NAG C Library Function Document

nag_moment_2_landau (g01qtc)

1 Purpose

nag_moment_2_landau (g01qtc) returns the value of the second moment \( \Phi_2(x) \) of the Landau density function.

2 Specification

\[
\text{double nag_moment_2_landau (double } x)\]

3 Description

nag_moment_2_landau (g01qtc) evaluates an approximation to the second moment \( \Phi_2(x) \) of the Landau density function given by

\[
\Phi_2(x) = \frac{1}{\Phi(x)} \int_{-\infty}^{x} \lambda^2 \phi(\lambda) d\lambda,
\]

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

To obtain the value of \( \Phi_1(x) \), nag_moment_1_landau (g01ptc) can be used.

4 References


5 Parameters

1: \( x \) – double

\( \quad \text{Input} \)

\( \quad \text{On entry}: \text{the argument } x \text{ of the function.} \)

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 \( \Phi_2(x) \) at \( x = 0.5 \), and prints the results.
9.1 Program Text

/* nag_moment_2_landau (g01qtc) 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(" g01qtc Example Program Results\n");

    /* Skip heading in data file */
    Vscanf("%*[\n"]);
    Vscanf("%lf%*[\n"] , &x);
    y = g01qtc(x);

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

9.2 Program Data

g01qtc Example Program Data
0.5 : Value of X

9.3 Program Results

g01qtc Example Program Results

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>9.0868e-01</td>
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