

Package ‘CWT’

May 28, 2024

Type Package

Title Continuous Wavelet Transformation for Spectroscopy

Version 0.1.1

Maintainer J. Antonio Guzmán Q. <antguz06@gmail.com>

Description Fast application of Continuous Wavelet Transformation ('CWT') on time series with special attention to spectroscopy. It is written using data.table and 'C++' language and in some functions it is possible to use parallel processing to speed-up the computation over samples. Currently, only the second derivative of a Gaussian wavelet function is implemented.

License GPL (>= 3)

URL <https://github.com/Antguz/CWT>

BugReports <https://github.com/Antguz/CWT/issues>

Depends R (>= 4.0.0)

Imports data.table (>= 1.14.0), Rcpp

Suggests testthat (>= 3.2.0)

LinkingTo Rcpp, RcppArmadillo

ByteCompile true

Config/testthat/edition 3

Encoding UTF-8

RoxygenNote 7.3.1

SystemRequirements GNU make

NeedsCompilation yes

Author J. Antonio Guzmán Q. [cre, aut, cph]
(<<https://orcid.org/0000-0002-0721-148X>>)

Repository CRAN

Date/Publication 2024-05-28 12:00:05 UTC

R topics documented:

CWT-package	2
cwt	2

Index	4
--------------	----------

CWT-package	<i>Continuous Wavelet Transformation for Spectroscopy</i>
-------------	---

Description

Fast application of Continuous Wavelet Transformation on time series with special attention to spectroscopy. It is written using data.table and C++ language and in some functions it is possible to use parallel processing to speed-up the computation over samples.

Author(s)

Maintainer: J. Antonio Guzmán Q. <antguz06@gmail.com> ([ORCID](#)) [copyright holder]

See Also

Useful links:

- <https://github.com/Antguz/CWT>
- Report bugs at <https://github.com/Antguz/CWT/issues>

cwt	<i>Continuous Wavelet Transform</i>
-----	-------------------------------------

Description

Compute a 1D continuous wavelet transformation using 2st order derivative Gaussian wavelet.

Usage

```
cwt(t, scales, variance = 1, summed_wavelet = FALSE, threads = 1L)
```

Arguments

t	A data.table, matrix, or numeric vector where columns or values represent time (i.e., bands) and rows samples (i.e., pixels).
scales	A positive numeric vector describing the scales to compute. The minimum scale (i.e., scales = 1) is equal to sampling interval between columns.
variance	A positive number describing the variance of the Gaussian PDF used to scale. Default variance = 1.
summed_wavelet	If TRUE, it returns the sum of scales. If FALSE, each scale is returned.
threads	An integer specifying the number of threads to use. Experiment to see what works best for your data on your hardware.

Value

If `summed_wavelet = TRUE`, it returns a `data.table` where columns are the sum of wavelet scales.
If `summed_wavelet = FALSE`, it returns an array (i.e., time, samples, and scales).

Author(s)

J. Antonio Guzmán Q.

Examples

```
time_series <- sin(seq(0, 20 * pi, length.out = 100))

# Using a numeric vector

cwt(t = time_series,
    scales = c(1, 2, 3, 4, 5),
    summed_wavelet = FALSE)

cwt(t = time_series,
    scales = c(1, 2, 3, 4, 5),
    summed_wavelet = TRUE)

# Using a matrix

times <- 100
frame <- matrix(rep(time_series, times),
               nrow = times,
               byrow = TRUE)

cwt(t = frame,
    scales = c(1, 2, 3, 4, 5),
    summed_wavelet = FALSE)

cwt(t = frame,
    scales = c(1, 2, 3, 4, 5),
    summed_wavelet = TRUE)
```

Index

CWT (CWT-package), [2](#)

cwt, [2](#)

CWT-package, [2](#)