

Package ‘dfidx’

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Title Indexed Data Frames

Depends R (>= 4.1.0)

Imports Formula, Rdpack

Suggests knitr, quarto, tinytest

Description Provides extended data frames, with a special data frame column which contains two indexes, with potentially a nesting structure.

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URL <https://cran.r-project.org/package=dfidx>

VignetteBuilder quarto

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Contents

dfidx	2
idx	4
idx_name	5
methods.dfidx	6
model.frame.dfidx	8
munnell	10
unfold_idx	11

dfidx

*Data frames with indexes***Description**

data frames for which observations are defined by two (potentially nested) indexes and for which series have therefore a natural tabular representation

Usage

```
dfidx(
  data,
  idx = NULL,
  drop.index = TRUE,
  as.factor = NULL,
  pkg = NULL,
  fancy.row.names = FALSE,
  subset = NULL,
  idnames = NULL,
  shape = c("long", "wide"),
  choice = NULL,
  varying = NULL,
  sep = ".",
  opposite = NULL,
  levels = NULL,
  ranked = FALSE,
  name,
  position,
  sort = TRUE,
  drop.unused.levels = TRUE,
  ...
)
```

Arguments

data	a data frame
idx	an index
drop.index	if TRUE (the default), remove the index series from the data.frame as stand alone series
as.factor	should the indexes be coerced to factors ?
pkg	if set, the resulting dfidx object is of class <code>c("dfidx_pkg", "dfidx")</code> which enables to write specific classes
fancy.row.names	if TRUE, fancy row names are computed (deprecated)

subset	a logical which defines a subset of rows to return
idnames	the names of the indexes
shape	either "wide" or "long"
choice	the choice
varying, sep	relevant for data sets in wide format, these arguments are passed to reshape
opposite	return the opposite of the series
levels	the levels for the second index
ranked	a boolean for ranked data
name	name of the idx column
position	position of the idx column
sort	should the data frame be sorted using the indexes ?
drop.unused.levels	if TRUE the unused levels of the second index are dropped
...	further arguments

Details

Indexes are stored as a data frame column in the resulting dfidx object

Value

an object of class "dfidx"

Author(s)

Yves Croissant

Examples

```
# the first two columns contain the indexes
mn <- dfidx(munnell)

# explicitly indicate the two indexes using either a vector or a
# list of two characters
mn <- dfidx(munnell, idx = c("state", "year"))
mn <- dfidx(munnell, idx = list("state", "year"))

# rename one or both indexes
mn <- dfidx(munnell, idnames = c(NA, "period"))

# for balanced data (with observations ordered by the first, then
# by the second index

# use the name of the first index
mn <- dfidx(munnell, idx = "state", idnames = c("state", "year"))

# or an integer equal to the cardinal of the first index
```

```

mn <- dfidx(munnell, idx = 48L, idnames = c("state", "year"))

# Indicate the values of the second index using the levels argument
mn <- dfidx(munnell, idx = 48L, idnames = c("state", "year"),
           levels = 1970:1986)

# Nesting structure for one of the index
mn <- dfidx(munnell, idx = c(region = "state", president = "year"))

# Data in wide format
mn <- dfidx(munnell_wide, idx = c(region = "state"),
           varying = 3:36, sep = "_", idnames = c(NA, "year"))

# Customize the name and the position of the `idx` column
dfidx(munnell, position = 3, name = "index")

```

idx

Index for dfidx

Description

The index of a `dfidx` is a data frame containing the different series which define the two indexes (with possibly a nesting structure). It is stored as a "sticky" data frame column of the `dfidx` object and is also inherited by series (of class `'xseries'`) which are extracted from a `dfidx` object.

Usage

```

idx(x, n = NULL, m = NULL)

## S3 method for class 'dfidx'
idx(x, n = NULL, m = NULL)

## S3 method for class 'idx'
idx(x, n = NULL, m = NULL)

## S3 method for class 'xseries'
idx(x, n = NULL, m = NULL)

## S3 method for class 'idx'
format(x, size = 4, ...)

```

Arguments

<code>x</code>	a <code>dfidx</code> or a <code>xseries</code>
<code>n, m</code>	<code>n</code> is the index to be extracted (1 or 2), <code>m</code> equal to one to get the index, greater than one to get a nesting variable.
<code>size</code>	the number of characters of the indexes for the format method
<code>...</code>	further arguments (for now unused)

Details

idx is defined as a generic with a `dfidx` and a `xseries` method.

