Package 'RAMpath'

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Type Package

Title Structural Equation Modeling Using the Reticular Action Model
(RAM) Notation

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Description
We rewrite of RAMpath software developed by John McArdle and Steven Boker as an R package. In addition to performing regular SEM analysis through the R package lavaan, RAMpath has unique features. First, it can generate path diagrams according to a given model. Second, it can display path tracing rules through path diagrams and decompose total effects into their respective direct and indirect effects as well as decompose variance and covariance into individual bridges. Furthermore, RAMpath can fit dynamic system models automatically based on latent change scores and generate vector field plots based upon results obtained from a bivariate dynamic system. Starting version 0.4, RAMpath can conduct power analysis for both univariate and bivariate latent change score models.

Depends R (>= 2.0), lavaan, ellipse, MASS

License GPL-2

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Contents

RAMpath-package   *RAMpath for SEM analysis*

Description

We rewrite of RAMpath software developed by John McArdle and Steven Boker as an R package. In addition to performing regular SEM analysis through the R package lavaan, RAMpath has unique features. First, it can generate path diagrams according to a given model. Second, it can display path tracing rules through path diagrams and decompose total effects into their respective direct and indirect effects as well as decompose variance and covariance into individual bridges. Furthermore, RAMpath can fit dynamic system models automatically based on latent change scores and generate vector field plots based upon results obtained from a bivariate dynamic system. Starting version 0.4, RAMpath can conduct power analysis for both univariate and bivariate latent change score models.

Details

Package:	RAMpath
Type:	Package
License:	GPL

Author(s)

Zhiyong Zhang, Jack McArdle, Aki Hamagami, and Kevin Grimm Maintainer: Zhiyong Zhang <zhiyongzhang@nd.edu>

References

Boker, S. M., McArdle, J. J. & Neale, M. C. (2002) An algorithm for the hierarchical organization of path diagrams and calculation of components of covariance between variables. Structural Equation Modeling, 9(2), 174-194

Yves Rosseel (2012). lavaan: An R Package for Structural Equation Modeling. Journal of Statistical Software, 48(2), 1-36. URL https://www.jstatsoft.org/v48/i02/.

Zhang, Z., Hamagami, F., Grimm, K. J., & McArdle, J. J. (2015). Using R package RAMpath for tracing SEM path diagrams and conducting complex longitudinal data analysis. Structural Equation Modeling, 22(1), 132-147. https://doi.org/10.1080/10705511.2014.935257

---

ex1 *Example data set 1*

Description

Three variables in the data set:

age:

hvlt: Hopkins Verbal Learning Test

ept: Everyday problem solving test

Usage

```
data(ex1)
```

---

ex2 *Example data set 2*

Description

Five variables in the data set:

edu

gender

word sets (ws1)

letter set (ls1)

letter series (lt1)

Usage

```
data(ex2)
```

---

ex3 *Example data set 3*

Description

12 variables in the data set:

X1-X6: data for variable X from time 1 to time 6.

Y1-Y6: data for variable X from time 1 to time 6.

Usage

```
data(ex3)
```

---

isNumeric *Is the input a numeric variable*

Description

Check whether the input is a numeric variable

Usage

```
isNumeric(constant)
```

Arguments

constant   A variable to check

Value

TRUE or FALSE

---

lavaan2ram   *Convert lavaan output to RAM matrices*

Description

Convert lavaan output to RAM matrices

Usage

```
lavaan2ram(fitModel, digits = 2, zero.print = "0", ram.out = TRUE, fit = FALSE)
```

Arguments

fitModel   A lavaan object generated by the function [lavaan](#), [sem](#), or [growth](#)

digits   Digits for number print

zero.print   Format zeros in the matrix

ram.out   Whether print RAM matrices

fit   Whether print fit statistics

Value

A and Ase   A matrix and its standard errors

S and Sse   S matrix and its standard errors

fit   model fit

lavaan   The lavaan input, the same as fitModel

---

makeBridgeList   *Generate all bridges*

Description

Generate all bridges based on Boker, McArdle, & Neale (2002)

Usage

```
makeBridgeList(pathList, spanList)
```

Arguments

pathList	A path list from the function makePathList
spanList	A span list from the function makeSpanList

References

Boker, S. M., McArdle, J. J. & Neale, M. C. (2002) An algorithm for the hierarchical organization of path diagrams and calculation of components of covariance between variables. Structural Equation Modeling, 9(2), 174-194

Zhang, Z., Hamagami, F., Grimm, K. J., & McArdle, J. J. (2015). Using R package RAMpath for tracing SEM path diagrams and conducting complex longitudinal data analysis. Structural Equation Modeling, 22(1), 132-147. https://doi.org/10.1080/10705511.2014.935257

