Package 'gen5helper'

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Type Package

Title Processing 'Gen5' 2.06 Exported Data

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Description A collection of functions for processing 'Gen5' 2.06 exported data.
'Gen5' is an essential data analysis software for BioTek plate readers <https://www.biotek.com/products/software-robotics-software/gen5-microplate-reader-and-imager-software/>. This package contains functions for data cleaning,
modeling and plotting using exported data from 'Gen5' version 2.06. It exports technically correct data defined in (Edwin de Jonge and Mark van der Loo (2013) <https://cran.r-project.org/doc/contrib/de_Jonge+van_der_Loo-Introduction_to_data_cleaning_with_R.pdf>) for customized analysis. It contains Boltzmann fitting for general kinetic analysis.
See <https://www.github.com/yanxianUCSB/gen5helper> for more information, documentation and examples.

Depends dplyr, utils

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`as.is` *Cast an object to match class of another object*

Description

Cast an object to match class of another object

Usage

```
as.is(x, vec)
```

Arguments

`x`	object to transform
`vec`	object to extract class

Examples

```
as.is(c("1", "2", "3"), 1:3)
```

`Boltzmann` *Boltzmann model for fitting time series data*

Description

Boltzmann model for fitting time series data

Usage

```
Boltzmann(time_, val_, A0 = 1, k0 = 1, t20 = 1)
```

Arguments

`time_`	time series
`val_`	normalized value
`A0`	amplititude
`k0`	rate constant
`t20`	halt time

Value

a model

Examples

```
Boltzmann(1:10, c(0,0,1,3,5,7,9,10,10,10), A0 = 10, k0 = 10, t20 = 5)
```

`factor2num` *this is a file for functions that are universally useful at common data manipulations Convert factor to numeric*

Description

this is a file for functions that are universally useful at common data manipulations Convert factor to numeric

Usage

```
factor2num(x)
```

Arguments

`x`	factor

Examples

```
factor2num(factor(c('1', '10', '100')))
```

`fit.boltzmann` *Fit readings with Boltzmann model*

Description

fit.boltzmann() using Boltzmann model to fit readings and time intervals with unit of hours, using start as initial guesses. It appends A, y0, k, t2 and val.predict, while preserving existing variables.

Usage

```
fit.boltzmann(.data, A0 = 1, k0 = 1, t20 = 1)
```

Arguments

`.data`	data.frame with x as time, y as value
`A0`	initial guess of amplititue, default 1
`k0`	initial guess, default 1
`t20`	initial guess, default 1

Value

data.frame with fitted parameter and predicted value

Examples

```
fit.boltzmann(data.frame(x=1:10,y=c(0,0,1,3,5,7,9,10,10,10)), A0 = 10, k0 = 10, t20 = 5)
```

`g5h.annotate` *Annotate a cleaned dataset*

Description

Add time interval in hour from the oldest timestamp

Usage

```
g5h.annotate(.data, by = "col")
```

Arguments

.data	data.frame cleaned by g5h.clean()
by	'col' or 'row', default is 'col'. See ?g5h.gather_col for more info.

Value

data.frame

Examples

```
# suppose "gen5_export.txt" is the export from Gen5 2.06

g5h.clean2("gen5_export.txt") %>%
    g5h.annotate()
```

---

g5h.clean2 *Clean Gen5 exported data*

Description

g5h.clean2() returns technically correct data.frame from Gen5 2.06 exported tab-delim data. The exported data can be generated using default export protocol in Gen5 2.06. See Gen5 User Guide for more information.

Usage

```
g5h.clean2(files)
```

Arguments

files	a vector of names of the file which the data are to be read from. If it does not contain an absolute path, the file name is relative to the current working directory, getwd().

Value

technically correct data.frame.

Examples

```
# suppose "exported_data_1.txt" and "exported_data_2.txt" are the exports from Gen5 2.06

# this line will clean one exported data
data <- g5h.clean2("exported_data_1.txt")

# this line will clean two exported data and return one appended dataset
data <- g5h.clean2(c("exported_data_1.txt", "exported_data_2.txt"))
```

g5h.clean_ *Clean Gen5 exported data*

Description

g5h.clean_() returns technically correct data.frame from Gen5 2.06 exported tab-delim data. The exported data can be generated using default export protocol in Gen5 2.06. See Gen5 User Guide for more information.

Usage

```
g5h.clean_(file)
```

Arguments

file	the name of the file which the data are to be read from. If it does not contain an absolute path, the file name is relative to the current working directory, getwd().

Value

technically correct data.frame.

g5h.set_time2 *Add time intervals to cleaned dataset*

Description

g5h.set_time() preserves existing variables and add new variable, time, which are time intervals in hours.

