report.pdf>

5 Parameters

5.1 Compulsory Input Parameters

1: **n** – INTEGER

n , the number of elements in x .

2: **x(1 + (n - 1) × |incx|)** – REAL (KIND=nag_wp) array

The vector x . Element x_i is stored in **x**(($i - 1$) × |**incx**| + 1), for $i = 1, 2, \dots, n$.

3: **incx** – INTEGER

The increment in the subscripts of **x** between successive elements of x .

Constraint: **incx** ≠ 0.

5.2 Optional Input Parameters

None.

5.3 Output Parameters

1: **k** – INTEGER

k , the index, from the set $\{1, 2, \dots, n\}$, of the largest component of x with respect to absolute value. If **n** ≤ 0 on input then **k** is returned as 0.

2: **r** – REAL (KIND=nag_wp)

r , the largest component of x with respect to absolute value. If $\mathbf{n} \leq 0$ on input then **r** is returned as 0.0.

6 Error Indicators and Warnings

If $\mathbf{incx} = 0$, an error message is printed and program execution is terminated.

7 Accuracy

The BLAS standard requires accurate implementations which avoid unnecessary over/underflow (see Section 2.7 of Basic Linear Algebra Subprograms Technical (BLAST) Forum (2001)).

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

```
function f16jq_example
fprintf('f16jq example results\n\n');

% maxabs real and location
n = nag_int(5);
x = [1 10 11 -2 9];
incx = nag_int(1);

[xloc, xmax] = f16jq(n, x, incx);

fprintf('maxabs(');
fprintf('%5.1f', x);
fprintf(') = |x(%4d)| = %5.1f\n', xloc, xmax);
```

9.2 Program Results

```
f16jq example results
maxabs( 1.0 10.0 11.0 -2.0 9.0) = |x( 3)| = 11.0
```