---

makePathList   *Make a list of effects*

Description

Make a list of effects

Usage

```
makePathList(AMatrix, Ase, indirect = TRUE)
```

Arguments

AMatrix	A matrix from the ram matrices
Ase	Standard error matrix for A matrix from the ram matrices
indirect	Whether to generate all indirect effects

References

Boker, S. M., McArdle, J. J. & Neale, M. C. (2002) An algorithm for the hierarchical organization of path diagrams and calculation of components of covariance between variables. Structural Equation Modeling, 9(2), 174-194

Zhang, Z., Hamagami, F., Grimm, K. J., & McArdle, J. J. (2015). Using R package RAMpath for tracing SEM path diagrams and conducting complex longitudinal data analysis. Structural Equation Modeling, 22(1), 132-147. https://doi.org/10.1080/10705511.2014.935257

---

makeSpanList   *Make a list of spans*

Description

Make a list of spans

Usage

```
makeSpanList(SMatrix, Sse)
```

Arguments

SMatrix	S matrix from the ram matrices
Sse	Standard error matrix for S matrix from the ram matrices

References

Boker, S. M., McArdle, J. J. & Neale, M. C. (2002) An algorithm for the hierarchical organization of path diagrams and calculation of components of covariance between variables. Structural Equation Modeling, 9(2), 174-194

Zhang, Z., Hamagami, F., Grimm, K. J., & McArdle, J. J. (2015). Using R package RAMpath for tracing SEM path diagrams and conducting complex longitudinal data analysis. Structural Equation Modeling, 22(1), 132-147. https://doi.org/10.1080/10705511.2014.935257

---

plot.lcs.power   *Plot the power curve for each specified parameter*

Description

Plot the power curve for each specified parameter

Usage

```
## S3 method for class 'lcs.power'
plot(x, parameter, ...)
```

Arguments

x	Output from the `powerLCS` function or Output from the `powerBLCS` function
parameter	parameter to be plotted.
...	Options for the plot function.

References

Zhang, Z., & Liu, H. (2018). Sample size and measurement occasion planning for latent change score models through Monte Carlo simulation. In E. Ferrer, S. M. Boker, and K. J. Grimm (Eds.), Advances in longitudinal models for multivariate psychology: A festschrift for Jack McArdle (pp. 189-211). New York, NY: Routledge.

---

plot.RAMpath	*Plot the path diagram according to RAM path and bridges or Plot the vector field for the bivariate latent change score model*

Description

Plot the path diagram according to RAM path and bridges or Plot the vector field for the bivariate latent change score model

Usage

```
## S3 method for class 'RAMpath'
plot(x, file, from, to, type = c("path", "bridge"),
size = c(8, 8), node.font = c("Helvetica", 14), edge.font = c("Helvetica", 10),
rank.direction = c("LR", "TB"), digits = 2, output.type = c("graphics", "dot"),
graphics.fmt = "pdf", dot.options = NULL, ...)

## S3 method for class 'blcs'
plot(x, ylim, xlim, ninterval=10, scale=.1, length=.25,
scatter=TRUE, n=20, alpha=.95, ...)
```

Arguments

x	Output from the `ramPathBridge` function or Output from the `ramBLCS` function
file	File name for the generated figures
from	from variable: path starts from this variable
to	to variable: path ends on this variable
type	path: to plot the effect path;
	bridge: to plot the bridges path
size	The size of the plot in inches
node.font	The size of the text for the variables
edge.font	The size of the text on the pahts

rank.direction	LR: from left to right; TB: from top to bottom.
digits	Digits of numbers to plot
output.type	If "graphics", the default, both a ".dot" file and a graphics file will be created.
graphics.fmt	a graphics format recognized by the dot program; the default is "pdf"; graphics.fmt is also used for the extension of the graphics file that is created.
dot.options	options to be passed to the dot program, given as a character string.
ylim	Range of y data, for example, c(0,80) from 0 to 80
xlim	Range of x data, for example, c(0,80) from 0 to 80
ninterval	Number of intervals for plotting. The default is 10.
scale	Time interval to calculate vector fields.
length	The length of arrows to plot
scatter	Whether to plot the data points
n	The number of data points to be plotted
alpha	The confidence level to calculate the ellipse
...	Options for plot and arrows function.

