

Package ‘deformula’

July 22, 2025

Type Package

Title Integration of One-Dimensional Functions with Double Exponential Formulas

Version 0.1.2

Description Numerical quadrature of functions of one variable over a finite or infinite interval with double exponential formulas.

URL <https://github.com/okamumu/deformula/>

BugReports <https://github.com/okamumu/deformula/issues>

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Encoding UTF-8

RoxygenNote 7.2.0

LinkingTo cpp11, Rcpp

Imports Rcpp

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

SystemRequirements C++11

NeedsCompilation yes

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Repository CRAN

Date/Publication 2022-05-30 06:40:15 UTC

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deformula

deformula: Integration of One-Dimensional Functions with Double Exponential Formulas

Description

Numerical quadrature of functions of one variable over a finite or infinite interval with double exponential formulas.

Author(s)

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See Also

Useful links:

- <https://github.com/okamumu/deformula/>
- Report bugs at <https://github.com/okamumu/deformula/issues>

deformula.moneone

Integration of one-dimensional functions over finite interval with the double exponential formula.

Description

Numerical quadrature of functions of one variable over (lower, upper) with the double exponential formula.

Usage

```
deformula.moneone(
  f,
  lower,
  upper,
  ...,
  zero.eps = 1e-12,
  rel.tol = 1e-08,
  start.divisions = 8,
  max.iter = 12
)
```

Arguments

<code>f</code>	An R function taking a numeric first argument.
<code>lower</code>	The lower limit of integration.
<code>upper</code>	The upper limit of integration.
<code>...</code>	Additional arguments to be passed to 'f'.
<code>zero.eps</code>	A threshold value to be zero.
<code>rel.tol</code>	A relative accuracy requested.
<code>start.divisions</code>	An integer. The initial number of subintervals.
<code>max.iter</code>	An integer for the maximum number of iterations to increase subintervals.

Value

A list with components;

<code>value</code>	A value for integral.
<code>x</code>	A vector of subintervals.
<code>w</code>	A vector of weights.
<code>t</code>	A vector of subintervals for trapezoid integral.
<code>h</code>	A value of subinterval.
<code>message</code>	OK or a string for the error message.

Examples

```
f <- function(x, a) exp(-a*x)
deformula.moneone(f, 0, 1, a=0.1)
```

<code>deformula.zeroinf</code>	<i>Integration of one-dimensional functions over infinite interval with the double exponential formula.</i>
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Description

Numerical quadrature of functions of one variable over $[0, \infty)$ with the double exponential formula.

Usage

```
deformula.zeroinf(
  f,
  ...,
  zero.eps = 1e-12,
  rel.tol = 1e-08,
  start.divisions = 8,
  max.iter = 12
)
```

Arguments

<code>f</code>	An R function taking a numeric first argument.
<code>...</code>	Additional arguments to be passed to ‘f’.
<code>zero.eps</code>	A threshold value to be zero.
<code>rel.tol</code>	A relative accuracy requested.
<code>start.divisions</code>	An integer. The initial number of subintervals.
<code>max.iter</code>	An integer for the maximum number of iterations to increase subintervals.

Value

A list with components;

<code>value</code>	A value for integral.
<code>x</code>	A vector of subintervals.
<code>w</code>	A vector of weights.
<code>t</code>	A vector of subintervals for trapezoid integral.
<code>h</code>	A value of subinterval.
<code>message</code>	OK or a string for the error message.

Examples

```
f <- function(x, a) exp(-a*x)
deformula.zeroinf(f, a=0.1)
```

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