Package 'zeitgebr'

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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 parameters.

Depends R (>= 3.00),
behavr

Imports data.table,
lomb,
ggplot2

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:

`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)

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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, alpha = 0.05)
```

Arguments

`data`	behavr::behavr table represneted a periodogram, as returned by periodogram
`n_peaks`	maximal numbers of peak to be detected
`alpha`	the significance threshold of p-values over which peaks are ignored

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, alpha=1e-3)
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)
```

`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(1), alpha = 0.05, 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)
```

`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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