

Package ‘RedeR’

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Type Package

Title Interactive visualization and manipulation of nested networks

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Description RedeR is an R-based package combined with a stand-alone Java application for interactive visualization and manipulation of nested networks.

License GPL (>= 3)

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RedeR-package	<i>RedeR: bridging the gap between network analysis and visualization.</i>
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Description

RedeR is an R-based package combined with a stand-alone Java application for interactive visualization and manipulation of modular structures, nested networks and multiple levels of hierarchical associations. The software takes advantage of R to run robust statistics, while the R-to-Java interface bridges the gap between network analysis and visualization.

Details

Package:	RedeR
Type:	Package
License:	GPL
LazyLoad:	yes

Author(s)

Mauro Castro <mauro.a.castro@gmail.com>

References

Castro, MAA et al. *RedeR: R/Bioconductor package for representing modular structures, nested networks and multiple levels of hierarchical associations*. Genome Biology 13(4):R29, 2012.

See Also

[RedPort-class](#)

<code>.rederpost</code>	<i>This function implements an RPC protocol for RedeR.</i>
-------------------------	--

Description

Post to RedeR's handler at the Java side.

Usage

```
.rederpost(obj, method, ..., gdata=list(...))
```

Arguments

obj	Object of RedPort Class.
method	A method listed in RedeR's handler at the Java side.
...	Additional arguments passed to the Java side.
gdata	A list of graph options passed to RedeR's handler at the Java side.

Value

Post to RedeR's handler at the Java side.

Note

This is an internal function.

Author(s)

Mauro Castro

See Also

[RedPort](#)

addEdgeBetweenContainers

Add edges between containers.

Description

Method to add edges between RedeR containers. This method adds non-nested assignments, in contrast to the default behavior that builds nested associations to-and-from containers.

Usage

```
addEdgeBetweenContainers(obj, containerA, containerB )
```

Arguments

obj	Object of RedPort Class.
containerA	<string>
containerB	<string>

Value

Add graph objects.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'call').

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
# Initialize igraph
library(igraph)

e1<-matrix(c('n1','n2','n3','n4'), ncol=2, byrow=TRUE)
g <- graph.edgelist(e1)

## Not run:

rdp <- RedPort()
call(rdp)

addGraph( rdp, g, layout.kamada.kawai(g) )
nestNodes( rdp, c('n1','n2') )
nestNodes( rdp, c("n3","n4") )
addEdgeBetweenContainers(rdp, "N0", "N1")
updateGraph(rdp)

## End(Not run)
```

addEdges

Add edges to RedeR graphs.

Description

Add edges to an active RedeR session.

Usage

```
addEdges(obj, edges)
```

Arguments

obj	Object of RedPort Class.
edges	A vertex sequence <vector of strings> or data frame of ncol=2.

Value

Adds the specified edges to the graph.

Note

Prior calling this method invoke RedeR application via 'callD' function.

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
# Initialize igraph
library(igraph)

# edges as a vertex sequence
edges<-c("n1","n2","n1","n3","n1","n4","n1","n5","n1","n6","n1","n7")

# edges as a data.frame
edges <- data.frame(A=c("n1","n1","n1","n1","n1","n1"),
                   B=c("n2","n3","n4","n5","n6","n7"))

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)
updateGraph(rdp)

## End(Not run)
```

addGraph

Display 'igraph' objects in the RedeR application.

Description

Methods and arguments to setup igraph objects for the RedeR application.

Usage

```
addGraph(obj, g, ...)
```

Arguments

<code>obj</code>	Object of RedPort Class.
<code>g</code>	An igraph object.
<code>...</code>	Additional arguments passed to RedeR application.

Details

Additional arguments:

layout Vertex coordinates (graph layout). Accepts matrix with 2 cols (i.e. x and y coords) <matrix>. Note, xy coords are not updated when "layout=NULL". This allows graph attributes to be updated, keeping the same layout of an active graph.

gscale Expansion factor of the graph area related to the app panel area (default = 75) <numeric>.

gcoord Sets the graph x,y center. Coords between 0 and 100 are set to the visible area of the app panel (default = c(50,50)) <numeric vector>.

zoom Sets zoom scale for the app panel (range: 0.0 to 100.0; default = NULL) <numeric>.

gzoom Sets zoom scale only for objects on the app panel (range: 0.0 to 100.0; default = NULL) <numeric>. This option overrides 'zoom'.

isNest Logical value, whether to nest all nodes into a new container (default = FALSE). See additional args in [nestNodes](#)

isAnchor If isNest=TRUE, this logical value sets whether to anchor the container in dynamic layouts (default = TRUE).

isAssign If isNest=TRUE, this logical value sets whether to assign the container name to the nested nodes (default = FALSE).

loadEdges Logical value, whether to send edges to RedeR app (default = TRUE).

ntransform Logical value, whether to transform nodes into containers (default = FALSE).

parent ID of a container already available in the app <string>. Nodes from 'g' will be nested to this container.

theme Some pre-defined nest attributes. Options: 'tm0','tm1','tm2','tm3','tm4','tm5','tm6' <string>. Alternatively, it can be a list with customized attributes.

Value

Send R graphs to RedeR app.

Attributes passed by the igraph object**Graph attributes:**

bgColor Sets the background color of the app panel <hexadecimal>.

zoom Sets the zoom scale for the app panel (range: 0.0 to 100.0) (Default=100) <numeric>.

gzoom Sets zoom scale only for objects on the app panel (range: 0.0 to 100.0) (Default=NULL) <numeric>. This option overrides 'zoom'. Obs. this is an alternative entry to the 'gzoom' argument above.

gscale Expansion factor of the graph area related to the app panel (range: 0.0 to 100.0) (Default=100) <numeric>. Obs. this is an alternative entry to the 'gscale' argument above.

isNest Logical value, whether to nest all nodes into a new container (Default=FALSE). Obs. this is an alternative entry to the 'nest' argument above.

isAnchor If isNest=TRUE, this logical value sets whether to anchor the container in dynamic layouts (Default=FALSE).

isAssign If isNest=TRUE, this logical value sets whether to assign the container name to the nested nodes (Default=FALSE).

nestAlias If isNest=TRUE, this attribute sets the label of the new container <string>.

nestSize If isNest=TRUE, this attribute sets the size of the container (Default=NULL) <numeric>.

nestShape If isNest=TRUE, this attribute sets the shape of the container, options: 'ELLIPSE', 'RECTANGLE', 'ROUNDED_RECTANGLE', 'TRIANGLE', 'DIAMOND' (Default= ELLIPSE) <string>.

nestColor If isNest=TRUE, this attribute sets the 'color' of the new container <hexadecimal>.

nestFontSize If isNest=TRUE, this attribute sets the size of the container label (Default=18). <numeric>.

nestFontColor If isNest=TRUE, this attribute sets the 'color' of the container label <hexadecimal>.

nestLineWidth If isNest=TRUE, this attribute sets the line width of the container, options: >= 0 (Default=1.0) <numeric>.

nestLineColor If isNest=TRUE, this attribute sets the line color of the container <hexadecimal>.

nestLineType If isNest=TRUE, this attribute sets the line type of the container: <'SOLID'>, <'DOTTED'>, <'DASHED'>, <'LONG_DASH'> (Default='SOLID').

nestImage If isNest=TRUE, sets the status of the container on the screen: <'plain'>, <'transparent'>, or <'hide'> (Default= plain).

