NAG Toolbox

nag_blast_damin_val (f16jr)

1 Purpose

nag_blast_damin_val (f16jr) computes, with respect to absolute value, the smallest component of a real vector, along with the index of that component.

2 Syntax

```
[k, r] = nag_blast_damin_val(n, x, incx)
[k, r] = f16jr(n, x, incx)
```

3 Description

nag_blast_damin_val (f16jr) computes, with respect to absolute value, the smallest component, r, of an n-element real vector x, and determines the smallest index, k, such that

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

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**($\mathbf{1} + (\mathbf{n} - \mathbf{1}) \times |\mathbf{incx}|$) – REAL (KIND=nag_wp) array

The vector x. Element x_i is stored in **x**($(i-1) \times |\mathbf{incx}| + 1$), for $i = 1, 2, \ldots, n$.

3: **incx** – INTEGER

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

Constraint: **incx** $\neq 0$.

5.2 Optional Input Parameters

None.

5.3 Output Parameters

1: **k** – INTEGER

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

2: **r** – REAL (KIND=nag_wp)

r, the smallest 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 smallest component with respect to absolute value and index of that component for the vector

$$x = (1, 10, 11, -2, 9)^{\mathrm{T}}.$$

9.1 Program Text

```
function f16jr_example

fprintf('f16jr example results\n\n');

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

[xloc, xmin] = f16jr(n, x, incx);

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

9.2 Program Results

```
f16jr example results

minabs(  1.0 10.0 11.0 -2.0  9.0) = |x(   1)| =   1.0
```