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 0.2.8

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

RoxygenNote 7.2.1

Encoding UTF-8

NeedsCompilation yes

Repository CRAN

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R topics documented:

`rspa-package` *A package for minimal vector adjustment.*

Description

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

Details

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 succsessive projection algorithm for data stored in data.frame like objects.

`match_restrictions` *Alter numeric data records to match linear (in)equality constraints.*

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 = NULL,
  weight = rep(1, ncol(dat)),
  remove_tag = TRUE,
  ...
)
```

Arguments

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

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 sice 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 inequalies 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] <- 1

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

remove_tag *Remove cell position tags*

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 *Retrieve tagged cell positions*

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` *Tag currently missing elements of a data.frame*

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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