Package 'zeitgebr'

April 28, 2018

Title Analyse and Visualise Circadian Behaviours

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Version 0.0.0.9000

Description Use behavioural variables to compute period, rhythmicity and other circadian parameters.

Depends R (>= 3.00),
    behavr

Imports data.table,
    lomb,
    ggplot2,
    pracma

Suggests testthat,
    covr,
    knitr

License GPL-3

Encoding UTF-8

LazyData true

URL https://github.com/rethomics/zeitgebr

BugReports https://github.com/rethomics/zeitgebr/issues

RoxygenNote 6.0.1

Roxygen list(markdown = TRUE)

R topics documented:

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dams_sample	*A behavr table with approximatly ten days of DAM2 recording for 32 fruit flies. The first 10, the following 11 and the last 11 animals have long, short and wild type period, respectively (see* meta(dams_sample)). *Raw data stored at https://github.com/rethomics/zeitgebr/tree/master/raw_data*

Description

A behavr table with approximatly ten days of DAM2 recording for 32 fruit flies. The first 10, the following 11 and the last 11 animals have long, short and wild type period, respectively (see meta(dams_sample)). Raw data stored at https://github.com/rethomics/zeitgebr/tree/master/raw_data

Usage

```
dams_sample
```

Format

An object of class behavr (inherits from data.table, data.frame) with 415040 rows and 3 columns.

Author(s)

Maite Ogueta

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find_peaks	*Find peaks in a periodogram*

Description

Locate the peaks in a pregenerated periodogram. Detection is based on pracma::findpeaks. Only the significant (with threshold 'alpha") peaks are extracted.

Usage

```
find_peaks(data, n_peaks = 3)
```

Arguments

data	behavr::behavr table representing a periodogram, as returned by periodogram
n_peaks	maximal numbers of peak to be detected

Value

[behavr::behavr](behavr) table that is data with an extra column peak. peak is filled with NA values except for rows match a peak. In which case, they have an integer value corresponding to the rank of the peak (e.g. 1 for the first peak).

Examples

```
data(dams_sample)
per_dt_xs <- periodogram(activity, dams_sample, FUN=chi_sq_periodogram)
per_dt_xs_with_peaks <- find_peaks(per_dt_xs)
per_dt_xs_with_peaks[peak==1]
## Not run:
ggetho::ggperio(per_dt_xs_with_peaks) + geom_line()  +
geom_line(aes(y=signif_threshold), colour="blue") +
geom_point(data = per_dt_xs_with_peaks[peak==1], col="red") +
facet_wrap( ~ id, ncol = 8, labeller = id_labeller)

## End(Not run)
```

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periodogram	*Computes periodograms*

Description

This function builds peroidograms, with one of several methods, for each individual of behavr table

Usage

```
periodogram(var, data, period_range = c(hours(16), hours(32)),
  resample_rate = 1/mins(15), alpha = 0.01, FUN = chi_sq_periodogram, ...)
```

Arguments

var	variable to analyse
data	behavr table
period_range	vector of size 2 defining minimal and maximal range of period to study (in seconds)
resample_rate	frequency to resample (up or down) the data at (in hertz)
alpha	significance level
FUN	function used to compute periodogram (see periodogram_methods)
...	additional arguments to be passed to FUN

Value

a behavr table with TODO

Examples

```
data(dams_sample)
pdt <- periodogram(activity, dams_sample, FUN=ls_periodogram, oversampling = 4)
pdt <- periodogram(activity, dams_sample, FUN=chi_sq_periodogram)
```

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periodogram_methods   *Methods For Computing Periodograms*

Description

These functions provides a series of methods to assess periodicity of circadian processes.

Usage

```
ac_periodogram(x, period_range = c(hours(16), hours(32)),
  sampling_rate = 1/mins(1), alpha = 0.05)

chi_sq_periodogram(x, period_range = c(hours(16), hours(32)),
  sampling_rate = 1/mins(1), alpha = 0.05, time_resolution = hours(0.1))

fourier_periodogram(x, period_range = c(hours(16), hours(32)),
  sampling_rate = 1/mins(1), alpha = 0.05)

ls_periodogram(x, period_range = c(hours(16), hours(32)),
  sampling_rate = 1/mins(1), alpha = 0.05, oversampling = 8)
```

Arguments

x	numeric vector
period_range	vector of size 2 defining minimal and maximal range of period to study (in seconds)
sampling_rate	the – implicitly regular – sampling rate of x (in hertz)
alpha	significance level
time_resolution	
	the resolution of periods to scan
oversampling	the oversampling factor

Value

a [data.table](#) with the columns:

- period – the period (in s)
- power – the power (or equivalent) for a given period
- p_value – the significance of the power
- signif_threshold – the significance threshold of the power (at alpha)

See Also

- lomb::lsp the orginal function for `ls_periodogram`
- xsp::chiSqPeriodogram (code modified from)
- acf the orginal function for `ac_periodogram`

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