Package 'iadf'

October 13, 2022

Type Package

Title Analysis of Intra Annual Density Fluctuations

Version 0.1.2

Description Calculate false ring proportions from data frames of intra annual density fluctuations.

License GPL-3

Encoding UTF-8

LazyData true

Imports manipulate, tibble, dplyr, tidyr, dplR, rlang, stats, tidyselect

Suggests lazyeval, testthat, knitr, rmarkdown

RoxygenNote 7.1.1

VignetteBuilder knitr

URL https://github.com/konradmayer/iadf

BugReports https://github.com/konradmayer/iadf/issues

NeedsCompilation no

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Repository CRAN

Date/Publication 2021-05-24 15:40:02 UTC

R topics documented:

`afrp` *adjusted false ring proportion*

Description

Calculate the adjusted false ring proportion, as suggested by Osborn et. al. (1997), of a set of binary false ring assignments.

Usage

```
afrp(iadf)
```

Arguments

`iadf`	A data frame with numeric columns representing individual series and years as rownames where years with IADF are marked with 1, those without with 0, years not covered by the series are set to NA.

Value

a data frame

References

Osborn TJ, Briffa KR and Jones PD (1997) Adjusting variance for sample-size in tree-ring chronologies and other regional mean time-series. Dendrochronologia 15, 89-99.

See Also

`frp`

campelo_chapman *campelo_chapman*

Description

Chapman model fitting to size classes for the calculation of size corrected IADF frequencies according to Campelo et al. (2015).

Usage

```
campelo_chapman(
  campelo_freq_object,
  min.n = 15,
  start = NULL,
  make.plot = TRUE,
  max.iter = 500,
  ...
)
```

Arguments

campelo_freq_object	a campelo frequency object, output of campelo_freq
min.n	minimum number of samples within each group to be included in model estimation
start	set custom start values - default to list(a = 0.8, b = 0.03, c = 12.5)
make.plot	logical
max.iter	maximum iterations for internally used nls
...	additional plotting arguments

Value

a model object of class "nls"

References

Campelo, F., Vieira, J., Battipaglia, G. et al. Which matters most for the formation of intra-annual density fluctuations in Pinus pinaster: age or size? Trees (2015) 29: 237. doi:10.1007/s00468-014-1108-9

See Also

campelo_freq, campelo_index

Examples

```
data('example_iadf')
data('example_rwl')
model <- campelo_chapman(campelo_freq(example_iadf, example_rwl))
campelo_index(example_iadf, example_rwl, model)
```

`campelo_chapman_find_start` *campelo_chapman_find_start*

Description

Find good start values manually in case `campelo_chapman` returns an error caused by insufficient default starting values.

Usage

```
campelo_chapman_find_start(
  campelo_freq_object,
  min.n = 15,
  max_a = 3,
  max_b = 1,
  max_c = 17
)
```

Arguments

`campelo_freq_object`	a campelo frequency object, output of `campelo_freq`
`min.n`	minimum number of samples within each group to be included in model estimation
`max_a`	maximum value of manipulate slider for parameter a
`max_b`	maximum value of manipulate slider for parameter b
`max_c`	maximum value of manipulate slider for parameter c

Value

a list which can be used as input argument 'start' in `campelo_chapman`

campelo_freq *iadf frequency per ring width class*

Description

Calculate the frequency per ring width class as suggested by Campelo (2015).

