NAG C Library Function Document

nag_moment_1_landau (g01ptc)

1 Purpose
nag_moment_1_landau (g01ptc) returns the value of the first moment \( \Phi_1(x) \) of the Landau density function.

2 Specification

```c
double nag_moment_1_landau (double x)
```

3 Description
nag_moment_1_landau (g01ptc) evaluates an approximation to the first moment \( \Phi_1(x) \) of the Landau density function given by

\[
\Phi_1(x) = \frac{1}{\Phi(x)} \int_{-\infty}^{x} \lambda \phi(\lambda) d\lambda,
\]

where \( \phi(\lambda) \) is described in nag_prob_density_landau (g01mtc), using piecewise approximation by rational functions. Further details can be found in Kölbig and Schorr (1984).

To obtain the value of \( \Phi_2(x) \), nag_moment_2_landau (g01qtc) can be used.

4 References

5 Parameters

1: x – double
   
   On entry: the argument \( x \) of the function.

6 Error Indicators and Warnings
None.

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.

8 Further Comments
None.

9 Example
The example program evaluates \( \Phi_1(x) \) at \( x = 0.5 \), and prints the results.
9.1 Program Text

/* nag_moment_1_landau (g01ptc) Example Program. */
/* Copyright 2002 Numerical Algorithms Group. */
/* Mark 7, 2002. */

#include <stdio.h>
#include <nag.h>
#include <nag_stdlib.h>
#include <nagg01.h>

int main(void)
{
    /* Scalars */
    double x, y;
    Integer exit_status;
    exit_status = 0;

    Vprintf(" g01ptc Example Program Results\n");

    /* Skip heading in data file */
    Vscanf("%*[\n] ");

    Vscanf("%lf%*[\n] ", &x);
    y = g01ptc(x);

    Vprintf("\n X Y\n");
    Vprintf(" %3.1f %12.4e\n", x, y);
    return exit_status;
}

9.2 Program Data

g01ptc Example Program Data
0.5 : Value of X

9.3 Program Results

g01ptc Example Program Results

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>-6.2932e-01</td>
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