Package ‘hyperdraw’

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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

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

```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 <- 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))

---

**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


**Rgraphviz**: Provides plotting capabilities for R graph objects.

## 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

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.

eedgeData<- signature(self = "RagraphBPH", from = "character", to = "character", attr = "character"): 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)
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