Usage

```
g5h.set_time2(.data, units = "hours")
```

Arguments

.data	data.frame cleaned by g5h.clean()
units	"hours" or "minutes"

Value

input data.frame appended with time

gen5helper *gen5helper: A Collection of Functions for Processing Gen5 2.06 Exported Data*

Description

A collection of functions for processing Gen5 2.06 exported data. Gen 5 is a popular data analysis software for BioTek plate readers. This packages contains functions for data cleaning, modeling and plotting using exported data from Gen5 version 2.06. It exports technically correct data defined in (Edwin de Jonge and Mark van der Loo, 2013) for customized analysis. It contains Boltzmann fitting for general kinetic analysis. It also implement line plot and bar plot for generating publishable figures. See https://www.github.com/yanxianUCSB/gen5helper for more information, documentation and examples.

get.halftime *Get half time by linear fitting*

Description

get half time according to http://www.amylofit.ch.cam.ac.uk The algorithm for the extraction of the half times proceeds as follows: first the middle part of the curve is selected, by determining when the average over several points is first above 0.3 and when the average is last below 0.7. The number of points to be averaged over depends on the number of points in the curve. A straight line is then fitted to this middle part of the curve, the point at which it crosses the value of 0.5 is recorded as the half time. (source: DOI: nprot.2016.010)

Usage

```
get.halftime(time, val)
```

Arguments

time	vector of time
val	vector of values

Value

half time

Examples

```
get.halftime(c(1:10), c(0,1,2,3,4,5,6,7,8,9))
get.halftime(c(1:10), c(0,0,1,3,5,7,9,10,10,10))
```

mapvalues_ *Map the unique values of a vector*

Description

Map the unique values of a vector

Usage

```
mapvalues_(x, facs, bNaturalSort = FALSE)
```

Arguments

x	factor or character
facs	character. It maps unique(x) to facs
bNaturalSort	binary. Whether to convert factor in natural order.

Value

factor

Examples

```
mapvalues_(c("A","A","B","C"), c("one", "two", "three"))
mapvalues_(c("apple", "apple", "banana", "pineable", "pineable"), c(3, 2, 1), bNaturalSort = TRUE)
```

most.freq *Return most frequent numbers*

Description

get the n most frequent elements in an array

Usage

```
most.freq(x, n = 1)
```

Arguments

x	an array of elements
n	integer, default is 1

Value

the most n elements

Examples

```
most.freq(c('a', 'a', 'b', 'b', 'b', 'c'), n = 2)
most.freq(c(1, 1, 2, 3, 3, 3, 4, 4), n = 2)
```

---

normalize *Scale a vector to 0-1 by min and max*

Description

Scale a vector to 0-1 by min and max

Usage

```
normalize(x, na.rm = TRUE)
```

Arguments

x	numeric
na.rm	bool whether to remove NA values.

Value

a normalized vector

Examples

```
normalize(0:10)
normalize(c(1, 100, NA, 10), na.rm = TRUE)
```

---

range_ *Return range of a vector*

Description

This computes the range of a vector as a value.

Usage

```
range_(x, na.rm = TRUE)
```

Arguments

x	numeric
na.rm	bool whether to remove NA values.

Value

numeric value

Examples

```
range_(c(1, 5, 10))
range_(c(1, 5, 10, NA), na.rm = TRUE)
```

---

saveRDS_ *saveRDS and return .data*

Description

This function returns the object passed in, can be used for dplyr pipeline.

Usage

```
saveRDS_(.data, file, ...)
```

Arguments

.data	object to be saved
file	filename to save
...	for saveRDS

Value

whatever object passed in.

Examples

```
data <- data.frame(a=1, b=2, c=3)
data %>%
    saveRDS_(file.path(tempdir(), "data.rds")) %>%
    print()
```

smooth.mean *Smooth a vector using moving average*

Description

Smooth a vector using moving average

Usage

```
smooth.mean(vec, naverage)
```

Arguments

vec	numeric vector
naverage	width of moving average

Value

smoothed

Examples

```
smooth.mean(1:10, 2)
smooth.mean(1:10, 3)
smooth.mean(1:10, 5)
```

ungroup_ *Run ungroup() and as.data.frame()*

Description

Run ungroup() and as.data.frame()

Usage

```
ungroup_(.data)
```

Arguments

.data	grouped data.frame

Value

an ungrouped data.frame()

Examples

```
data <- data.frame(m=c(1,2), n=c(2,3), group=c('a','b'))
data %>%
    group_by(group) %>%
    ungroup_()
```

`write.csv_` *write.csv without row.names*

Description

This function returns the object passed in, can be used for dplyr pipeline.

Usage

```
write.csv_(x, file)
```

Arguments

`x`	object
`file`	filename for write.csv

Value

whatever object passed in

Examples

```
write.csv_(data.frame(a=1, b=2, c=3), file.path(tempdir(), "data.csv"))

data <- data.frame(a=1, b=2, c=3)
data %>%
    file.path(tempdir(), "data.csv") %>%
    print()
```

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