Package ‘hyperdraw’

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Title Visualizing Hypergraphs
Author Paul Murrell
Maintainer Paul Murrell <p.murrell@auckland.ac.nz>
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R topics documented:

   graphBPH                    Constructor for graphBPH objects

Description

A convenience constructor for graphBPH-class objects. This is a generic function.

Usage

  graphBPH(graph, edgeNodePattern, ...)

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Arguments

- **graph**
  Some form of graph that is to be converted into a graphBPH object.
- **edgeNodePattern**
  A regular expression used to distinguish between normal nodes and edge nodes.
- ...
  Potential arguments to other methods.

Value

An object of class `graphBPH-class`

Methods

- **graphBPH** signature(graph = "graphNEL", edgeNodePattern = "character"): create a graphBPH object from a (directed) graphNEL object.
- **graphBPH** signature(graph = "Hypergraph", edgeNodePattern = "missing"): create a graphBPH object from a Hypergraph object (where all Hyperedges are DirectedHyperedges).

Author(s)

Paul Murrell

References

Falcon, S. and Gentleman, R. hypergraph: A package providing hypergraph data structures.

See Also

- `graphBPH-class`

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**graphBPH-class**

*Class "graphBPH"*

Description

A bipartite representation of a hypergraph. The purpose of this class is to support visualization of the hypergraph; it is not intended for analysis or manipulation of the hypergraph.

Objects from the Class

Objects can be created by calls of the form `new("graphBPH", graph, edgeNodePattern, ...)`. There is also a convenience function `graphBPH()`.

A graphBPH object consists of a graphNEL object, which must obey some strict rules:

- nodes in the graph are divided into two sets: normal nodes and edge-nodes,
- all edges in the graph must connect a normal node to an edge node,
- the graph must be a directed graph.

The edgeNodePattern is a regular expression that is used to define the set of edge-nodes.
Slots

graph: Object of class graphNEL. This graph must obey the constraints described above.
edgeNodePattern: Object of class character. The regular expression used to define edge-nodes.
nodes: Object of class character. Records which nodes in the graph are normal nodes.
edgeNodes: Object of class character. Records which nodes in the graph are edge-nodes.
edgeNodeIO: Object of class list. Records information about which edges enter and exit each edge-node.

Methods

plot signature(x = "graphBPH", y = "ANY"): draw a representation of the hypergraph where edges between normal nodes in the graph pass through an intermediate edge-node in a nice smooth curve.

graphLayout signature(graph = "graphBPH", layoutType = "missing"): convert the graphBPH object to a RagraphBPH object (using a default layout method).

graphLayout signature(graph = "graphBPH", layoutType = "character"): convert the graphBPH object to a RagraphBPH object (using the specified layout method).

Author(s)

Paul Murrell

References


See Also

agopen, graphLayout and graphNEL RagraphBPH

Examples

nodes <- c(LETTERS[1:5], paste("R", 1:3, sep=""))
testgnel <- new("graphNEL",
        nodes=nodes,
        edgel=list(
            A=list(edges="R1", "R2")),
            B=list(edges="R2"),
            C=list(),
            D=list(edges="R3"),
            E=list(),
            R1=list(edges="B"),
            R2=list(edges=c("C", "D")),
            R3=list(edges="E")),
        edgemode="directed")
testbph <- graphBPH(testgnel, "R")
plot(testbph)
# A Hypergraph equivalent
require(hypergraph)
dh1 <- DirectedHyperedge("A", "B", "R1")
dh2 <- DirectedHyperedge(c("A", "B"), c("C", "D"), "R2")
dh3 <- DirectedHyperedge("D", "E", "R3")
hg <- Hypergraph(LETTERS[1:5], list(dh1, dh2, dh3))
plot(graphBPH(hg))

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**graphLayout**

*Layout a graph.*

**Description**

This function is designed to layout a graph using the Rgraphviz package. The hyperdraw package makes this a generic function with a method for graphBPH objects. The function of the same name in the Rgraphviz package is used as a method for Ragraph objects.

