Package ‘deformula’

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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.

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BugReports https://github.com/okamumu/deformula/issues
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Author Hiroyuki Okamura [aut, cre] (<https://orcid.org/0000-0001-6881-0593>)
Maintainer Hiroyuki Okamura <okamu@hiroshima-u.ac.jp>
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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)

Maintainer: Hiroyuki Okamura <okamu@hiroshima-u.ac.jp> (ORCID)

See Also

Useful links:

- [https://github.com/okamumu/deformula/](https://github.com/okamumu/deformula/)
- Report bugs at [https://github.com/okamumu/deformula/issues](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
)

deformula.zeroInf

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.
- \( \ldots \) Additional arguments to be passed to \( f \).
- \( \text{zero.eps} \) A threshold value to be zero.
- \( \text{rel.tol} \) A relative accuracy requested.
- \( \text{start.divisions} \) An integer. The initial number of subintervals.
- \( \text{max.iter} \) An integer for the maximum number of iterations to increase subintervals.

Value

A list with components:

- \( \text{value} \) A value for integral.
- \( \text{x} \) A vector of subintervals.
- \( \text{w} \) A vector of weights.
- \( \text{t} \) A vector of subintervals for trapezoid integral.
- \( \text{h} \) A value of subinterval.
- \( \text{message} \) OK or a string for the error message.

Examples

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