Package 'zeitgebr'

February 15, 2018

Title Analyse and Visualise Circadian Behaviours	
Date 2017-09-06	
Version 0.0.0.9000	
Description Use behavioural variables to compute period, rhythmicity and other circadian parameter	rs.
Depends R (>= 3.00), behavr	
Imports data.table, lomb, ggplot2, pracma	
Suggests testthat, covr, knitr	
License GPL-3	
Encoding UTF-8	
LazyData true	
<pre>URL https://github.com/rethomics/zeitgebr</pre>	
BugReports https://github.com/rethomics/zeitgebr/issues	
RoxygenNote 6.0.1	
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R topics documented:	
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dams_sample	A behavr table with approximatly ten days of DAM2 record-
	ing 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 behave 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 behave (inherits from data.table, data.frame) with 415040 rows and 3 columns.

Author(s)

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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

periodogram 3

Value

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)</pre>
```

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
```

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Examples

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

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)

periodogram_methods

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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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