Vertex attributes:

name Node attribute 'name' <string>.

nodeAlias Node attribute 'alias' <string>.

coordX Node attribute 'x coord' (Default=random coord) <numeric>.

coordY Node attribute 'y coord' (Default=random coord) <numeric>.

nodeSize Node attribute 'size', options: >= 0 (Default=20) <numeric>.

nodeShape Node attribute 'shape', options: 'ELLIPSE', 'RECTANGLE', 'ROUNDED_RECTANGLE', 'TRIANGLE', 'DIAMOND' (Default= ELLIPSE) <string>.

nodeColor Node attribute 'color', e.g. "#ff0000" for red <hexadecimal>.

nodeLineWidth Node attribute 'line width', options: >= 0 (Default=1) <numeric>.

nodeLineColor Node attribute 'line color', e.g. "#ff0000" for red <hexadecimal>.

nodeFontSize Node attribute 'font size', options: >= 0 (Default=12) <integer>.

nodeFontColor Node attribute 'font color', e.g. "#ff0000" for red <hexadecimal>.

nodeBend Node attribute 'bend', options: 0-100% (Default=50) <numeric>.

nodeWeight Node attribute 'weight', options: >= 0 (Default=0) <numeric>.

Edge attributes:

edgeWeight Edge attribute 'weight', options: >= 0 (Default=0.0) <numeric>.

- edgeWidth** Edge attribute 'width', options: ≥ 0 (Default=1.0) <numeric>.
- edgeColor** Edge attribute 'color', e.g. "#ff0000" for red <hexadecimal>.
- edgeType** Edge attribute 'type', options: 'SOLID', 'DOTTED', 'DASHED', 'LONG_DASH' (Default='SOLID').
- arrowLength** Edge arrow attribute 'length', options: ≥ 0 (Default=15) <numeric>.
- arrowAngle** Edge arrow attribute 'angle', options: 10-75 degrees (Default=20) <numeric>.
- arrowType** Edge arrow attribute 'type', used to set the associations in directed graphs. Options: -1, 0 and 1 (Default=1) <integer>.
- arrowDirection** Edge arrow attribute 'direction', used to set the associations in undirected graphs. Options: 0 (A-B), 1 (A-> B), -1 (A-l B), 2 (A <-B), -2 (A l-B), 3 (A <-> B), -3 (A l-l B), 4 (A l-> B) and -4 (A <-l B) (Default=0) <integer>.
- linkType** Set assignment type either between nodes and containers or containers and containers. Options: 'nested' and 'notnested' (Default='nested') <string>.

Note

In 'igraph' package, vertex and edge attributes can be assigned as arbitrary R objects. In order to pass these extensible features to RedeR the attributes must be provided in a valid syntax (see above). Only UNIQUE edges are accepted. If present, mutual/multiple edges will be collapsed to unique edges. In this cases, source-target information is transferred to 'arrowDirection' attribute; other attributes will be related to the first edge from the edge list.

Author(s)

Mauro Castro

See Also

[getGraph](#) [addLegend](#) [nesthc](#) [nestNodes](#) [mergeOutEdges](#) [relax](#) [selectNodes](#) [att](#)

Examples

```
# Initialize igraph
library(igraph)

## Not run:

rdp <- RedPort()
callD(rdp)

###

g1 <- igraph::graph.empty(n=10, directed=FALSE)
addGraph( rdp, g1, layout.random(g1) )

resetD(rdp)

###

g2 <- igraph::graph.lattice(c(5,5,5))
```

```

addGraph( rdp, g2, layout.kamada.kawai(g2) )

resetd(rdp)

###

g <- igraph::barabasi.game(10)
V(g)$name <- letters[1:10]
V(g)$nodeSize <- c(100,rep(30,9))
addGraph( rdp, g, ntransform=TRUE )

sg <- igraph::barabasi.game(3)
addGraph( rdp, sg, parent="a" )

resetd(rdp)

###...to check loading time of an interactome!

data(hs.inter)
vcount(hs.inter)
#[1] 9233
layout <- igraph::layout_with_dr1(hs.inter)
system.time( addGraph(rdp, hs.inter, layout=layout) )

## End(Not run)

```

addLegend

Add graph legends to RedeR application.

Description

Methods to send legends to RedeR app.

Usage

```

addLegend.color(obj, colvec, ...)
addLegend.size(obj, sizevec, ...)
addLegend.shape(obj, shapevec, ...)

```

Arguments

obj	Object of RedPort Class.
colvec	Vector with legend colors, either hexadecimal or valid R color names.
sizevec	Vector with legend node size, options: > 0 <numeric>.
shapevec	Vector with valid shape names: 'ELLIPSE', 'RECTANGLE', 'ROUNDED_RECTANGLE', 'TRIANGLE', 'DIAMOND'.
...	Additional arguments passed to RedeR application.

Details

Alternatively, `colvec`, `sizevec` and `shapevec` can be `igraph` objects with legend information previously set by the functions `'att.setv'` and `'att.sete'`.

Additional arguments:

type Legend type. Options: "node" or "edge" (default: "node") <character>.

labvec Vector with legend labels <character>.

position Position of the legend in RedeR panel. Options: 'topleft', 'topright', 'bottomleft', 'bottomright' (default: `addLegend.color` "topright", `addLegend.size` "bottomleft", and `addLegend.shape` "bottomright") <character>.

dxborder Distance (in pixel) from panel border (default: 5) <numeric>.

dyborder Distance (in pixel) from panel border (default: 5) <numeric>.

vertical Logical value, set vertical/horizontal position of the legend in the app panel (default: TRUE for `addLegend.color` and `addLegend.size` and FALSE for `addLegend.shape`).

ftsize Font size (in pixel) (default: 12) <numeric>.

title Legend title <string>.

dxtitle Distance (in pixel) from legend title to the main axis (adjusted to `nchar`) (default: 5) <numeric>.

size Legend size; only for `addLegend.color` and `addLegend.shape` methods (default: 20) <numeric>.

bend Legend width/height ratio; only for `addLegend.color` method (default: 0.85) <numeric>.

intersp Legend inter space (only for `addLegend.size` and `addLegend.shape` methods) (default: 5) <numeric>.

edgelen Length of the edges in `addLegend.size` method (default: 50) <numeric>.

Value

Send legend objects to RedeR app.

Author(s)

Mauro Castro

Examples

```
# Initialize igraph
library(igraph)

## Not run:

rdp <- RedPort()
callD(rdp)

cols<-colorRampPalette(colors=c('red', 'blue'))(14)
addLegend.color(rdp,cols)
addLegend.color(rdp,cols,type="edge")
```

```
size<-c(10,20,30,40,50)
addLegend.size(rdp,size)

size<-c(1:10)
addLegend.size(rdp,size,type="edge")

shape<-c('ELLIPSE', 'RECTANGLE', 'ROUNDED_RECTANGLE', 'TRIANGLE', 'DIAMOND')
addLegend.shape(rdp,shape)

shape<-c('SOLID', 'DOTTED', 'DASHED', 'LONG_DASH')
addLegend.shape(rdp,shape,type="edge")

## End(Not run)
```

addNodes

Add nodes to RedeR graphs.

Description

Method to add nodes to an active RedeR session.

Usage

```
addNodes(obj, nodes)
```

Arguments

obj	Object of RedPort Class.
nodes	Node sequence as an array <array of strings>

Value

Add graph objects.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'call').

