

NAG Toolbox for MATLAB

g01ft

1 Purpose

g01ft returns the value of the inverse $\Phi^{-1}(x)$ of the Landau distribution function, via the function name.

2 Syntax

```
[result, ifail] = g01ft(x)
```

3 Description

g01ft evaluates an approximation to the inverse $\Phi^{-1}(x)$ of the Landau distribution function given by

$$\Psi(x) = \Phi^{-1}(x)$$

(where $\Phi(\lambda)$ is described in g01et and g01mt), using either linear or quadratic interpolation or rational approximations which mimic the asymptotic behaviour. Further details can be found in Kölbig and Schorr 1984.

It can also be used to generate Landau distributed random numbers in the range $0 < x < 1$.

4 References

Kölbig K S and Schorr B 1984 A program package for the Landau distribution *Comp. Phys. Comm.* **31** 97–111

5 Parameters

5.1 Compulsory Input Parameters

1: **x – double scalar**

The argument x of the function.

Constraint: $0.0 < \mathbf{x} < 1.0$.

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.

2: **ifail – int32 scalar**

0 unless the function detects an error (see Section 6).

6 Error Indicators and Warnings

Errors or warnings detected by the function:

ifail = 1

On entry, $x \leq 0.0$,
or $x \geq 1.0$.

7 Accuracy

At least 5 – 6 significant digits are correct. Such accuracy is normally considered to be adequate for applications in large scale Monte Carlo simulations.

8 Further Comments

None.

9 Example

```
x = 0.5;  
[result, ifail] = g01ft(x)  
  
result =  
    1.3558  
ifail =  
        0
```