Usage

```
campelo_freq(iadf, rwl, n = 20)
```

Arguments

iadf	A data frame with numeric columns representing individual series and years as rownames where years with IADF are marked binary with 1, those without with 0, years not covered by the series are set to NA.
rwl	data frame containing ring widths with years in rows and series in columns
n	number of ring width classes

Value

a data frame

References

Campelo, F., Vieira, J., Battipaglia, G. et al. Which matters most for the formation of intra-annual density fluctuations in Pinus pinaster: age or size? Trees (2015) 29: 237. doi:10.1007/s00468-014-1108-9

See Also

campelo_chapman, campelo_index

Examples

```
data('example_iadf')
data('example_rwl')
model <- campelo_chapman(campelo_freq(example_iadf, example_rwl))
campelo_index(example_iadf, example_rwl, model)
```

campelo_index *campelo_index*

Description

Calculation of size corrected IADF frequencies according to Campelo et al. (2015)

Usage

```
campelo_index(iadf, rwl, model)
```

Arguments

iadf	A data frame with numeric columns representing individual series and years as rownames where years with IADF are marked binary with 1, those without with 0, years not covered by the series are set to NA.
rwl	a rwl/data.frame object
model	a chapman model, output of campelo_chapman

Value

a data frame

References

Campelo, F., Vieira, J., Battipaglia, G. et al. Which matters most for the formation of intra-annual density fluctuations in Pinus pinaster: age or size? Trees (2015) 29: 237. doi:10.1007/s00468-014-1108-9

See Also

campelo_freq, campelo_chapman

Examples

```
data('example_iadf')
data('example_rwl')
model <- campelo_chapman(campelo_freq(example_iadf, example_rwl))
campelo_index(example_iadf, example_rwl, model)
```

example_iadf *example_iadf*

Description

An rwl object to be used in documented examples

Usage

```
example_iadf
```

Format

A data.frame with 135 years and 30 series.

example_rwl *example_rwl*

Description

An rwl object to be used in documented examples

Usage

```
example_rwl
```

Format

A data.frame with 135 years and 30 series.

frp *false ring proportion*

Description

Calculate the false ring proportion of a set of binary false ring assignments.

Usage

```
frp(iadf)
```

Arguments

iadf	A data frame with numeric columns representing individual series and years as rownames where years with IADF are marked binary with 1, those without with 0, years not covered by the series are set to NA.

Value

a data frame

See Also

afrp

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iadf *iadf*

Description

calculate false ring proportions from data frames of intra annual density fluctuations

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novak_freq *iadf frequency per cambial age*

Description

Calculate the frequency per cambial age as suggested by Novak et al. (2013).

Usage

```
novak_freq(iadf, po = NULL)
```

Arguments

iadf	A data frame with numeric columns representing individual series and years as rownames where years with IADF are marked binary with 1, those without with 0, years not covered by the series are set to NA.
po	a data frame with pith offsets with series names in the first and pith offset as number of rings in the second column

Value

a data frame

References

Novak, Klemen and Sánchez, Miguel Angel Saz and Čufar, Katarina and Raventós, Josep and de Luis, Martin. Age, climate and intra-annual density fluctuations in in Spain, IAWA Journal, 34, 459-474 (2013), doi:10.1163/22941932-00000037

See Also

novak_weibull, novak_index

Examples

```
data('example_iadf')
model <- novak_weibull(novak_freq(example_iadf), 15)
novak_index(example_iadf, model)
```

---

novak_index *novak_index*

Description

Calculation of age corrected IADF frequencies according to Novak et al. (2013).

Usage

```
novak_index(iadf, model, po = NULL, method = "difference")
```

Arguments

iadf	A data frame with numeric columns representing individual series and years as rownames where years with IADF are marked binary with 1, those without with 0, years not covered by the series are set to NA.
model	a model, output of either novak_weibull
po	an optional data frame of pith offsets with series names in the first and pith offsets in the second column
method	method for the RCS detrending, 'quotient' or 'difference'

Value

a data frame

References

Novak, Klemen and Sánchez, Miguel Angel Saz and Čufar, Katarina and Raventós, Josep and de Luis, Martin. Age, climate and intra-annual density fluctuations in in Spain, IAWA Journal, 34, 459-474 (2013), doi:10.1163/22941932-00000037

See Also

novak_freq, novak_weibull

Examples

```
data('example_iadf')
model <- novak_weibull(novak_freq(example_iadf), 15)
novak_index(example_iadf, model)
```

`novak_weibull` *novak_weibull*

Description

Fit a Weibull function for the calculation of age corrected IADF frequencies according to Novak et al. (2013).

