

Package ‘rspa’

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Title Adapt Numerical Records to Fit (in)Equality Restrictions

Type Package

LazyLoad yes

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Description Minimally adjust the values of numerical records in a data.frame, such that each record satisfies a predefined set of equality and/or inequality constraints. The constraints can be defined using the 'validate' package. The core algorithms have recently been moved to the 'lintools' package, refer to 'lintools' for a more basic interface and access to a version of the algorithm that works with sparse matrices.

Version 0.2.5

Depends R (>= 2.13.0)

Imports graphics, stats, validate, lintools

Suggests editrules, tinytest

URL <https://github.com/markvanderloo/rspa>

BugReports <https://github.com/markvanderloo/rspa/issues>

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Encoding UTF-8

NeedsCompilation yes

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rspa-package	<i>A package for minimal vector adjustment.</i>
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Description

A package for minimal vector adjustment.

Overview

Given a vector \mathbf{x}^0 , and a set linear restrictions of the form $\mathbf{a}_i \cdot \mathbf{x}_i = b_i$ and/or $\mathbf{a}_i \cdot \mathbf{x}_i \leq b_i$ with $i = 1, 2, \dots, m$. This package finds the nearest vector to \mathbf{x}^0 (in the (weighted) euclidean sense) that satisfies all restrictions.

Much of this package's functionality, including algorithms for working with large, sparse problems has been moved to the `lintools` package. This package will serve as a front-end for application of the successive projection algorithm for data stored in `data.frame` like objects.

match_restrictions	<i>Alter numeric data records to match linear (in)equality constraints.</i>
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Description

Apply the successive projection algorithm to adjust each record in `dat` to satisfy a set of linear (in)equality constraints.

Usage

```
match_restrictions(dat, restrictions, adjust, weight = rep(1, ncol(dat)),
  remove_tag = TRUE, ...)
```

Arguments

<code>dat</code>	A <code>data.frame</code>
<code>restrictions</code>	An object of class <code>validator</code>
<code>adjust</code>	(optional) A logical matrix of dimensions <code>dim(dat)</code> where <code>TRUE</code> indicates that a value may be adjusted. When missing, the <code>tagged_values</code> are used. If no tagging was applied, <code>adjust</code> will default to an all <code>TRUE</code> matrix with dimensions equal to <code>dim(dat)</code> .
<code>weight</code>	A weight vector of length <code>ncol(dat)</code> or a matrix of dimensions <code>dim(dat)</code> .
<code>remove_tag</code>	if a value position indicator is present, remove it?
<code>...</code>	arguments passed to <code>project</code> .

Value

dat, with values adapted.

Note on inequality restrictions

All inequality restrictions of the form $a.x < b$ are treated as $a.x \leq b$. The idea is to project the original record x onto the boundary defined by the (in)equations. Projection on a boundary defined by a strict inequation is illdefined since the value b in the restriction $a.x < b$ is strictly outside the valid region.

See Also

[tag_missing](#)

Examples

```
# a very simple adjustment example

v <- validate::validator(
  x + y == 10,
  x > 0,
  y > 0
)

# x and y will be adjusted by the same amount
match_restrictions(data.frame(x=4,y=5), v)

# One of the inequalities violated
match_restrictions(data.frame(x=-1,y=5), v)

# Weighted distances: 'heavy' variables change less
match_restrictions(data.frame(x=4,y=5), v, weight=c(100,1))

# if w=1/x0, the ratio between coefficients of x0 stay the same (to first order)
x0 <- data.frame(x=4,y=5)
x1 <- match_restrictions(x0, v, weight=1/as.matrix(x0))

x0[,1]/x0[,2]
x1[,1] / x1[,2]

# example of tag usage
v <- validate::validator(x + y == 1, x>0,y>0)
d <- data.frame(x=NA,y=0.5)
d <- tag_missing(d)
# impute
d[,1] <- 1

# only the tagged values will be altered. The tag is
# removed afterwards.
match_restrictions(d,v)
```

remove_tag	<i>Remove cell position tags</i>
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Description

Remove cell position tags

Usage

```
remove_tag(dat, ...)
```

Arguments

dat	[data.frame]
...	Currently not used

Value

dat with tag removed

See Also

Other tagging: [tag_missing](#), [tagged_values](#)

tagged_values	<i>Retrieve tagged cell positions</i>
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Description

Retrieve tagged cell positions

Usage

```
tagged_values(dat, ...)
```

Arguments

dat	[data.frame]
...	Currently not used

Value

A logical matrix, or NULL

See Also

Other tagging: [remove_tag](#), [tag_missing](#)

tag_missing	<i>Tag currently missing elements of a data.frame</i>
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Description

Attach an attribute that marks which cells are empty (NA).

Usage

```
tag_missing(dat, ...)
```

Arguments

dat	[data.frame] to be tagged
...	Currently not used.

Value

dat, tagged for missing values.

See Also

Other tagging: [remove_tag](#), [tagged_values](#)

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