NAG Toolbox for MATLAB

a02ab

1 Purpose

a02ab returns the value of the modulus of the complex number $x = (x_r, x_i)$.

2 Syntax

```
[result] = a02ab(xr, xi)
```

3 Description

The function evaluates $\sqrt{x_r^2 + x_i^2}$ by using $a\sqrt{1 + \left(\frac{b}{a}\right)^2}$ where a is the larger of x_r and x_i, and b is the smaller of x_r and x_i. This ensures against unnecessary overflow and loss of accuracy when calculating $\left(x_r^2 + x_i^2\right)$.

4 References

Wilkinson J H and Reinsch C 1971 *Handbook for Automatic Computation II, Linear Algebra* Springer–Verlag

5 Parameters

5.1 Compulsory Input Parameters

1: **xr – double scalar**

2: **xi – double scalar**

x_r and x_i, the real and imaginary parts of x, respectively.

5.2 Optional Input Parameters

None.

5.3 Input Parameters Omitted from the MATLAB Interface

None.

5.4 Output Parameters

1: **result – double scalar**

The result of the function.

6 Error Indicators and Warnings

None.

7 Accuracy

The result should be correct to ***machine precision***.

8 Further Comments

None.

9 Example

```
xr = -1.7;
xi = 2.6;
[result] = a02ab(xr, xi)
```

```
result =
    3.1064
```