References

Zhang, Z., Hamagami, F., Grimm, K. J., & McArdle, J. J. (2015). Using R package RAMpath for tracing SEM path diagrams and conducting complex longitudinal data analysis. Structural Equation Modeling, 22(1), 132-147. https://doi.org/10.1080/10705511.2014.935257

Examples

```
data(ex3)
test.blcs<-ramBLCS(ex3, 1:6, 7:12, ram.out=TRUE)
ramVF(test.blcs, c(0,80),c(0,80), length=.05, xlab='X', ylab='Y',scale=.5, ninterval=9)
plot(test.blcs, c(0,80),c(0,80), length=.05, xlab='X', ylab='Y',scale=.5, ninterval=9)
```

---

powerBLCS	*Power analysis for bivariate latent change score models*

Description

Calculate power for bivariate latent change score models based on Monte Carlo simulation.

Usage

```
powerBLCS(N=100, T=5, R=1000, betay=0, my0=0, mys=0, varey=1,
vary0=1, varys=1, vary0ys=0, alpha=0.05, betax=0, mx0=0,
mxs=0, varex=1, varx0=1, varxs=1, varx0xs=0, varx0y0=0,
varx0ys=0, vary0xs=0, varxsys=0, gammax=0, gammay=0, ...)
```

Arguments

N	Sample size, can be a scalar or a vector. For better performance, make sure N is at least two times of T
T	Number of times, occasions or waves of measurements, can be a scalar or a vector
R	Number of replications to run in Monte Carlo simulation. Recommended 1000 or more
betay	Population parameter values
my0	Population parameter values
mys	Population parameter values
varey	Population parameter values
vary0	Population parameter values
varys	Population parameter values
vary0ys	Population parameter values
betax	Population parameter values
mx0	Population parameter values
mxs	Population parameter values
varex	Population parameter values
varx0	Population parameter values
varxs	Population parameter values
varx0xs	Population parameter values
gammax	Population parameter values
gammay	Population parameter values
varx0y0	Population parameter values
varx0ys	Population parameter values
vary0xs	Population parameter values
varxsys	Population parameter values
alpha	Significance level
...	Options can be used for lavaan

Value

A matrix with power for each parameter.

References

Zhang, Z., & Liu, H. (2018). Sample size and measurement occasion planning for latent change score models through Monte Carlo simulation. In E. Ferrer, S. M. Boker, and K. J. Grimm (Eds.), Advances in longitudinal models for multivariate psychology: A festschrift for Jack McArdle (pp. 189-211). New York, NY: Routledge.

Examples

```
## Not run:
powerBLCS(R=1000)

## End(Not run)
```

---

powerLCS   *Power analysis for univariate latent change score models*

Description

Calculate power for univariate latent change score models based on Monte Carlo simulation.

Usage

```
powerLCS(N=100, T=5, R=1000, betay=0, my0=0, mys=0,
varey=1, vary0=1, varys=1, vary0ys=0, alpha=0.05, ...)
```

Arguments

N	Sample size, can be a scalar or a vector. For better performance, make sure N is at least two times of T
T	Number of times, occasions or waves of measurements, can be a scalar or a vector
R	Number of replications to run in Monte Carlo simulation. Recommended 1000 or more
betay	Population parameter values
my0	Population parameter values
mys	Population parameter values
varey	Population parameter values
vary0	Population parameter values
varys	Population parameter values
vary0ys	Population parameter values
alpha	Significance level
...	Options can be used for lavaan

Value

model	The lavaan model specification of the bivariate latent change score model
lavaan	The lavaan output
ram	Output in terms of RAM matrices

References

Zhang, Z., & Liu, H. (2018). Sample size and measurement occasion planning for latent change score models through Monte Carlo simulation. In E. Ferrer, S. M. Boker, and K. J. Grimm (Eds.), Advances in longitudinal models for multivariate psychology: A festschrift for Jack McArdle (pp. 189-211). New York, NY: Routledge.

Examples

```
## Not run:
powerLCS(R=1000)

## End(Not run)
```

---

ram2lavaan   *RAM model to lavaan model*

Description

Convert RAM matrix specification to a lavaan model

Usage

```
ram2lavaan(model)
```

Arguments

model   An ram model

References

Yves Rosseel (2012). lavaan: An R Package for Structural Equation Modeling. Journal of Statistical Software, 48(2), 1-36. URL http://www.jstatsoft.org/v48/i02/.