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
# Initialize igraph
library(igraph)

nodes<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addNodes(rdp, nodes)
updateGraph(rdp)

## End(Not run)
```

addSeries	<i>Add series to RedeR application.</i>
-----------	---

Description

Deprecated function...

Usage

```
addSeries(obj, g, ...)
```

Arguments

obj	Object of RedPort Class.
g	An igraph object.
...	Additional arguments passed to RedeR application.

Details

Additional arguments:

setnodes Logical value, whether to update node attributes in the new item of the series (default = TRUE).

setedges Logical value, whether to add edges and update attributes in the new item of the series (default = TRUE).

Value

Submits series of R graphs to RedeR app.

Author(s)

Mauro Castro

See Also[addGraph](#)**Examples**

```
# Deprecated function...
```

addSubgraph	<i>Add subgraphs to RedeR application.</i>
-------------	--

Description

Deprecated function...

Usage

```
addSubgraph(obj, g, nodes, ...)
```

Arguments

<code>obj</code>	Object of RedPort Class.
<code>g</code>	An igraph object.
<code>nodes</code>	Nodes of the subgraph <array of strings>
<code>...</code>	Additional arguments passed to RedeR application.

Details

Additional arguments:

gatt A list of graph attributes. See attribute syntax in [addGraph](#)

gscale Expansion factor of the graph area related to the app panel (default = 75) <numerics>.

gcoord Sets the graph x,y center. Coords between 0 and 100 are set to the visible area of the app panel (default = c(75,75)) <numeric vector>.

theme Some pre-defined nest attributes. Options: 'tm0','tm1','tm2','tm3','tm4','tm5'

Value

Extracts subgraphs from 'igraph' objects and sends the result to the RedeR app.

Author(s)

Mauro Castro

See Also

[addGraph](#) [addSubgraph.list](#)

Examples

```
# Deprecated function...
```

```
addSubgraph.list      Add a list of subgraphs to RedeR application.
```

Description

Deprecated function...

Usage

```
addSubgraph.list(obj, g, nodeList, ...)
```

Arguments

obj	Object of RedPort Class.
g	An igraph object.
nodeList	List of nodes. Will be used to extra subgraphs from g.
...	Additional arguments passed to RedeR application.

Details

Additional arguments:

gridRows Number of lines to layout the subgraph panel (default = 2) <integer>

gridScale Expansion factor of the grid area in the app panel. Options: 0.0 to 100 (default = 50) <numeric>.

gscale Expansion factor each subgraph related to the app panel (default = 20) <numeric>.

gatt Either a list or data frame with graph attributes (for data frames, attribute names on cols). See attribute syntax in [addGraph](#)

update String argument: if 'all' it forces to update node/edge attributes of a graph already available in the app panel; if 'partial', only node attributes are updated (default = NULL).

theme Some pre-defined nest attributes. Options: 'tm0', 'tm1', 'tm2', 'tm3', 'tm4', 'tm5', 'tm6'.

Value

Extracts subgraphs from 'igraph' objects and sends the result to the RedeR app.

Author(s)

Mauro Castro

Examples

```
# Deprecated function...
```

 att

Add, map, and set edge and vertex attributes to the RedeR application.

Description

Given an 'igraph' object 'g', 'att.addv' adds a new attribute with a fixed 'value' to all nodes or selected nodes using 'filter', while 'att.adde' adds a new attribute with a fixed 'value' to all edges.

The 'att.mapv' and 'att.mape' functions map data frames to the 'g' object, useful for adding batches of attributes.

The 'att.setv' and 'att.sete' functions set attributes available in the 'g' object, transforming them into new attribute classes (for examples, numeric values into colors or sizes).

Usage

```
att.addv(g, to, value, filter = NULL, index = V(g))
```

```
att.adde(g, to, value, index = E(g))
```

```
att.mapv(g, dat, refcol=1)
```

```
att.mape(g, dat, refcol=c(1,2))
```

```
att.setv(g, from, to='nodeColor', pal=1, cols=NULL, na.col=grey(0.7),
xlim=c(20,100,1), shapes=NULL, breaks=NULL, categvec=NULL, nquant=NULL,
isrev=FALSE, getleg=TRUE, roundleg=1, title=NULL)
```

```
att.sete(g, from, to='edgeColor', pal=1, cols=NULL, na.col=grey(0.7),
xlim=c(20,100,1), shapes=NULL, breaks=NULL, categvec=NULL, nquant=NULL,
isrev=FALSE, getleg=TRUE, roundleg=1, title=NULL)
```

Arguments

g	An igraph object.
from	An attribute name available in 'g' <string>.
to	A valid RedeR attribute name (see addGraph or type 'att.setv()' and 'att.sete()' for a quick list).
value	A single value to add in a edge or vertex attribute.
filter	A named list of length = 1, used to filter which nodes will receive the attribute. The attribute 'to' will be added to nodes which have the attribute.
index	An optional index to set and attribute of a subset of vertices or edges (see set_vertex_attr and set_edge_attr).
breaks	A numeric vector of two or more breakpoints to be applied to the attribute values.

pal	Color scaling option (1 or 2); 'pal=1' will use a single color palette, while 'pal=2' will split 'breaks' at the center, generating two color palettes. The 'pal=2' option may be useful to build separated color palettes for negative and positive values.
xlim	A numeric vector with three boundaries: c(<lower boundary>, <upper boundary>, <NA>). It corresponds to boundary values to be applied to numeric attributes (e.g. nodeSize). Default: c(20,100,1).
cols	Vector of colors (either hexadecimals or valid R color names).
na.col	A color representing eventual NAs. Default: grey(0.7).
shapes	A string vector with valid RedeR shapes (see addGraph or type 'att.setv()' or 'att.sete()').
categvec	Levels to encode attributes as a factor <vector>.
nquant	Number of breakpoints to split attribute values by quantiles <integer>.
isrev	Reverse of attribute values <logical>.
getleg	Optional: return legend values <logical>.
dat	A data frame with the attributes to be mapped to 'g'.
refcol	A reference column in the 'dat' object used to map 'dat' to 'g'. For 'att.mapv', 'refcol' is a single integer value indicating a column with node ids. For 'att.mapv', 'refcol' is a vector of two integers indicating two columns with edge ids. Also, for 'att.mapv', 'refcol = 0' indicates 'dat' rownames will be used to map 'dat' to 'g'.
roundleg	Integer indicating the number of decimal places in the legend of numerical attributes.
title	A title legend.

Value

Add, map, and set igraph attributes to the RedeR application.

Author(s)

Mauro Castro, Clarisse Groeneveld.

See Also

[addGraph](#)

Examples

```
library(igraph)
data(ER.deg)

sg <- ER.deg$ceg # an igraph object
dt <- ER.deg$dat # a data frame object

# add a new vertex attribute, creating 'nodeFontSize' from a fixed value
```

```
sg <- att.addv(sg, to = "nodeFontSize", value = 10)

# same as above, but applied only to three nodes
sg <- att.addv(sg, to = "nodeFontSize", value = 100,
              filter = list("name" = V(sg)$name[1:3]))

# map vertex attributes, adding 'dt' into 'g'
sg <- att.mapv(g=sg, dat=dt, refcol=1)

# set a new vertex attribute, creating 'nodeAlias' from 'symbol'
sg <- att.setv(sg, from="Symbol", to="nodeAlias")

# set a new vertex attribute, creating 'nodeColor' from 'logFC.t3'
sg <- att.setv(sg, from="logFC.t3", to="nodeColor", breaks=seq(-1,1,0.2), pal=2)

# set a new vertex attribute, creating 'nodeSize' from 'ERbdist'
sg <- att.setv(sg, from="ERbdist", to="nodeSize", nquant=10, isrev=TRUE, xlim=c(5,40,1))
```

calld

Call RedeR app from R.

Description

Method to invoke RedeR application from R.

Usage

```
calld(obj, ...)
```

Arguments

obj	Object of RedPort Class.
...	Additional arguments passed to RedeR application.

Details

Other arguments can be passed to the system in order to open the application.

filepath Path to 'reder.jar' file <string>

maxlag Max acceptable lag time for the R-Java callback confirmation (default=20 s) <numeric>

checkcalls Reports eventual errors from the R-Java callback (default=FALSE) <logical>

Value

Systems call to open RedeR application and XML-RPC server.

Author(s)

Mauro Castro

See Also[RedPort addGraph](#)**Examples**

```
rdp <- RedPort('MyPort')

## Not run:

  callD(rdp)

## End(Not run)
```

 cea

Co-expression analysis.

Description

Simple function for correlation analysis. This function computes a null distribution via permutation and returns the significant correlation values.

Usage

