Package 'galoislattice'

April 5, 2017

Title Galois Lattice and Positional Dominance

Version 0.1

Author Maria Mircea

Date 2017-03-06

Description Builds a Galois lattice of a binary two-mode network. It can be used to identify hierarchical structures in the data. A dominance tree can be build which describes the positional dominance between nodes by using the shortest paths. Also a hierarchical layout is included to see the structure accordingly.

Maintainer Maria Mircea <maria.mircea@hfp.tum.de>

License GPL-2

Depends R (>= 3.2.0), igraph

RoxygenNote 5.0.1

LazyData true

R topics documented:

`do_dominance_tree` *Find dominace Tree*

Description

Finds the positional dominance between two nodes, by finding all shortest path between the nodes in a galois lattice

Usage

```
do_dominance_tree(graph, from, to, nodes)
```

Arguments

graph	a Galois lattice of which the dominance should be found
from	the node from where to start the path search
to	the node to which the shortest path should be found
nodes	the labels of those nodes for which one is interested in knowing the dominace relation for example the names of all affiliations

Details

The algorithm should be used with a directed galois lattice, e.g. G <- do_galois_lattice(X, directed = TRUE). The algorithm returns the positional dominance of the original graph, if it is applied on the REDUCED label of the galois lattice.

Value

igraph object, a Tree describing the dominace between nodes

See Also

do_galois_lattice for constructing the according input graph

---

do_full_label *Get full Labeling of Galois Lattice*

Description

Adds to the resulting label of Galois lattice, the full label of all nodes

Usage

```
do_full_label(GaloisGraph, OriginalGraph)
```

Arguments

GaloisGraph	the Galois Graph from do_galois_lattice
OriginalGraph	the original two-mode graph used for the galois lattice

Value

igraph object, a Galois Lattice with Full Label

See Also

do_reduced_label for reduced label galois lattice and galois_layout for correct hierarchical plots

Examples

```
M=matrix(c(1,1,1,0,0,0,
0,0,0,1,1,1,
1,0,0,1,0,0,
1,1,0,1,0,1),nrow=6)
colnames(M) <- c("A", "B", "C", "D")
rownames(M) <- as.character(1:6)
Galois <- do_galois_lattice(M)
Galois <- do_full_label(Galois, M)
```

`do_galois_lattice` *Create a Galois lattice*

Description

Creates a Galois lattice for a two mode Graph, with labeling of chosen mapping

Usage

```
do_galois_lattice(X, directed = FALSE, by = "best", label = "partly")
```

Arguments

`X`	a igraph object of a two mode network, or matrix
`directed`	TRUE/FALSE depending on wether the output Galois lattice should be directed
`by`	"col","row","best", depending if the result should be using the colnames, rownames or the most time efficient option
`label`	"partly","full","reduced", depending if the result should have partly labeled nodes as chosen with "by" or the full label or an reduced labeling approach

Value

igraph object, a Galois Lattice

See Also

`do_full_label` for full label galois lattice and `galois_layout` for correct hierarchical plots and `do_dominance_tree` for extracting positional dominance from a galois lattice

Examples

```
M=matrix(c(1,1,1,0,0,0,
0,0,0,1,1,1,
1,0,0,1,0,0,
1,1,0,1,0,1),nrow=6)
colnames(M) <- c("A", "B", "C", "D")
rownames(M) <- as.character(1:6)
Galois <- do_galois_lattice(M)
```

do_reduced_label *Get Reduced Labelling of Galois Lattice*

Description

Reduces full label of Galois lattice to a specific reduced label

Usage

```
do_reduced_label(GaloisGraph, OriginalGraph)
```

Arguments

GaloisGraph	the Galois Graph from do_galois_lattice with full label
OriginalGraph	the original two-mode graph used for the galois lattice

Details

function can only be used for a full labeled galois lattice

Value

igraph object, a Galois Lattice with Reduced Label

See Also

galois_layout for correct hierarchical plots and do_dominance_tree for extracting positional dominance from a galois lattice

Examples

```
M=matrix(c(1,1,1,0,0,0,
0,0,0,1,1,1,
1,0,0,1,0,0,
1,1,0,1,0,1),nrow=6)
colnames(M) <- c("A", "B", "C", "D")
rownames(M) <- as.character(1:6)
Galois <- do_galois_lattice(M)
Galois <- do_full_label(Galois, M)
Galois <- do_reduced_label(Galois, M)
```

`galois_layout` *Layout for plotting a Galois lattice*

Description

orders the nodes of a Galois lattice according to their hierarchical position

Usage

```
galois_layout(X)
```

Arguments

`X`	a Galois lattice, as the output of do_galois_lattice

Value

matrix, the layout to use in plot for the galois lattice

See Also

`do_dominance_tree` for extracting positional dominance from a galois lattice

Examples

```
M=matrix(c(1,1,1,0,0,0,
0,0,0,1,1,1,
1,0,0,1,0,0,
1,1,0,1,0,1),nrow=6)
colnames(M) <- c("A", "B", "C", "D")
rownames(M) <- as.character(1:6)
Galois <- do_galois_lattice(M)
Galois <- do_full_label(Galois, M)
Galois <- do_reduced_label(Galois, M)
plot(Galois, layout = galois_layout(Galois))
```

Index