

Package ‘rutils’

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Type Package

Title Utility Functions for Simplifying Financial Data Management and Modeling

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Author Jerzy Pawlowski

Maintainer Jerzy Pawlowski <algoquant@algoquants.ch>

Description Functions for managing object names and attributes, applying functions over lists, managing objects in environments.

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Depends xts, quantmod,

Suggests knitr, rmarkdown

VignetteBuilder knitr

LazyData true

Repository GitHub

URL <https://github.com/algoquant/rutils>

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chart_xts	<i>Plot an xts time series with custom y-axis range and with vertical background shading.</i>
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Description

A wrapper for function `chart_Series()` from package **quantmod**.

Usage

```
chart_xts(x_ts, ylim = NULL, in_dex = NULL, ...)
```

Arguments

<code>x_ts</code>	xts time series.
<code>ylim</code>	numeric vector with two elements containing the y-axis range.
<code>in_dex</code>	Boolean vector or xts time series for specifying the shading areas, with TRUE indicating "lightgreen" shading, and FALSE indicating "lightgrey" shading.
<code>...</code>	additional arguments to function <code>chart_Series()</code> .

Details

Extracts the chart object and modifies its `ylim` parameter using accessor and setter functions. Also adds background shading using function `add_TA()`. The `in_dex` argument should have the same length as the `x_ts` time series. Finally the function `chart_xts()` plots the chart object and returns it invisibly.

Value

chart object `chob` returned invisibly.

Examples

```
chart_xts(env_etf$VTI["2015-11"],
  name="VTI in Nov 2015", ylim=c(102, 108),
  in_dex=zoo::index(env_etf$VTI["2015-11"]) > as.Date("2015-11-18"))
```

clo_se	<i>Extract close prices from an OHLC time series.</i>
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Description

Extract close prices from an OHLC time series.

Usage

```
clo_se(x_ts, which_col = "Close")
```

Arguments

`x_ts` an OHLC time series.

`which_col` partial name of the column to be extracted.

Details

Extracts close prices from an OHLC time series. Assigns a column name corresponding to its symbol (ticker) and the column name, for example "VTI.Close". The `which_col` argument is partially matched, for example "vol" is matched to "Volume".

Value

single column OHLC time series in `xts` format.

Examples

```
# get close prices for VTI
clo_se(env_etf$VTI)
# get volumes for VTI
clo_se(env_etf$VTI, which_col="vol")
```

diff_it	<i>Calculate the row differences of a numeric vector or matrix.</i>
---------	---

Description

Calculate the row differences of a numeric vector or matrix.

Usage

```
diff_it(in_put, lag = 1)
```

Arguments

`in_put` a numeric vector or matrix.

`lag` integer equal to the number of periods of lag.

Details

Calculates the row differences between rows that are `lag` rows apart. The leading or trailing stub periods are padded with zeros. Positive `lag` means that the difference is calculated as the current row minus the row that is `lag` rows above. (vice versa negative `lag`). This also applies to vectors, since they can be viewed as single-column matrices.

Value

vector or matrix with the same dimensions as the input object.

Examples

```
# diff vector by 2 periods
diff_it(1:10, lag=2)
# diff matrix by negative 2 periods
diff_it(matrix(1:10, ncol=2), lag=-2)
```

diff_xts

Calculate the time differences of an xts time series.

Description

Calculate the time differences of an xts time series.

Usage

```
diff_xts(x_ts, lag = 1, ...)
```

Arguments

x_ts	an xts time series.
lag	integer equal to the number of time periods of lag.
...	additional arguments to function xts::diff_xts().

Details

Calculates the time differences of an xts time series and pads with zeros instead of NAs. Positive lag means differences are calculated with values from lag periods in the past (vice versa negative lag). The function diff() is just a wrapper for diff_xts() from package **xts**, but it pads with zeros instead of NAs.

Value

xts time series with the same dimensions and the same time index as the input series.