```
cea(x, sig=0.01, padj.method="fdr", cor.method="spearman", nper=1000,
regulators=NULL, plotcea=TRUE, ...)
```

Arguments

x	A matrix or data frame. Variables should be on rows, samples on columns. The 'x' matrix should be named, with unique row names.
sig	Significance threshold.
padj.method	Correction method passed to "p.adjust" function.
cor.method	Correlation method passed to "cor" function.
nper	Number of permutations.
plotcea	Logical value, option to plot density and the null distributions.
regulators	An optional character vector listing variables (e.g. genes) regarded as regulators.
...	Additional arguments passed to plotcea option.

Details

Additional arguments:

n.breaks If plotcea=TRUE, 'n.breaks' sets the number of histogram breaks (Default=100 <integer>).

plotnull If plotcea=TRUE, 'plotnull' sets whether to plot the null distribution (Default=TRUE <logical>).

avnull If plotcea=TRUE, 'avnull' takes the average null distribution (Default=TRUE <logical>).

nullcol If plotcea=TRUE, 'nullcol' sets the color of the null distribution (Default="black" <character>).

Value

An adjacency matrix with significant correlation values.

Author(s)

Mauro Castro

See Also

[cor p.adjust](#)

Examples

```
#--- Load a a gene expression matrix
data(ER.deg)
x <- ER.deg$exp

#--- NOTE1: 'x' should have variables on rows and samples on columns!
#--- NOTE2: 'x' should be named, with unique names on rows.
x[1:3,1:3]
#      GSM286031 GSM286032 GSM286033
#1      7.106765  7.225175  7.217780
#10005  8.108632  8.012673  7.932592
#10007 10.225053 10.068826 10.236548

#--- Get a subset, with 100 genes, for a quick demonstration!
x <- x[sample(1:nrow(x))[1:100], ]

## Not run:
#--- Run correlation analysis, estimating significant
#--- associations by permutation.
#--- NOTE: set 'nper' for at least 1000
res <- cea(x=x, nper=100)

## End(Not run)
```

deleteEdges	<i>Remove edges from RedeR graphs.</i>
-------------	--

Description

Method to remove edges between nodes in an active RedeR session.

Usage

```
deleteEdges(obj, edges)
```

Arguments

obj	Object of RedPort Class.
edges	A vertex sequence <vector of strings> or data frame of ncol=2.

Value

Removes the specified edges from the graph.

Note

Prior calling this method invoke RedeR application via 'calld' function.

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
# Initialize igraph
library(igraph)

# edges as a vertex sequence
edges<-c("n1","n2","n1","n3","n1","n4","n1","n5","n1","n6","n1","n7")

# edges as a data.frame
edges <- data.frame(A=c("n1","n1","n1","n1","n1","n1"),
                   B=c("n2","n3","n4","n5","n6","n7"))

## Not run:

rdp <- RedPort()
calld(rdp)
addEdges(rdp, edges)
```

```

updateGraph(rdp)
deleteEdges(rdp, c("n1", "n3", "n1", "n7") )
updateGraph(rdp)

```

```
## End(Not run)
```

deleteNodes	<i>Remove nodes from RedeR graphs.</i>
-------------	--

Description

Method to remove nodes from an active RedeR session.

Usage

```
deleteNodes(obj, nodes)
```

Arguments

obj	Object of RedPort Class.
nodes	Node sequence as an array <array of strings>

Value

Remove graph objects.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'calld').

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```

# Initialize igraph
library(igraph)

edges<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

rdp <- RedPort()

```

```
callD(rdp)
addEdges(rdp, edges)
deleteNodes(rdp, c("n1", "n3") )
updateGraph(rdp)

## End(Not run)
```

deleteSelectedEdges *Delete selected edges in RedeR graphs.*

Description

Remove all edges selected in an active RedeR session.

Usage

```
deleteSelectedEdges(obj)
```

Arguments

obj Object of RedPort Class.

Value

Remove graph objects.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'callD').

Author(s)

Mauro Castro

See Also

[RedPort](#), [selectAllEdges](#), [selectEdges](#), [deSelectEdges](#)

Examples

```
# Initialize igraph
library(igraph)

edges<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

rdp <- RedPort()
callD(rdp)
```

```
addEdges(rdp, edges)
selectEdges(rdp, "n1", "n3")
deleteSelectedEdges(rdp)
updateGraph(rdp)

## End(Not run)
```

deleteSelectedNodes *Delete selected nodes in RedeR graphs.*

Description

Remove all selected nodes from an active RedeR session.

Usage

```
deleteSelectedNodes(obj)
```

Arguments

obj Object of RedPort Class.

Value

Remove graph objects.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'call').

Author(s)

Mauro Castro

See Also

[RedPort](#), [selectAllNodes](#), [selectNodes](#), [deSelectNodes](#)

Examples

```
# Initialize igraph
library(igraph)

edges<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

rdp <- RedPort()
calld(rdp)
```



```
addEdges(rdp, edges)
selectNodes(rdp, c("n3", "n4"))
deleteSelectedNodes(rdp)
updateGraph(rdp)

## End(Not run)
```

deSelectEdges	<i>Unmark selected edges.</i>
---------------	-------------------------------

Description

Unmark all selected edges in an active RedeR session.

Usage

```
deSelectEdges(obj)
```

Arguments

obj Object of RedPort Class.

Value

Unmark edges.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'callD').

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
# Initialize igraph
library(igraph)

edges<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

callD(rdp)
addEdges(rdp, edges)
```

```

selectEdges(rdp,"n1","n3")
deSelectEdges(rdp)
updateGraph(rdp)

## End(Not run)

```

deSelectGraph	<i>Unmark selected graph objects.</i>
---------------	---------------------------------------

Description

Unmark all selected objects in an active RedeR session.

Usage

```
deSelectGraph(obj)
```

Arguments

obj Object of RedPort Class.

Value

Unmark graph.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'call').

Author(s)

Mauro Castro

See Also

[RedPort](#), [selectNodes](#), [selectEdges](#), [selectGraph](#)

Examples

```

# Initialize igraph
library(igraph)

edges<-c("n1","n2","n1","n3","n1","n4","n1","n5","n1","n6","n1","n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)

```

```

selectGraph(rdp)
deSelectGraph(rdp)
updateGraph(rdp)

## End(Not run)

```

deSelectNodes	<i>Unmark selected nodes.</i>
---------------	-------------------------------

Description

Unmark all selected nodes in an active RedeR session.

Usage

```
deSelectNodes(obj)
```

Arguments

obj Object of RedPort Class.

Value

Unmark nodes.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'call').

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```

# Initialize igraph
library(igraph)

edges<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)
selectNodes(rdp,c("n3", "n4", "n5"))

```

```

deSelectNodes(rdp)
updateGraph(rdp)

## End(Not run)

```

duplicateGraph	<i>Duplicate graphs in RedeR application.</i>
----------------	---

Description

Deprecated function...

Usage

```
duplicateGraph(obj, ...)
```

Arguments

obj	Object of RedPort Class.
...	Additional arguments passed to RedeR application.

Details

Additional arguments:

isToCopyEdges Logical value, whether to include edges to the copy (default = TRUE).

isDefaultCopy Logical value, whether to duplicate the complete network or to copy only the original graph (default = TRUE).

nodes Optional: nodes to be duplicated <array of strings> (p.s. in this case, isDefaultCopy=TRUE).

Value

Duplicates graphs in RedeR app.

Author(s)

Mauro Castro

Examples

```
# Deprecated function...
```

exitd	<i>Exit RedeR R-to-Java interface.</i>
-------	--

Description

Exit R interface and close the active RedeR session.

Usage

```
exitd(obj)
```

Arguments

obj Object of RedPort Class.

Value

Exit software.

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
rdp <- RedPort()

## Not run:

  calld(rdp)
  exitd(rdp)

## End(Not run)
```

getContainerComponets *Get container componets.*

Description

Method to get components (nested objects) of a specific container from an active RedeR session.