Usage

```
novak_weibull(
  novak_freq_object,
  min.n = 15,
  start = NULL,
  max.iter = 500,
  make.plot = TRUE,
  ...
)
```

Arguments

`novak_freq_object`	A novak_freq_object as obtained from novak_freq
`min.n`	minimum number of samples within each cambial age to be included in model estimation
`start`	set custom start values - default to `list(a = 4, b = 0.33, c = 15.5)`
`max.iter`	maximum iterations for internally used nls
`make.plot`	logical
`...`	additional plotting arguments

Value

a model object of class "nls"

References

Novak, Klemen and Sánchez, Miguel Angel Saz and Čufar, Katarina and Raventós, Josep and de Luis, Martin. Age, climate and intra-annual density fluctuations in in Spain, IAWA Journal, 34, 459-474 (2013), doi:10.1163/22941932-00000037

See Also

novak_freq, novak_index

Examples

```
data('example_iadf')
model <- novak_weibull(novak_freq(example_iadf), 15)
novak_index(example_iadf, model)
```

---

novak_weibull_find_start *novak_weibull_find_start*

Description

Find good start values manually in case novak_weibull returns an error caused by insufficient default starting values.

Usage

```
novak_weibull_find_start(
  novak_freq_object,
  min.n = 15,
  max_a = 10,
  max_b = 3,
  max_c = 30
)
```

Arguments

novak_freq_object	A novak_freq_object as obtained from novak_freq
min.n	minimum number of samples within each cambial age to be included in model estimation
max_a	maximum value of manipulate slider for parameter a
max_b	maximum value of manipulate slider for parameter b
max_c	maximum value of manipulate slider for parameter c

Value

a list which can be used as input argument 'start' in novak_weibull

series_length *series length*

Description

returns the series length of the series within a data.frame/rwl object.

Usage

```
series_length(x)
```

Arguments

x	a data.frame/rwl object

Value

a numeric vector

sort_by_index *sort_by_index*

Description

internal function such as sortByIndex as in package dplR, shifts series to start with index 1, maintaining the same vector length by adding NA values to the end.

Usage

```
sort_by_index(x)
```

Arguments

x	a numeric vector, representing an individual rwl series, potentially containing NA values.

Value

a numeric vector with the same length as x.

Examples

```
x <- c(NA,NA,NA,1,2,3,4,5, NA, NA)
iadf:::sort_by_index(x)
#[1]  1  2  3  4  5 NA NA NA NA NA
```

tidyrwl *tidy and untidy ring width data*

Description

little helper functions to convert dataframes from the data format used in multiple dendro-related R packages such as **dplR** to tidy data used in the **tidyverse** and vice versa

Usage

```
tidy_crn(crn)

untidy_crn(tidy_crn)

tidy_rwl(rwl, value_col = "rwl")

untidy_rwl(tidy_rwl, value_col = "rwl")
```

Arguments

crn	a chronology as obtained from chron
tidy_crn	a tidy chronology as obtained from tidy_crn
rwl	ring width data as obtained from read.rwl
value_col	column name of the value column in the tidy tibble of the input resp output object
tidy_rwl	tidy ring width data as obtained from tidy_rwl

Value

data frames or tibbles

to_cambial_age *to_cambial_age*

Description

This function aligns tree ring series to match their cambial ages, taking pith offset into account if provided.

Usage

```
to_cambial_age(rwl, po = NULL)
```

Arguments

rwl	a data frame/rwl object.
po	optional, a data frame containing series names in the first and po data as nr. of years in the second column.

Value

A data.frame with aligned series

Examples

```
library("dplR")
data("gp.rwl")
data("gp.po")
gp.po$series <- as.character(gp.po$series)
iadf:::to_cambial_age(gp.rwl, gp.po)
```

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