

# Package ‘iadf’

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**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

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**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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afrp	<i>adjusted false ring proportion</i>
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### 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.
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### 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](#)

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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 <a href="#">campelo_freq</a>
min.n	minimum number of samples within each group to be included in model estimation
start	set custom start values - default to <code>list(a = 0.8, b = 0.03, c = 12.5)</code>
make.plot	logical
max.iter	maximum iterations for internally used <a href="#">nls</a>
...	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

<code>campelo_freq_object</code>	a campelo frequency object, output of <a href="#">campelo_freq</a>
<code>min.n</code>	minimum number of samples within each group to be included in model estimation
<code>max_a</code>	maximum value of manipulate slider for parameter a
<code>max_b</code>	maximum value of manipulate slider for parameter b
<code>max_c</code>	maximum value of manipulate slider for parameter c

## Value

a list which can be used as input argument 'start' in [campelo\\_chapman](#)

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campelo_freq	<i>iadf frequency per ring width class</i>
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### 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	<i>campelo_index</i>
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---

### 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 <a href="#">campelo_chapman</a>

### 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	<i>example_iadf</i>
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---

**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	<i>example_rwl</i>
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**Description**

An rwl object to be used in documented examples

**Usage**

```
example_rwl
```

**Format**

A data.frame with 135 years and 30 series.

---

frp	<i>false ring proportion</i>
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---

**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](#)

---

<code>iadf</code>	<i>iadf</i>
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**Description**

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

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<code>novak_freq</code>	<i>iadf frequency per cambial age</i>
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---

**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	<i>novak_index</i>
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---

## 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 <a href="#">novak_weibull</a>
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	<i>novak_weibull</i>
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---

**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 <a href="#">novak_freq</a>
min.n	minimum number of samples within each cambial age to be included in model estimation
start	set custom start values - default to <code>list(a = 4, b = 0.33, c = 15.5)</code>
max.iter	maximum iterations for internally used <a href="#">nls</a>
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**

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

**Value**

a list which can be used as input argument 'start' in [novak\\_weibull](#)

---

series_length	<i>series length</i>
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---

**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	<i>sort_by_index</i>
---------------	----------------------

---

**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	<i>tidy and untidy ring width data</i>
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### 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 <a href="#">chron</a>
tidy_crn	a tidy chronology as obtained from <a href="#">tidy_crn</a>
rwl	ring width data as obtained from <a href="#">read.rwl</a>
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 <a href="#">tidy_rwl</a>

### Value

data frames or tibbles

---

to_cambial_age	<i>to_cambial_age</i>
----------------	-----------------------

---

### 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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