Usage

```
getContainerComponets(obj, container)
```

Arguments

obj	Object of RedPort Class.
container	Name of the container in the graph <string>

Value

Returns all nested objects assigned to a container <array of strings>

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'callD').

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
# Initialize igraph
library(igraph)

e1<-matrix(c('n1','n2','n3','n4'), ncol=2, byrow=TRUE)
g <- graph.edgelist(e1)

## Not run:

rdp <- RedPort()
callD(rdp)
addGraph( rdp, g, layout.kamada.kawai(g) )
nestNodes( rdp, c('n1','n2') )
nestNodes( rdp, c("n3","n4") )
updateGraph(rdp)
getContainerComponets(rdp, "N0")
```

```
## End(Not run)
```

getEdgeIDs	<i>Get edge IDs.</i>
------------	----------------------

Description

Method to get ids of all edges from an active RedeR application.

Usage

```
getEdgeIDs(obj, ...)
```

Arguments

obj	Object of RedPort Class.
...	Additional arguments passed to RedeR application.

Details

Additional arguments:

type Filter options. Valid arguments: <'node'>, <'container'> or <'all'>. Default='node'.

status Filter options. Valid arguments: <'selected'>, <'nonselected'> or <'all'>. Default='all'

Value

Returns edges<array of integers>

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'call').

Author(s)

Mauro Castro

See Also

[RedPort getGraph](#)

Examples

```
# Initialize igraph
library(igraph)

edges<-c("n1","n2","n1","n3","n1","n4","n1","n5","n1","n6","n1","n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)
updateGraph(rdp)
getEdgeIDs(rdp)

## End(Not run)
```

getEdges

Get edges.

Description

Method to get all edges from an active RedeR application.

Usage

```
getEdges(obj, ...)
```

Arguments

obj Object of RedPort Class.
... Additional arguments passed to RedeR application.

Details

Additional arguments:

status Filter options. Valid arguments: <'selected'>, <'nonselected'> or <'all'>. Default='selected'

type Filter options. Valid arguments: <'node'>, <'container'> or <'all'>. Default='node'.

Value

Returns edges <array of strings>

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'callD').

Author(s)

Mauro Castro

See Also[RedPort getGraph](#)**Examples**

```
# Initialize igraph
library(igraph)

edges<-c("n1","n2","n1","n3","n1","n4","n1","n5","n1","n6","n1","n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)
updateGraph(rdp)
getEdges(rdp)

## End(Not run)
```

getGraph

*Get RedeR graph.***Description**

Method to get and wrap up RedeR graphs into R objects.

Usage

```
getGraph(obj, ...)
```

Arguments

obj Object of RedPort Class.
... Additional arguments passed to RedeR application.

Details

Additional arguments:

status Filter options for RedeR graph status. Valid arguments: <'selected'>, <'nonselected'> or <'all'> (default='all').

type Filter options for RedeR graph objects. Valid arguments: <'node'>, <'container'> or <'all'> (default='node').

attribs Filter options for RedeR graph attributes. Valid arguments: <'plain'>, <'minimal'> or <'all'> (default='plain').

Value

Returns igraph objects.

Author(s)

Mauro Castro

See Also

[addGraph RedPort](#)

Examples

```
# Initialize igraph
library(igraph)

## Not run:

rdp <- RedPort()
callId(rdp)

#ps. first add a graph (e.g. see samples in RedeR or 'addGraph' method)!
g <- getGraph(rdp)

## End(Not run)
```

getNodeIDs

Get node IDs.

Description

Method to get node attributes 'node IDs' from an active RedeR session.

Usage

```
getNodeIDs(obj, ...)
```

Arguments

obj Object of RedPort Class.
... Additional arguments passed to RedeR application.

Details

Additional arguments:

type Filter options. Valid arguments: <'node'>, <'container'> or <'all'>. Default='node'.

status Filter options. Valid arguments: <'selected'>, <'nonselected'> or <'all'>. Default='all'

Value

Returns node attributes <array of numerics>

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'call').

Author(s)

Mauro Castro

See Also

[RedPort getGraph](#)

Examples

```
# Initialize igraph
library(igraph)

edges<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

rdp <- RedPort()
call(rdp)
addEdges(rdp, edges)
updateGraph(rdp)
getNodeIDs(rdp)

## End(Not run)
```

getNodes

Get nodes.

Description

Method to get node list from an active RedeR session.

Usage

```
getNodes(obj, ...)
```

Arguments

obj	Object of RedPort Class.
...	Additional arguments passed to RedeR application.

Details

Additional arguments:

status Filter options. Valid arguments: <'selected'>, <'nonselected'> or <'all'>. Default='selected'

type Filter options. Valid arguments: <'node'>, <'container'> or <'all'>. Default='node'.

Value

Returns nodes <array of strings>

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'callD').

Author(s)

Mauro Castro

See Also

[RedPort getGraph](#)

Examples

```
# Initialize igraph
library(igraph)

edges<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)
updateGraph(rdp)
getNodes(rdp)

## End(Not run)
```

getSourceEdgeIDs	<i>Get source-edge IDs.</i>
------------------	-----------------------------

Description

Method to get IDs of all 'source' edges from an active RedeR session.

Usage

```
getSourceEdgeIDs(obj, ...)
```

Arguments

`obj` Object of RedPort Class.
`...` Additional arguments passed to RedeR application.

Details

Additional arguments:

type Filter options. Valid arguments: <'node'>, <'container'> or <'all'>. Default='node'.

status Filter options. Valid arguments: <'selected'>, <'nonselected'> or <'all'>. Default='all'

Value

Returns 'source' edges <array of integers>

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'callld').

Author(s)

Mauro Castro

See Also

[RedPort getGraph](#)

Examples

```
# Initialize igraph
library(igraph)

edges<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

rdp <- RedPort()
callld(rdp)
addEdges(rdp, edges)
updateGraph(rdp)
getSourceEdgeIDs(rdp)

## End(Not run)
```

getTargetEdgeIDs *Get target-edge IDs.*

Description

Method to get IDs of all 'target' edges from an active RedeR session.

Usage

```
getTargetEdgeIDs(obj, ...)
```

Arguments

obj Object of RedPort Class.
 ... Additional arguments passed to RedeR application.

Details

Additional arguments:

type Filter options. Valid arguments: <'node'>, <'container'> or <'all'>. Default='node'.

status Filter options. Valid arguments: <'selected'>, <'nonselected'> or <'all'>. Default='all'

Value

Returns 'target' edges <array of integers>

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'calld').

Author(s)

Mauro Castro

See Also

[RedPort getGraph](#)

Examples

```
# Initialize igraph
library(igraph)

edges<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

rdp <- RedPort()
```

```

    callD(rdp)
    addEdges(rdp, edges)
    updateGraph(rdp)
    getTargetEdgeIDs(rdp)

## End(Not run)

```

gtoy.rm

Random graphs and modules.

Description

A simple function to simulate random graphs with modular structures.

Usage

```

gtoy.rm(m=5, nmax=30, nmin=5, p1=0.5, p2=0.03, p3=0.7, gg=NULL,
nn=vcount(gg), noise.range=c(0.2, 0.6), plot=FALSE, fname=NULL)

```

Arguments

m	Number of modules.
nmax	The maximum number of vertices in each module.
nmin	The minimum number of vertices in each module.
p1	Probability for adding new vertices to a module.
p2	Probability for drawing an edge between modules.
p3	Probability for drawing an edge within modules.
gg	An igraph object generated by the 'gtoy.rm' function. This option will add a random graph to the 'gg' object, following Erdos-Renyi model (see erdos.renyi.game).
nn	When 'gg' is provided, this option defines the number of new vertices to add to the 'gg' object.
noise.range	When 'gg' is provided, this option sets the upper and lower bounds of a uniform random distribution assigned to the random graph by the runif function, which is applied with default settings.
plot	A logical value. This option generates a boxplot for the simulated signal generated for each graph module.
fname	A string. The name of the pdf file in which the plot will be saved.

Value

Returns a igraph object.

Author(s)

Mauro Castro

Examples

```
#g<-gtoy.rm()
```

isRelaxActive	<i>Inquires about RedeR current state.</i>
---------------	--

Description

Inquires whether 'dynamics' algorithm is active in RedeR application.

Usage

```
isRelaxActive(obj)
```

Arguments

obj Object of RedPort Class.

Value

Returns 1<integer> if true, 0<integer> otherwise.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'call').

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
rdp <- RedPort()

## Not run:

  calld(rdp)
  isRelaxActive(rdp)
  # 1 or 0

## End(Not run)
```

mergeNodes	<i>Merge nodes.</i>
------------	---------------------

Description

Merge nodes in an active RedeR session and build a new group.

