Package: keedwell (via r-universe)

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Title Latin Squares in R

Version 0.2.0

Description Completion and embedding of latin squares in R.

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Encoding UTF-8

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Imports dplyr, igraph, purrr, tibble, tidygraph, tidyr

Repository https://mhenderson.r-universe.dev

RemoteUrl https://github.com/MHenderson/keedwell

RemoteRef v0.2.0

RemoteSha ee0211687885dc1425cd1c282d59ddcf737105a3

Contents

add_cols *Add new columns to a latin rectangle*

Description

Add new columns to a latin rectangle

Usage

```
add_cols(R, cols, l_order, strategy = next_col_matching)
```

Arguments

R	A latin rectangle
cols	Indices of columns to add
l_order	Dimension of latin square
strategy	Strategy for filling columns

Value

A latin rectangle

add_rows *Embed latin rectangle in a latin square*

Description

Input is a latin rectangle as a data frame with variables for row, column and symbol. Output is a latin square in the same format which contains the given latin rectangle in the first rows.

Usage

```
add_rows(R, rows, strategy = next_row_matching)
```

Arguments

R	latin rectangle
rows	empty rows to be filled
strategy	row filling strategy

Details

Use can optionally provide a vector of row indices. Only those rows will be filled if that optional vector is provided.

Value

A latin rectangle

`edge_tbl` *Symbols missing from columns edge data frame*

Description

Constructs a data frame representing the edges of a bipartite graph based on a latin rectangle where the graph has an edge for every symbol not already used in a column.

Usage

```
edge_tbl(R, i, l_order = 3)
```

Arguments

`R`	latin rectangle
`i`	column
`l_order`	size of latin square R is going to be embedded into

Details

Acutally, this is just for one column.

Value

The edge data frame.

`edge_tbl_2` *Symbols missing from rows data frame*

Description

Symbols missing from rows data frame

Usage

```
edge_tbl_2(R, i, l_order = 3)
```

Arguments

`R`	latin rectangle
`i`	row index
`l_order`	size of latin square R is going to be embedded into

Value

The edge data frame.

`first_row_natural` *First row in in natural order*

Description

First row in in natural order

Usage

```
first_row_natural(n)
```

Arguments

`n`	Number of columns

Value

A 1 x n latin rectangle with first row 1,...,n

`next_col_matching` *Matching strategy for adding new columns*

Description

Matching strategy for adding new columns

Usage

```
next_col_matching(R, i, l_order)
```

Arguments

`R`	a latin rectangle
`i`	column index
`l_order`	dimension

Value

a latin rectangle with more columns

next_col_random *Random strategy for choosing a new columns*

Description

Random strategy for choosing a new columns

Usage

```
next_col_random(R, i, l_order)
```

Arguments

R	a latin rectangle
i	column index
l_order	dimension

Value

A latin rectangle with more columns

next_row_matching *Find a compatible row for extending a latin rectangle*

Description

Given an input latin rectangle this function will generate a new row that can be added to the latin rectangle.

Usage

```
next_row_matching(R, i, l_order)
```

Arguments

R	A latin rectangle
i	Number of columns to add
l_order	Order of R

Details

The method used is to create a bipartite graph with vertex partitions for columns and symbols missing from columns and then find a maximum matching in that bipartite graph.

Value

A latin rectangle with more rows.

next_row_random *Find a random new row for a latin rectangle*

Description

Find a random new row for a latin rectangle

Usage

```
next_row_random(R, i, l_order)
```

Arguments

R	A latin rectangle
i	Number of columns to add
l_order	Order of R

Value

A latin square with more rows.

to_tidygraph *Symbols missing from columns bipartite graph*

Description

Input is a latin rectangle as a data frame with variables for row, column and symbol. Output is a tidygraph representing the bipartite graph with vertices for columns and symbols and edges representing symbols missing from columns.

Usage

```
to_tidygraph(R, l_order = 3)
```

Arguments

R	A latin rectangle.
l_order	Order of R.

Value

A bipartite graph.

`to_tidygraph_2` *Symbols missing from rows bipartite graph*

Description

Symbols missing from rows bipartite graph

Usage

```
to_tidygraph_2(R, l_order, n_rows, n_cols)
```

Arguments

`R`	A latin rectangle.
`l_order`	Order of R.
`n_rows`	Number of rows.
`n_cols`	Number of columns.

Value

A bipartite graph.

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