Package ‘hyperdraw’

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Title Visualizing Hypergaphs

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Description Functions for visualizing hypergraphs.

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legacy.R node.R RagraphBPH.R

biocViews Visualization, GraphAndNetwork

NeedsCompilation no

R topics documented:

graphBPH 1
graphBPH-class 2
graphLayout 4
RagraphBPH-class 5

Index **8**

`graphBPH` *Constructor for graphBPH objects*

Description

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

Usage

```
graphBPH(graph, edgeNodePattern, ...)
```

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.

Gentleman, R. and Whalen, E. and Huber, W. and Falcon, S. **graph**: A package to handle graph data structures.

See Also

`graphBPH-class`

`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

Gansner, E.R. and and North, S.C. (1999) An open graph visualization system and its applications to software engineering, *Software - Practice and Experience*, 30:1203–1233.

Gentleman, R. and Whalen, E. and Huber, W. and Falcon, S. **graph**: A package to handle graph data structures.

Gentry, J. and Long, L. and Gentleman, R. and Falcon, S. and Hahne, F. and Sarkar, D. and Hansen, K. **Rgraphviz**: Provides plotting capabilities for R graph objects.

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=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(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

```
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

Gansner, E.R. and and North, S.C. (1999) An open graph visualization system and its applications to software engineering, *Software - Practice and Experience*, 30:1203–1233.

Gentry, J. and Long, L. and Gentleman, R. and Falcon, S. and Hahne, F. and Sarkar, D. and Hansen, K. **Rgraphviz**: Provides plotting capabilities for R graph objects.

See Also

`agopen` and `GraphvizLayouts`

Examples

```
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

`graph`**:** Object of class `Ragraph`. 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.

`edgeNodeIO`**:** 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.

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

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

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

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=""))
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 <- graphBPH(testgnel, "^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"
graphData(testrabph, "arrowLoc") <- "end"
plot(testrabph)
graphData(testrabph, "arrowLoc") <- "none"
plot(testrabph)
```

Index

∗Topic **classes**
graphBPH, 1
graphBPH-class, 2
RagraphBPH-class, 5
∗Topic **dplot**
graphLayout, 4

agopen, *3*, *5*

edgeData<-,RagraphBPH,character,character,character,ANY-method
(RagraphBPH-class), 5
edgeDataDefaults<-,RagraphBPH,character,ANY-method
(RagraphBPH-class), 5

graphBPH, 1, *6*
graphBPH,graphNEL,character-method
(graphBPH), 1
graphBPH,Hypergraph,missing-method
(graphBPH), 1
graphBPH-class, 2
graphData<-,RagraphBPH,character,ANY-method
(RagraphBPH-class), 5
graphDataDefaults<-,RagraphBPH,character,ANY-method
(RagraphBPH-class), 5
graphLayout, *3*, 4, *6*
graphLayout,graphBPH,character-method
(graphBPH-class), 2
graphLayout,graphBPH,missing-method
(graphBPH-class), 2
graphNEL, *3*
GraphvizLayouts, *5*

nodeData<-,RagraphBPH,character,character,ANY-method
(RagraphBPH-class), 5
nodeDataDefaults<-,RagraphBPH,character,ANY-method
(RagraphBPH-class), 5

plot,graphBPH,ANY-method
(graphBPH-class), 2
plot,RagraphBPH,ANY-method
(RagraphBPH-class), 5

Ragraph, *6*
RagraphBPH, *3*
RagraphBPH *(*RagraphBPH-class*)*, 5
RagraphBPH-class, 5