Value

a data frame containing the indexes or a series if a specific index is selected

Author(s)

Yves Croissant

Examples

```
mn <- dfidx(munnell, idx = c(region = "state", president = "year"))
idx(mn)
gsp <- mn$gsp
idx(gsp)
# get the first index
idx(mn, 1)
# get the nesting variable of the first index
idx(mn, 1, 2)
```

idx_name

Get the name and the position of the index column

Description

This function extract the names of the indexes (along with the position of the `idx` column) or the name of a specific index

Usage

```
idx_name(x, n = 1, m = NULL)

## S3 method for class 'dfidx'
idx_name(x, n = NULL, m = NULL)

## S3 method for class 'idx'
idx_name(x, n = NULL, m = NULL)

## S3 method for class 'xseries'
idx_name(x, n = NULL, m = NULL)
```

Arguments

<code>x</code>	a <code>dfidx</code> , a <code>idx</code> or a <code>xseries</code> object
<code>n</code>	the index to be extracted (1 or 2, ignoring the nesting variables)
<code>m</code>	if > 1, a nesting variable

Value

if `n` is `NULL`, a named integer which gives the position and the name of the `idx` column in the `dfidx` object, otherwise, a character of length 1

Author(s)

Yves Croissant

Examples

```
mn <- dfidx(munnell, idx = c(region = "state", president = "year"))
# get the position of the idx column
idx_name(mn)
# get the name of the first index
idx_name(mn, 1)
# get the name of the second index
idx_name(mn, 2)
# get the name of the nesting variable for the second index
idx_name(mn, 2, 2)
```

methods.dfidx

Methods for dfidx

Description

A `dfidx` object is a data frame with a "sticky" data frame column which contains the indexes. Specific methods of functions that extract lines and/or columns of a data frame are provided: `[], [[, $, [<-`, `[[<-` and `$<-`. Moreover, methods are provided for `base::transform` and `base::subset` in order to easily generate new variables and select some rows and columns of a `dfidx` object. An `organize` function is also provided to sort a `dfidx` object using one or several series.

Usage

```
## S3 method for class 'dfidx'
x[i, j, drop]

## S3 method for class 'dfidx'
as.data.frame(x, row.names = NULL, optional = FALSE, ...)

## S3 method for class 'dfidx'
print(x, ..., n = NULL)

## S3 method for class 'dfidx'
head(x, n = NULL, ...)

## S3 method for class 'dfidx'
x[[y]]
```

```

## S3 method for class 'dfidx'
x$y

## S3 replacement method for class 'dfidx'
object$y <- value

## S3 replacement method for class 'dfidx'
object[[y]] <- value

## S3 method for class 'xseries'
print(x, ..., n = NULL)

## S3 method for class 'idx'
print(x, ..., n = NULL)

## S3 method for class 'dfidx'
mean(x, ...)

## S3 method for class 'dfidx'
transform(`_data`, ...)

## S3 method for class 'dfidx'
subset(x, subset, select, drop = FALSE, drop.unused.levels = TRUE, ...)

organize(x, ...)

```

Arguments

x, *object*, *_data* a *dfidx* object
i the row index (or the column index if *j* is not used)
j the column index
drop if TRUE a vector is returned if the result is a one column data.frame
row.names, optional arguments of the generic *as.data.frame* method, not used
... further arguments
n the number of rows for the print method
y the name or the position of the series one wishes to extract
value the value for the replacement method
subset, select see `base::subset`
drop.unused.levels passed to `dfidx::dfidx`

Value

as.data.frame and *mean* return a data.frame, `[[` and `$` a vector, `[` either a *dfidx* or a vector, `$<-` and `[[<-` modify the values of an existing column or create a new column of a *dfidx* object. *transform*, *subset* and *organize* return a *dfidx* object. *print* is called for its side effect.

Author(s)

Yves Croissant

Examples

```

mn <- dfidx(munnell)
# extract a series (returns as a xseries object)
mn$gsp
# or
mn[["gsp"]]
# extract a subset of series (returned as a dfidx object)
mn[c("gsp", "unemp")]
# extract a subset of rows and columns
mn[mn$unemp > 10, c("utilities", "water")]
# dfidx, idx and xseries have print methods as (like tibbles), a n
# argument
print(mn, n = 3)
print(idx(mn), n = 3)
print(mn$gsp, n = 3)
# a dfidx object can be coerced to a data.frame
as.data.frame(mn)
# transform, subset and organize are usefull methods/function to
# create new series, select a subset of lines and/or columns and to
# sort the `dfidx` object using one or several series
transform(mn, gsp70 = ifelse(year == 1970, gsp, 0))
subset(mn, gsp > 200000, select = c("gsp", "unemp"))
subset(mn, 1:20, select = c("gsp", "unemp"))
organize(mn, year, unemp)

```

model.frame.dfidx

model.frame and model.matrix methods for dfidx objects

Description

Specific `model.frame` and `model.matrix` are provided for `dfidx` objects. This leads to an unusual order of arguments compared to the usage. Actually, the first two arguments of the `model.frame` method are a `dfidx` and a `formula` and the only main argument of the `model.matrix` method is a `dfidx` which should be the result of a call to the `model.frame` method, i.e. it should have a `terms` attribute.