Examples

```
# calculate time differences over lag by 10 periods
rutils::diff_xts(env_etf$VTI, lag=10)
```

do_call	<i>Recursively apply a function to a list of objects, such as xts time series.</i>
---------	--

Description

Performs a similar operation as `do.call()`, but using recursion, which is much faster and uses less memory. The function `do_call()` is a generalization of function `do_call_rbind()`.

Usage

```
do_call(func_tion, li_st, ...)
```

Arguments

<code>func_tion</code>	name of function that returns a single object from a list of objects.
<code>li_st</code>	list of objects, such as vectors, matrices, data frames, or time series.
<code>...</code>	additional arguments to function <code>func_tion()</code> .

Details

Performs lapply loop, each time binding neighboring elements and dividing the length of `li_st` by half. The result of performing `do_call(rbind, list_xts)` on a list of xts time series is identical to performing `do.call(rbind, list_xts)`. But `do.call(rbind, list_xts)` is very slow, and often causes an ‘out of memory’ error.

Value

single vector, matrix, data frame, or time series.

Examples

```
# create xts time series
x_ts <- xts(x=rnorm(1000), order.by=(Sys.time()-3600*(1:1000)))
# split time series into daily list
list_xts <- split(x_ts, "days")
# rbind the list back into a time series and compare with the original
identical(x_ts, do_call(rbind, list_xts))
```

do_call_assign	<i>Apply a function to a list of objects, merge the outputs into a single object, and assign the object to the output environment.</i>
----------------	--

Description

Apply a function to a list of objects, merge the outputs into a single object, and assign the object to the output environment.

Usage

```
do_call_assign(func_tion, sym_bols = NULL, out_put, env_in = .GlobalEnv,
  env_out = .GlobalEnv, ...)
```

Arguments

<code>func_tion</code>	name of function that returns a single object (vector, xts time series, etc.)
<code>sym_bols</code>	vector of strings with names of input objects.
<code>out_put</code>	string with name of output object.
<code>env_in</code>	environment containing <code>sym_bols</code> .
<code>env_out</code>	environment for creating <code>out_put</code> .
<code>...</code>	additional arguments to function <code>func_tion()</code> .

Details

Performs an lapply loop over `sym_bols`, applies the function `func_tion()`, merges the outputs into a single object, and creates the object in the environment `env_out`. The output object is created as a side effect, while its name is returned invisibly.

Value

single object (matrix, xts time series, etc.)

Examples

```
new_env <- new.env()
do_call_assign(
  func_tion=clo_se,
  sym_bols=env_etf$sym_bols,
  out_put="price_s",
  env_in=env_etf, env_out=new_env)
```

<code>do_call_rbind</code>	<i>Recursively ‘rbind’ a list of objects, such as xts time series.</i>
----------------------------	--

Description

Performs the same operation as `do.call(rbind, li_st)`, but using recursion, which is much faster and uses less memory. This is the same function as `‘do.call.rbind’` from package `‘qmao’`.

Usage

```
do_call_rbind(li_st)
```

Arguments

<code>li_st</code>	list of objects, such as vectors, matrices, data frames, or time series.
--------------------	--

Details

Performs lapply loop, each time binding neighboring elements and dividing the length of `li_st` by half. The result of performing `do_call_rbind(list_xts)` on a list of `xts` time series is identical to performing `do.call(rbind, list_xts)`. But `do.call(rbind, list_xts)` is very slow, and often causes an ‘out of memory’ error.

Value

single vector, matrix, data frame, or time series.

Examples

```
# create xts time series
x_ts <- xts(x=rnorm(1000), order.by=(Sys.time()-3600*(1:1000)))
# split time series into daily list
list_xts <- split(x_ts, "days")
# rbind the list back into a time series and compare with the original
identical(x_ts, do_call_rbind(list_xts))
```

end_points	<i>Calculate an index (integer vector) of equally spaced end points for a time series.</i>
------------	--

Description

Calculate an index (integer vector) of equally spaced end points for a time series.