Usage

```
mergeNodes(obj, nodes)
```

Arguments

obj	Object of RedPort Class.
nodes	Node sequence <array of strings>

Value

Add/change graph objects.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'call').

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
# Initialize igraph
library(igraph)

nodes<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addNodes(rdp, nodes)
mergeNodes(rdp, c("n2", "n3", "n4"))
updateGraph(rdp)

## End(Not run)
```

mergeOutEdges	<i>Merge out-edges between connected containers and transfers edges from nodes to containers.</i>
---------------	---

Description

Method to assign out-edges to containers in an active RedeR session. This method transfers edges from nodes to the respective containers.

Usage

```
mergeOutEdges(obj, ...)
```

Arguments

obj	Object of RedPort Class.
...	Additional arguments passed to RedeR application.

Details

Additional arguments:

nlevels Number of levels to be merged in the hierarchical network (default=2) <integer>.

rescale Logical value. Whether to rescale out-edge width to not overextend container size; if false, it will run a simple sum when combining out-edges between containers (default=TRUE).

lb Custom lower bound to rescale edge width between containers (default=NA) <numeric>.

ub Custom upper bound to rescale edge width between containers (default=NA) <numeric>.

Value

Add/change edge assignments.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'call').

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
# Initialize igraph
library(igraph)

e1<-matrix(c("n1","n2","n1","n3","n1","n4","n2","n5","n2","n6","n2","n7"), ncol=2, byrow=TRUE)
g <- graph.edgelist(e1)

## Not run:

rdp <- RedPort()
callD(rdp)
addGraph( rdp, g, layout.kamada.kawai(g) )
nestNodes( rdp, c("n1","n2") )
mergeOutEdges(rdp)
updateGraph(rdp)

## End(Not run)
```

 nesthc

Nest hclust objects to containers.

Description

Method to nest nodes in an active RedeR session.

Usage

```
nesthc(obj, hc, ...)
```

Arguments

<code>obj</code>	Object of RedPort Class.
<code>hc</code>	Either an object of hclust of pvclust class.
<code>...</code>	Additional arguments passed to RedeR application; if a "pvclust" object, it also passes arguments for "pvpick" function (e.g. to set the p-value threshold).

Details

Additional arguments:

cutlevel Numeric value indicating the point where the hclust object should be cut (default = 2). The distance is related to the option 'metric'. For "rootdist" and "leafdist", the cut level is related to the n steps required to get to the root's level or to the leaf's level, respectively (n>=1). For 'height', the cut is related to the corresponding dendrogram height <numeric>.

metric Metric used to cut the hclust object at the top level (Options: "rootdist", "leafdist" or "height"; default="rootdist") <string>.

nmemb Minimum number of members for a nest (>=2) <numeric>.

- nlev** Maximum number of levels of a nested sequence (default=2) <numeric>.
- grid** Number of rows and cols to lay out graphs in the panel (default = c(2,3)) <numeric>.
- gridScale** Expansion factor of the grid area in the app panel. Options: 0.0 to 100 (default = 75) <numeric>.
- gscale** Expansion factor to set the nest area related to the parents – or related to the app panel. Provided as a vector with three numbers, c(n1,n2,n3): n1 is related to nests at the first level of the hierarchy (i.e. nests rooted to the panel); n2 is related to nests from single branches, and n3 nests from double branches (default = c(30,75,45)) <numeric>.
- isAnchor** Logical value; it sets whether to anchor containers in dynamic layouts.
- isAssign** Logical value; it sets whether to assign container names to nested nodes.
- theme** Some pre-defined nest attributes. Options: 'tm0','tm1','tm2','tm3','tm4','tm5', 'tm6' (default: 'tm6') <string>. Alternatively, it can be a list with customized attributes.
- nlinewidth** Line width of a nested series containers.
- nfontsz** Label font size a nested series containers.
- plothc** Logical value; whether to plot the corresponding hclust object (i.e. dendrogram).
- col** A color vector; it is used to color labels in both containers and corresponding hclust object (i.e. dendrogram nodes).
- cex** Numeric character expansion factor of dendrogram text and labels.
- xlab** A label for the dendrogram x axis.
- ylab** A label for the dendrogram y axis.

Value

Add/change graph objects, plot corresponding hclust object, and return corresponding ids.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'calld').

Author(s)

Mauro Castro

See Also

[RedPort nestNodes gtoy.rm](#)

Examples

```
# Initialize igraph
library(igraph)

g <- gtoy.rm()
hc <- hclust(dist(get.adjacency(g)))

#plot(hc)
```

```
## Not run:

rdp <- RedPort()
callD(rdp)
addGraph(rdp,g)
ids <- nesthc(rdp, hc)

## End(Not run)
```

nestNodes	<i>Nest nodes to containers.</i>
-----------	----------------------------------

Description

Method to nest nodes in an active RedeR session.

Usage

```
nestNodes(obj, nodes, ...)
```

Arguments

obj	Object of RedPort Class.
nodes	<array of strings>
...	Additional arguments passed to RedeR application.

Details

Additional arguments:

nestImage Status of the container on the screen: <'plain'>, <'transparent'>, or <'hide'> (default = 'plain').

isAssign Logical value, whether to assign the container name to the nested nodes (default = TRUE).

isAnchor Logical value, whether is to anchor the container in dynamic layouts (default = FALSE).

gscale Expansion factor of the nest area related to a parent nest – or related to the app panel (default = 40) <numerics>.

gcoord Sets the nest c(x,y) center related to the parent center. Coords between 0 and 100 are set to the inner area (default = NULL) <numeric vector>.

parent Nest ID of a parent nest. Must be used with 'isAssign=TRUE' (default = NULL).

gatt A list with graph attributes. See nest attribute syntax in [addGraph](#)

theme Some pre-defined nest attributes. Options: 'tm0', 'tm1', 'tm2', 'tm3', 'tm4', 'tm5', 'tm6' <string>. Alternatively, it can be a list with customized attributes.

Value

Add/change graph objects.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'calld').

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
# Initialize igraph
library(igraph)

e1<-matrix(c('n1','n2','n3','n4'), ncol=2, byrow=TRUE)
g <- graph.edgelist(e1)

## Not run:

rdp <- RedPort()
calld(rdp)
addGraph( rdp, g, layout.kamada.kawai(g) )
nestNodes( rdp, c('n1','n2') )
nestNodes( rdp, c("n3","n4") )

## End(Not run)
```

ping

Test RedeR R-to-Java interface.

Description

Test R interface and the connection to an active RedeR session.

Usage

```
ping(obj)
```

Arguments

obj Object of RedPort Class.

Value

"R interface is ready to use!"

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'callD').

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
rdp <- RedPort('MyPort')

## Not run:

callD(rdp)
ping (rdp)

## End(Not run)
```

RedeR.data

Pre-processed dataset for RedeR case study.

