Package 'GregoryQuadrature'

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Title Gregory Weights for Function Integration

Version 1.0.0

Description Computes Gregory weights for a given number nodes and function order. Anthony Ralston and Philip Rabinowitz (2001) <ISBN:9780486414546>.

License GPL-3

Encoding UTF-8

RoxygenNote 7.3.1

Imports pracma

Suggests knitr, rmarkdown, testthat (>= 3.0.0)

Config/testthat/edition 3

VignetteBuilder knitr

URL https://github.com/dhetting/GregoryQuadrature

BugReports https://github.com/dhetting/GregoryQuadrature/issues

NeedsCompilation no

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R topics documented:

`Gregory_weights`	*Calculate the Gregory quadrature weights for equispaced integration. If f is a row vector containing the function values, the integral is approximated by the statement* `f %*% t(w)` *where w are the returned weights. Translated from https://www.colorado.edu/amath/sites/default/files/attached-files/gregory.pdf.*

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Calculate the Gregory quadrature weights for equispaced integration. If f is a row vector containing the function values, the integral is approximated by the statement `f %*% t(w)` where w are the returned weights. Translated from https://www.colorado.edu/amath/sites/default/files/attached-files/gregory.pdf.

Usage

```
Gregory_weights(n_nodes, h, order)
```

Arguments

`n_nodes`	Total number of nodes
`h`	Step size
`order`	Order of accuracy desired. 2, 3, 4, ... (with 2 giving the trapezoidal rule). The value must satisfy 2 <= order <= n_nodes

Value

The weights to be used for the successive function values

Examples

```
n_nodes = 11
order = 8
h = 2/(n_nodes-1)
x = pracma::linspace(-1, 1, n_nodes)
f = exp(x)

w = GregoryQuadrature::Gregory_weights(n_nodes, h, order)
int = f %*% w
# Exact value for integral
exact = exp(1) - exp(-1)

error = int - exact
```

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