Usage

```
end_points(x_ts, inter_val = 10, off_set = 0)
```

Arguments

<code>x_ts</code>	vector or time series.
<code>inter_val</code>	the number of data points per interval.
<code>off_set</code>	the number of data points in the first interval (stub interval).

Details

The end points divide the time series into equally spaced intervals. The `off_set` argument shifts the end points forward and creates an initial stub interval.

Value

integer vector of equally spaced end points.

Examples

```
# calculate end points with initial stub interval
end_points(env_etf$VTI, inter_val=7, off_set=4)
```

etf_data	<i>The etf_data dataset contains a single environment called env_etf, which includes daily OHLC time series data for a portfolio of symbols.</i>
----------	--

Description

The env_etf environment includes daily OHLC time series data for a portfolio of symbols, and reference data:

sym_bols a vector of strings with the portfolio symbols.

price_s a single xts time series containing daily closing prices for all the sym_bols.

re_turns a single xts time series containing daily returns for all the sym_bols.

Individual time series "VTI", "VEU", etc., containing daily OHLC prices for the sym_bols.

Usage

```
data(etf_data) # not required - data is lazy load
```

Format

Each xts time series contains the columns:

Open Open prices

High High prices

Low Low prices

Close Close prices

Volume daily trading volume

Adjusted Adjusted closing prices

Examples

```
# data(etf_data) # not needed - data is lazy load
# get first six rows of OHLC prices
head(env_etf$VTI)
chart_Series(x=env_etf$VTI["2009-11"])
```

lag_it	<i>Apply a lag to a numeric vector or matrix.</i>
--------	---

Description

Apply a lag to a numeric vector or matrix.

Usage

```
lag_it(in_put, lag = 1)
```


Arguments

`in_put` a numeric vector or matrix.
`lag` integer equal to the number of periods of lag.

Details

Applies a lag to a vector or matrix, by shifting its values by a certain number of rows, equal to the integer `lag`, and pads the leading or trailing stub periods with zeros. Positive `lag` means that values in the current row are replaced with values from the row that are `lag` rows above. (vice versa negative `lag`). This also applies to vectors, since they can be viewed as single-column matrices.

Value

vector or matrix with the same dimensions as the input object.

Examples

```
# lag vector by 2 periods
lag_it(1:10, lag=2)
# lag matrix by negative 2 periods
lag_it(matrix(1:10, ncol=2), lag=-2)
```

lag_xts	<i>Apply a time lag to an xts time series.</i>
---------	--

Description

Apply a time lag to an xts time series.

Usage

```
lag_xts(x_ts, k = 1, ...)
```

Arguments

`x_ts` an xts time series.
`k` integer equal to the number of time periods of lag.
`...` additional arguments to function `xts::lag_xts()`.

Details

Applies a time lag to an xts time series and pads with zeros instead of NAs. Positive lag `k` means values from `k` periods in the past are moved to the present. Negative lag `k` moves values from the future to the present. The function `lag()` is just a wrapper for function `lag_xts()` from package **xts**, but it pads with zeros instead of NAs.

Value

xts time series with the same dimensions and the same time index as the input series.

Examples

```
# lag by 10 periods
rutils::lag_xts(env_etf$VTI, k=10)
```

na_me	<i>Extract the name of an OHLC time series from its first column name.</i>
-------	--

Description

Extract the name of an OHLC time series from its first column name.

Usage

```
na_me(x_ts, field = 1)
```

Arguments

x_ts	OHLC time series.
field	the integer index of the field to be extracted.

Details

Extracts the symbol name (ticker) from the name of the first column of an OHLC time series. The column name is assumed to be in the format "symbol.Open". It can also extract the field name after the "." separator, for example "Open" from "SPY.Open".

Value

string with name of time series.

Examples

```
# get name for VTI
na_me(env_etf$VTI)
```

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