Description

Preprocessed data from a time-course gene expression and ChIP-on-chip analysis of estrogen receptor (ER) binding sites in MCF7 breast cancer cell line (Carroll et al, 2006).

Usage

```
data(Carroll2006)
```

Format

Carroll2006 List containing 'exp', 'tgs', 'ids', and 'bdsites' R objects.

Details

The gene expression dataset consists of 12 time-course Affymetrix U133Plus2.0 microarrays: 3 replicates at 0h, 3 replicates at 3h, 3 replicates at 6h and 3 replicates at 12h. The original dataset is available at GEO database (GSE11324). The gene ER binding site dataset consists of a Bed file of ER ChIP-on-chip experiment. The original dataset is available at <http://research.dfci.harvard.edu/brownlab/datasets/index.php> (ER sites from the Bed file '1E-5.bed').

Carroll2006\$exp data.frame with log2 gene expression dataset.

Carroll2006\$stgs data.frame with microarray details (e.g. targets for limma analysis).

Carroll2006\$ids data.frame with gene ids used in RedeR case study.

Carroll2006\$bdsites data.frame with ER binding sites mapped to genome build GRCh37.

hs.inter Human interactome extracted from the Human Protein Reference Database (HPRD) in April 2011 <igraph object> ('name' attribute is mapped to ENTREZ ID).

ER.limma data-frame containing pre-processed results from limma analysis and ER binding sites mapped to differentially expressed (DE) genes. Content: annotation (ENTREZ and Symbol), time-course fold change (logFC.t3, logFC.t6, logFC.t12), p values (p.value.t3, p.value.t6, p.value.t12), DE genes (degenes.t3, degenes.t6, degenes.t12) and distance of the closest ER binding site to the TSS – in kb (ERbdist).

ER.deg\$dat Summary from ER.limma data object with extracted data for differentially expressed genes only.

ER.deg\$exp Data matrix with log2 gene expression values of DE genes.

ER.deg\$ceg Co-expression gene network of early ER-responsive genes computed by the function `cea` [cea](#).

References

Carroll JS et al., Genome-wide analysis of estrogen receptor binding sites. Nat Genet. 38(11):1289-97, 2006.

Examples

```
data(Carroll2006)
data(hs.inter)
data(ER.limma)
data(ER.deg)
```

RedPort

The constructor for the RedPort class.

Description

Constructor to build RedeR interface via XML-RPC (remote procedure call) server.

Usage

```
RedPort(title = 'default', host = '127.0.0.1', port = 9091, checkJava = FALSE)
```

Arguments

<code>title</code>	A character string representing the XML-RPC port.
<code>host</code>	The domain name of the machine that is running the RedeR XML-RPC server.
<code>port</code>	An integer specifying the port on which the XML-RPC server should listen.
<code>checkJava</code>	Check Java Runtime Environment (JRE) installed on the system.

Value

An object of the RedPort Class.

Author(s)

Mauro Castro

See Also

[calld](#)

Examples

```
rdp <- RedPort('MyPort')
```

RedPort-class

Class "RedPort"

Description

A class providing access to the RedeR application.

Slots

title: The name of the XML-RPC port.

uri: The uri to the XML-RPC server.

host: The host to the XML-RPC server.

port: The port number to the XML-RPC server.

Methods**Get node attributes from a RedeR session:**

[getNodes](#)

[getNodeIDs](#)

Get edge attributes from a RedeR session:

[getEdges](#)

[getEdgeIDs](#)

[getSourceEdgeIDs](#)

[getTargetEdgeIDs](#)

Methods that change graph structure:

[addGraph](#)

[getGraph](#)

[addNodes](#)

deleteNodes
nestNodes
updateContainerSize
mergeOutEdges
getContainerComponets
mergeNodes
addEdges
addEdgeBetweenContainers
deleteEdges
setArrowDirection

Other methods to manipulate RedeR graphs:

updateGraph
selectEdges
selectNodes
selectAllEdges
selectAllNodes
selectGraph
deSelectEdges
deSelectNodes
deSelectGraph
deleteSelectedEdges
deleteSelectedNodes
isRelaxActive

Methods to establish RedeR server connection:

ping
version
calld
exitd
resetd

Details

RedPort methods invoke RedeR application via XML-RPC (remote procedure call) server. For each R method listed above there is a Java mirror that executes a callback procedure. Therefore, the Java callback engine must be initialized before any callback from RedeR (i.e. start the Java application).

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
# Creates a RedeR object by calling the constructor
rdp <- RedPort('MyPort')
```

relax

relax

Description

RedeR's hierarchical force-directed interactive layout.

Usage

```
relax(obj, p1=100, p2=100, p3=100, p4=100, p5=100, p6=10,
p7=10, p8=100, p9=10, ps=FALSE)
```

Arguments

obj	Object of RedPort Class.
p1	Edge target length (in pixels; ≥ 1) <numeric>.
p2	Edge stiffness (arbitrary unities; ≥ 0) <numeric>.
p3	Node repulsion factor (arbitrary unities; ≥ 0) <numeric>.
p4	Node perimeter effect (in pixels; ≥ 0) <numeric>.
p5	Node speed limit (arbitrary unities; ≥ 0) <numeric>.
p6	Repulsion radius, i.e., this parameter limits the repulsion factor range (given in p1 units; ≥ 0) <numeric>.
p7	Central pull (arbitrary unities; ≥ 0) <numeric>.
p8	Nest-nest edge target length, i.e., edge target between linked containers (in pixels; ≥ 1) <numeric>.
p9	Nest-node repulsion factor, i.e., repulsion among containers and out-nodes (arbitrary unities; ≥ 0) <numeric>.
ps	Deprecated parameter.

Details

RedeR's interactive layout uses a force-directed algorithm described elsewhere (Brandes 2001; Fruchterman and Reingold 1991). Here we adapted the method to deal with nested networks. In force-directed graphs, each edge can be regarded as a spring - with a given target length - and can either exert a repulsive or attractive force on the connected nodes, while nodes are analogous to mutually repulsive charged particles that move according to the applied forces. In RedeR, the simulation is additionally constrained by the hierarchical structure of the network. For example, a nested node is constrained to its parent-node by opposing forces applied by the nest, which is regarded as

a special node whose nested objects can reach a local equilibrium independently from other network levels. The simulation is adjusted by global options and evolves until the system reaches the equilibrium state. The default values are set to layout sparse networks with few nodes (e.g. 10-100 nodes). For large and dense networks better results can be achieved interactively by tuning one or more parameters.

Author(s)

Mauro Castro

References

Brandes U. Drawing graphs: methods and models. In: Lecture notes in computer science. Kaufmann M. and Wagner D. (Ed), vol. 2025. Heidelberg: Springer; 2001: 71-86.

Fruchterman TMJ, Reingold EM. Graph drawing by force-directed placement. Software: Practice and Experience 1991, 21(11):1129-1164.

Examples

```
# Initialize igraph
library(igraph)

g <- graph.lattice(c(5,5,5))

## Not run:

rdp <- RedPort()
callD(rdp)
addGraph( rdp, g, layout.random(g) )
relax(rdp)

## End(Not run)
```

resetd

Reset RedeR app.

Description

Reset the active RedeR session.

Usage

```
resetd(obj)
```

Arguments

obj Object of RedPort Class.

Value

Reset the software panel.

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
rdp <- RedPort('MyPort')

## Not run:

  calld(rdp)
  resetd(rdp)

## End(Not run)
```

selectAllEdges	<i>Select all edges.</i>
----------------	--------------------------

Description

Method to mark all edges in an active RedeR application. Selected objects are put available for other methods. It can be done interactively as well.

Usage

```
selectAllEdges(obj)
```

Arguments

obj Object of RedPort Class.

Value

Mark edges.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'calld').