Usage

```

## S3 method for class 'dfidx'
model.frame(
  formula,
  data = NULL,
  ...,
  lhs = NULL,
  rhs = NULL,

```

```
dot = "previous",
alt.subset = NULL,
reflevel = NULL,
balanced = FALSE
)

## S3 method for class 'dfidx'
model.matrix(object, ..., lhs = NULL, rhs = 1, dot = "separate")

## S3 method for class 'dfidx_matrix'
print(x, ..., n = NULL)
```

Arguments

formula	a dfix
data	a formula
..., lhs, rhs, dot	see the Formula method
alt.subset	a subset of levels for the second index
reflevel	a user-defined first level for the second index
balanced	a boolean indicating if the resulting data.frame has to be balanced or not
object	a dfix object
x	a model matrix
n	the number of lines to print

Value

a dfix object for the model.frame method and a matrix for the model.matrix method.

Author(s)

Yves Croissant

Examples

```
mn <- dfix(munnell)
mf <- model.frame(mn, gsp ~ privatecap | publiccap + utilities | unemp + labor)
model.matrix(mf, rhs = 1)
model.matrix(mf, rhs = 2)
model.matrix(mf, rhs = 1:3)
```

munnell

Productivity in the United States

Description

a panel data of 48 American States for 17 years, from 1970 to 1986

Usage

munnell

munnell_wide

Format

a data frame containing:

- state: the state
- year: the year
- region: one of the 9 regions of the United States
- president: the name of the president for the given year
- publiccap: public capital stock
- highway: highway and streets
- water: water and sewer facilities
- utilities: othe public building and structures
- privatecap: private capital stock
- gsp: gross state product
- labor: labor input measured by the employment in non-agricultural payrolls
- unemp: state unemployment rate

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 48 rows and 36 columns.

Source

Online complements to Baltagi (2001): <https://www.wiley.com/legacy/wileychi/baltagi/>

Online complements to Baltagi (2013): <https://bcs.wiley.com/he-bcs/Books?action=resource&bcsId=4338&itemId=1118672321&resourceId=13452>

References

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Baltagi BH, Pinnoi N (1995). "Public capital stock and state productivity growth: further evidence from an error components model." *Empirical Economics*, **20**, 351-359.

Munnell A (1990). "Why Has Productivity Growth Declined? Productivity and Public Investment." *New England Economic Review*, 3-22.

unfold_idx	<i>Fold and Unfold a dfix object</i>
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Description

fold_idx takes a dfix object, includes the indexes as stand alone columns, remove the idx column and return a data frame, with an ids attribute that contains the informations about the indexes. fold_idx performs the opposite operation.

Usage

```
unfold_idx(x)

fold_idx(x, pkg = NULL, sort = FALSE)
```

Arguments

x	a dfix object
pkg	if not NULL, this argument is passed to dfix
sort	a boolean, whether the resulting dfix object should be sorted or not

Value

a data frame for the unfold_dfix function, a dfix object for the fold_dfix function

Author(s)

Yves Croissant

Examples

```
mn <- dfix(munnell, idx = c(region = "state", "year"), position = 3, name = "index")
mn2 <- unfold_idx(mn)
attr(mn, "ids")
mn3 <- fold_idx(mn2)
identical(mn, mn3)
```

Index

- * **datasets**
 - munnell, 10
- * **dataset**
 - munnell, 10
- [.dfidx (methods.dfidx), 6
- [[.dfidx (methods.dfidx), 6
- [[<-.dfidx (methods.dfidx), 6
- \$.dfidx (methods.dfidx), 6
- \$<-.dfidx (methods.dfidx), 6

- as.data.frame.dfidx (methods.dfidx), 6

- dfidx, 2

- fold_idx (unfold_idx), 11
- format_idx (idx), 4

- head.dfidx (methods.dfidx), 6

- idx, 4
- idx_name, 5

- mean.dfidx (methods.dfidx), 6
- methods.dfidx, 6
- model.frame.dfidx, 8
- model.matrix.dfidx (model.frame.dfidx),
8
- munnell, 10
- munnell_wide (munnell), 10

- organize (methods.dfidx), 6

- print.dfidx (methods.dfidx), 6
- print.dfidx_matrix (model.frame.dfidx),
8
- print.idx (methods.dfidx), 6
- print.xseries (methods.dfidx), 6

- subset.dfidx (methods.dfidx), 6

- transform.dfidx (methods.dfidx), 6

- unfold_idx, 11