Package 'deformula'

October 13, 2022

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

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R topics documented:

`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

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

Value

A list with components;

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

Examples

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

---

deformula.zeroinf *Integration of one-dimensional functions over infinite interval with the double exponential formula.*

Description

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

Usage

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

Arguments

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

Value

A list with components;

value	A value for integral.
x	A vector of subintervals.
w	A vector of weights.
t	A vector of subintervals for trapezoid integral.
h	A value of subinterval.
message	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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