Author(s)

Mauro Castro

See Also

[RedPort](#), [deleteSelectedEdges](#)

Examples

```
# Initialize igraph
library(igraph)

edges<-c("n1","n2","n1","n3","n1","n4","n1","n5","n1","n6","n1","n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)
selectAllEdges(rdp)
updateGraph(rdp)

## End(Not run)
```

`selectAllNodes`

selectAllNodes

Description

Mark all nodes in an active RedeR application.

Usage

```
selectAllNodes(obj)
```

Arguments

`obj` Object of RedPort Class.

Value

Mark nodes.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'callD').

Author(s)

Mauro Castro

See Also

[RedPort](#), [deleteSelectedNodes](#)

Examples

```
# Initialize igraph
library(igraph)

edges<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)
selectAllNodes(rdp)
updateGraph(rdp)

## End(Not run)
```

selectEdges

selectEdges

Description

Select edges in an active RedeR application.

Usage

```
selectEdges(obj, edges)
```

Arguments

obj Object of RedPort Class.
edges A vertex sequence <vector of strings> or data frame of ncol=2.

Value

Mark edges – which can be handled by other methods.

Note

Prior calling this method invoke RedeR application via 'callD' function.

Author(s)

Mauro Castro

See Also

[RedPort](#), [deleteSelectedEdges](#)

Examples

```

# Initialize igraph
library(igraph)

# edges as a vertex sequence
edges<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

# edges as a data.frame
edges <- data.frame(A=c("n1", "n1", "n1", "n1", "n1", "n1"),
                   B=c("n2", "n3", "n4", "n5", "n6", "n7"))

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)
updateGraph(rdp)
selectEdges(rdp, c("n1", "n3"))
updateGraph(rdp)

## End(Not run)

```

selectGraph

Select graph.

Description

Method to mark all objects in an active RedeR application. Selected objects are put available for other methods. It can be done interactively as well.

Usage

```
selectGraph(obj)
```

Arguments

obj Object of RedPort Class.

Value

Mark graph.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'callD').

Author(s)

Mauro Castro

See Also

[RedPort](#), [deleteSelectedNodes](#), [deleteSelectedEdges](#), [deSelectGraph](#)

Examples

```
# Initialize igraph
library(igraph)

edges<-c("n1","n2","n1","n3","n1","n4","n1","n5","n1","n6","n1","n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)
selectGraph(rdp)
updateGraph(rdp)

## End(Not run)
```

selectNodes

Select nodes.

Description

Method to select nodes in an active RedeR application. Selected objects are put available for other methods. It can be done interactively as well.

Usage

```
selectNodes(obj, nodes, anchor=FALSE, nt=NULL)
```

Arguments

obj	Object of RedPort Class.
nodes	Names of nodes (or containers) <string or array of strings>
anchor	Option to anchor selected nodes: this will prevent the relax function from applying the relaxing algorithm on the selected nodes <boolean>
nt	Option for nested nodes: to restrict searching to a specific container <string>

Value

Mark nodes – which can be handled by other methods.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'callD').

Author(s)

Mauro Castro

See Also[RedPort](#), [deleteSelectedNodes](#)**Examples**

```
# Initialize igraph
library(igraph)

edges<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)
selectNodes(rdp, c("n3", "n4", "n5"))
updateGraph(rdp)

## End(Not run)
```

setArrowDirection *Set arrow direction.*

Description

Method to set edge attribute 'arrow direction' in active RedeR sessions.

Usage

```
setArrowDirection(obj, nodeA, nodeB, direction)
```

Arguments

obj	Object of RedPort Class.
nodeA	Name <string>
nodeB	Name <string>
direction	Options: 0 (A-B), 1 (A->B), 2 (A<-B) or 3 (A<->B) <integer>

Value

Sets edge attribute <integer>

Note

The direction is set according to the edge order in the app (i.e. the edge list available inside RedeR). So, if a request for direction "1" places nodeA='B' and nodeB='A', then the direction will appear as A->B in the app.

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
# Initialize igraph
library(igraph)

edges<-c("n1", "n2", "n1", "n3", "n1", "n4", "n1", "n5", "n1", "n6", "n1", "n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)
setArrowDirection(rdp, "n1", "n2", 2)
updateGraph(rdp)

## End(Not run)
```

subg

Subgraph of a graph.

Description

Creates a subgraph containing only nodes specified from a data frame, including all edges among neighbors.

Usage

```
subg(g, dat, refcol=1, maincomp=TRUE, connected=TRUE, transdat=TRUE)
```

Arguments

g	An igraph object.
dat	A data frame with node ids and attributes to be mapped to 'g'.
refcol	The reference column (node ids) in the 'dat' object.

maincomp	Logical value, whether to return only the main component of the subgraph.
connected	Logical value, whether to return only connected nodes.
transdat	Logical value, whether to transfer node attributes from the 'dat' object to the subgraph.

Value

Returns a igraph object.

Author(s)

Mauro Castro

Examples

```
data(hs.inter)
data(ER.deg)
#subnet <- subg(g=hs.inter, dat=ER.deg$dat, refcol=1)
```

updateContainerSize *Update container size.*

Description

Updates the size of all containers in an active RedeR session.

Usage

```
updateContainerSize(obj)
```

Arguments

obj Object of RedPort Class.

Value

Updates RedeR's container objects.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'calld').

Author(s)

Mauro Castro

See Also[RedPort](#)**Examples**

```
# Initialize igraph
library(igraph)

edges<-c("n1","n2","n1","n3","n1","n4","n1","n5","n1","n6","n1","n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)
nestNodes( rdp, c("n2","n3") )
updateContainerSize(rdp)
updateGraph(rdp)

## End(Not run)
```

updateCoordXY

Update node coordinates.

Description

This function updates node coordinates of an igraph object with the node coordinates from the RedeR interface.

Usage

```
updateCoordXY(obj, g, delNodes=FALSE, delEdges=FALSE)
```

Arguments

obj	Object of RedPort Class.
g	An igraph object, which will be updated with the graph layout displayed in the RedeR interface. Note: 'g' must be the same igraph object sent to the RedeR interface by the addGraph function.
delNodes	Option to delete nodes from 'g' when these nodes are not displayed in the RedeR interface.
delEdges	Option to delete edges from 'g' when these edges are not displayed in the RedeR interface.

Value

An update igraph object.

Note

Prior calling this method make sure that there is an active RedeR session.

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
# Initialize igraph
library(igraph)

g <- igraph::sample_pa(10, directed=FALSE)
V(g)$name <- letters[1:10]

## Not run:
#--- send 'g' to RedeR
rdp <- RedPort()
callD(rdp)
addGraph(rdp, g)
#--- apply RedeR's interactive layout
relax(rdp, g, ps=TRUE)
#--- update 'g' with changes introduced in the RedeR interface
g <- updateCoordXY(rdp, g)

## End(Not run)
```

updateGraph

Update RedeR graphs.

Description

This function updates an active RedeR application session.

Usage

```
updateGraph(obj)
```

Arguments

obj Object of RedPort Class.

Value

An updated RedeR application session.

Note

Prior calling this method make sure that there is an active RedeR session.

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
# Initialize igraph
library(igraph)

edges<-c("n1","n2","n1","n3","n1","n4","n1","n5","n1","n6","n1","n7")

## Not run:

rdp <- RedPort()
callD(rdp)
addEdges(rdp, edges)
updateGraph(rdp)

## End(Not run)
```

version

Version

Description

Check RedeR application version.

Usage

```
version(obj)
```

Arguments

obj Object of RedPort Class.

Value

Returns the version of the current RedeR application that is listening a specified XML-RPC port.

Note

Prior calling this method invoke RedeR application via XML-RPC server (i.e. 'callD').

Author(s)

Mauro Castro

See Also

[RedPort](#)

Examples

```
rdp <- RedPort('MyPort')
```

```
## Not run:
```

```
  calld(rdp)  
  version(rdp)
```

```
## End(Not run)
```


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