NAG Toolbox for MATLAB

g01mt

1 Purpose

g01mt returns the value of the Landau density function $\phi(\lambda)$, via the function name.

2 Syntax

```
[result] = g01mt(x)
```

3 Description

g01mt evaluates an approximation to the Landau density function $\phi(\lambda)$ given by

$$\phi(\lambda) = \frac{1}{2\pi i}\int_{c-i\infty}^{c+i\infty} \exp(\lambda s + s\ln s)\, ds,$$

where c is an arbitrary real constant, using piecewise approximation by rational functions. Further details can be found in Kölbig and Schorr 1984.

To obtain the value of $\phi'(\lambda)$, g01rt can be used.

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 λ of the function.

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

There are no failure exits from this routine.

7 Accuracy

At least 7 significant digits are usually correct, but occasionally only 6. Such accuracy is normally considered to be adequate for applications in experimental physics.

Because of the asymptotic behaviour of $\phi(\lambda)$, which is of the order of $\exp[-\exp(-\lambda)]$, underflow may occur on some machines when λ is moderately large and negative.

8 Further Comments

None.

9 Example

```
x = 0.5;
[result] = g01mt(x)
```

```
result =
    0.1652
```