**Usage**

```r
graphLayout(graph, layoutType, ...)
```

**Arguments**

- `graph` An graphBPH object, which is to be laid out.
- `layoutType` The layout method (e.g., dot or neato).
- `...` These arguments will be passed to the agopen() function.

**Value**

An RagraphBPH object.

**Author(s)**

Paul Murrell

**References**


**See Also**

agopen and GraphvizLayouts
Examples

```r
nodes <- c(LETTERS[1:5], paste("R", 1:3, sep=""))
testgnel <- new("graphNEL",
  nodes=nodes,
  edgeL=list(
    A=list(edges=c("R1", "R2")),
    B=list(edges="R2"),
    C=list(),
    D=list(edges="R3"),
    E=list(),
    R1=list(edges="B"),
    R2=list(edges=c("C", "D")),
    R3=list(edges="E")),
  edgemode="directed")
testbph <- new("graphBPH", testgnel, "^R")
testrabph <- graphLayout(testbph)
```

RagraphBPH-class

Class "RagraphBPH"

Description

The purpose of this class is to represent a laid out version of a graphBPH object. The laying out is performed by the Rgraphviz package. This is an intermediate step in the process of drawing a graphBPH object.

Objects from the Class

Objects of this class should be created via the graphLayout() function.

Slots

g: Object of class Raph. The laid out graph.

allNodes: Object of class character. The names of all nodes in the graph.

nodes: Object of class character. Records normal nodes in the graph.

edgeNodes: Object of class character. Records edge-nodes in the graph.

eNodeIO: Object of class list. Records which edges enter and exit each edge-node.

Methods

plot signature(x = "RagraphBPH", y = "ANY"): draw a representation of the hypergraph where edges between normal nodes in the graph pass through an intermediate edge-node in a nice smooth curve.

dataDefaults<- signature(self = "RagraphBPH", attr = "character", value = "ANY"): set the default drawing attributes for all edges.

data<- signature(self = "RagraphBPH", from = "character", to = "character", attr = "character"): set a specific drawing attribute for one or more edges.

dataDefaults<- signature(self = "RagraphBPH", attr = "character", value = "ANY"): set the default drawing attributes for all nodes.
RagraphBPH-class

nodeData<- signature(self = "RagraphBPH", n = "character", attr = "character", value = "ANY"):
set a specific attribute for one or more nodes.

graphDataDefaults<- signature(self = "RagraphBPH", attr = "character", value = "ANY"):
set the default drawing attributes for the graph.

graphData<- signature(self = "RagraphBPH", n = "character", attr = "character", value = "ANY"):
set a specific attribute for the graph.

Author(s)

Paul Murrell

See Also

graphLayout, graphBPH, and Ragraph

Examples
	nodes <- c(LETTERS[1:5], paste("R", 1:3, sep=""))
testnel <- new("graphNEL",
  nodes=nodes,
  edgeL=list(  
    A=list(edges=c("R1", "R2")),
    B=list(edges="R2"),
    C=list(),
    D=list(edges="R3"),
    E=list(),
    R1=list(edges="B"),
    R2=list(edges=c("C", "D")),
    R3=list(edges="E")),
  edgemode="directed")
testbph <- graphBPH(testnel, "^R")
testrabph <- graphLayout(testbph)

edgeDataDefaults(testrabph, "lwd") <- 1
edgeData(testrabph, c("A", "R1"), c("R1", "B"), "lwd") <- c("3", 5)
edgeDataDefaults(testrabph, "color") <- "black"
edgeData(testrabph, c("A", "R1"), c("R1", "B"), "color") <- "red"
nodeDataDefaults(testrabph, "margin") <- unit(2, "mm")
nodeDataDefaults(testrabph, "shape") <- "circle"

plot(testrabph)

graphDataDefaults(testrabph, "arrowLoc") <- "middle"

plot(testrabph)

graphData(testrabph, "arrowLoc") <- "end"

plot(testrabph)

graphData(testrabph, "arrowLoc") <- "none"

plot(testrabph)
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