Package ‘zeitgebr’

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| dams_sample | A behavr table with approximately 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)). |

Description

A behavr table with approximately 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)).

Usage

dams_sample

Format

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

Author(s)

Luis Garcia

References

Raw data stored at https://github.com/rethomics/zeitgebr/tree/master/raw_data

find_peaks

Find peaks in a periodogram

Description

This function locates the peaks in a pregenerated periodogram. Detection is based on pracma::findpeaks. Only the significant (i.e. power > signif_threshold) 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

Value

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

References

- zeitgebr tutorial – the relevant rehtomics tutorial

See Also

- periodogram – to generate a periodogram in a first place
- ggetho::geom_peak – a layer to show peaks on a periodogram

Examples

data(dams_sample)
# only a half of the individuals for the sake of the example
dt <- dams_sample[xmv(region_id) %in% (1:16 * 2)]
per_dt_xs <- periodogram(activity, dt, FUN = chi_sq_periodogram)
per_dt_xs_with_peaks <- find_peaks(per_dt_xs)
per_dt_xs_with_peaks[peak == 1]

peridogram

Computes periodograms

Description

This function builds periodograms, with one of several methods, for each individual of a 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::behavr` table. In addition to the metadata, it contains data that encodes a periodogram (i.e. power vs period). The data contains the columns:

- **power** – the power the or equivalent (according to `FUN`)
- **period** – the period at which power is computed (in seconds)
- **p.value** – the p value associated to the power estimation
- **signif threshold** – the threshold above which power is considered significant

References

- `zeitgebr tutorial` – the relevant rehtomics tutorial

See Also

- `periodogram_methods` – the list of built-in methods
- `find_peaks` – to find peaks in the periodogram
- `ggetho::ggperio` – to plot periodograms

Examples

```r
data(dams_sample)
# only a half of the individuals for the sake of the example
dt <- dams_sample[xmv(region_id) %in% (1:16 * 2)]
pdt <- periodogram(activity, dt, FUN = ls_periodogram, oversampling = 4)
pdt <- periodogram(activity, dt, FUN = chi_sq_periodogram)
require(ggetho)
ggperio(pdt, aes(colour=period_group)) + stat_pop_etho()
```

Description

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

Usage

```r
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))
```
periodogram_methods

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 (see lomb::lsp)

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)

References

  • zeitgebr tutorial – the relevant rehtomics tutorial

See Also

  • lomb::lsp – the orginal function for ls_periodogram
  • xsp::chiSqPeriodogram – code modified from
  • stats::acf – the orginal function for ac_periodogram
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