# NAG Toolbox

# nag_blast_zamax_val (f16js)

## 1    Purpose

nag_blast_zamax_val (f16js) computes, with respect to absolute value, the largest component of a complex vector, along with the index of that component.

## 2    Syntax

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

[k, r] = f16js(n, x, incx)
```

## 3    Description

nag_blast_zamax_val (f16js) computes, with respect to absolute value, the largest component, $r$, of an $n$-element complex vector $x$, and determines the smallest index, $k$, such that

$$r = |\text{Re } x_k| + |\text{Im } x_k| = \max_j |\text{Re } x_j| + |\text{Im } x_j|.$$

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

   The vector $x$. Element $x_i$ is stored in $\mathbf{x}((i-1) \times |\mathbf{incx}| + 1)$, 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 largest component of $x$ with respect to absolute value. If **n** $\leq 0$ 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 **n** $\leq 0$ on input then **r** is returned as 0.0.

# 6    Error Indicators and Warnings

None.

# 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

$$x = (-4 + 2.1i, 3.7 + 4.5i, -6 + 1.2i)^{\mathrm{T}}.$$

## 9.1   Program Text

```
    function f16js_example

fprintf('f16js example results\n\n');

% maxabs complex and location
n    = nag_int(3);
x    = [ -4 + 2.1i      3.7 + 4.5i      -6 + 1.2i];
incx = nag_int(1);

[xloc, xmax] = f16js(n, x, incx);

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

## 9.2   Program Results

```
    f16js example results

maxabs(x) = |x(   2)| =   8.2
```