Zhang, Z., Hamagami, F., Grimm, K. J., & McArdle, J. J. (2015). Using R package RAMpath for tracing SEM path diagrams and conducting complex longitudinal data analysis. Structural Equation Modeling, 22(1), 132-147. https://doi.org/10.1080/10705511.2014.935257

---

ramBLCS   *Conduct bivariate latent change score analysis*

Description

Conduct bivariate latent change score analysis

Usage

```
ramBLCS(data, y, x, timey, timex, ram.out = FALSE, betax,
betay, gammax, gammay, mx0, mxs, my0, mys, varex, varey,
varx0, vary0, varxs, varys, varx0y0, varx0xs, vary0ys,
varx0ys, vary0xs, varxsys, ...)
```

Arguments

data	Data
y	Indices for y variables
x	Indices for x variables
timey	Time for y variables
timex	Time for x variables
ram.out	whether print ram matrices
betax	Starting value
betay	Starting value
gammax	Starting value
gammay	Starting value
mx0	Starting value
mxs	Starting value
my0	Starting value
mys	Starting value
varex	Starting value
varey	Starting value
varx0	Starting value
vary0	Starting value
varxs	Starting value
varys	Starting value
varx0y0	Starting value
varx0xs	Starting value
vary0ys	Starting value
varx0ys	Starting value
vary0xs	Starting value
varxsys	Starting value
...	Options can be used for [lavaan](#)

Value

model	The lavaan model specification of the bivariate latent change score model
lavaan	The lavaan output
ram	Output in terms of RAM matrices

References

Zhang, Z., Hamagami, F., Grimm, K. J., & McArdle, J. J. (2015). Using R package RAMpath for tracing SEM path diagrams and conducting complex longitudinal data analysis. Structural Equation Modeling, 22(1), 132-147. https://doi.org/10.1080/10705511.2014.935257

Examples

```
data(ex3)
## Test the bivariate latent change score model ramBLCS

test.blcs<-ramBLCS(ex3, 7:12, 1:6, ram.out=TRUE)
summary(test.blcs$lavaan, fit=TRUE)

bridge<-ramPathBridge(test.blcs$ram, allbridge=FALSE,indirect=FALSE)
## uncomment to plot
## plot(bridge, 'blcs')


## Test the vector field plot
## test.blcs is the output of the ramBLCS function.
ramVF(test.blcs, c(0,80),c(0,80), length=.05, xlab='X', ylab='Y',scale=.5, ninterval=9)
```

---

ramEffectSE	*Sobel standard error for a given effect*

Description

Sobel standard error for a given effect

Usage

```
ramEffectSE(object, effect, path=TRUE)
```

Arguments

object	An RAM path bridge output
effect	The effect to calculate se for. It is in the form a > b > c.
path	se for the direct and indirect effect.

Description

Fit a model using lavaan based on ram input

Usage

```
ramFit(ramModel, data, type=c('ram','lavaan'), digits = 3, zero.print = "0", ...)
```

Arguments

ramModel	An ram model
data	data
type	ram: specify a ram model; lavaan: specify a lavaan model
digits	Digits for print
zero.print	Format of zeros
...	Options for lavaan

Value

A and Ase	A matrix and its standard error
S and Sse	S matrix and its standard error
lavaan	Original lavaan output
fit	Model fit statistics and indices

References

Yves Rosseel (2012). lavaan: An R Package for Structural Equation Modeling. Journal of Statistical Software, 48(2), 1-36. URL http://www.jstatsoft.org/v48/i02/.

Zhang, Z., Hamagami, F., Grimm, K. J., & McArdle, J. J. (2015). Using R package RAMpath for tracing SEM path diagrams and conducting complex longitudinal data analysis. Structural Equation Modeling, 22(1), 132-147. https://doi.org/10.1080/10705511.2014.935257

Examples

```
## Example 1. A path model
data(ex1)
m1<-'
manifest=3
label=age,hvlt,ept
arrow(2,1)=?
arrow(3,1)=?
arrow(3,2)=?
```

```
  sling(1,1)=?
  sling(2,2)=?
  sling(3,3)=?
  '

## Fit the model
res1<-ramFit(m1, ex1)

## More output from Lavaan
summary(res1$lavaan, fit=TRUE)

## Effects and variance decomposition
bridge<-ramPathBridge(res1, allbridge=TRUE, indirect=TRUE)
summary(bridge)
summary(bridge, type='bridge')

## plot the path diagram
## uncomment to plot
## plot(bridge, 'ex1')

## plot the effects from age to ept
## uncomment to plot
## plot(bridge, 'ex1effect', 'age','ept')

## plot the bridges for ept
## uncomment to plot
## plot(bridge, 'ex1bridge', 'ept','hvlt', type='bridge')

## summarize
summary(bridge)
summary(bridge, type='bridge')


## Example 2: An SEM model (MIMIC model)
data(ex2)
## Using lavaan directly for model estimation and specification
mimic<-'
R =~ ws1 + ls1 + lt1
R ~ edu + gender
'

mimic.res<-sem(mimic, data=ex2)

mimic.ram<-lavaan2ram(mimic.res)

## plot the path diagram
bridge<-ramPathBridge(mimic.ram, allbridge=FALSE, indirect=FALSE)
## uncomment to plot
## plot(bridge, 'mimic')
```

---

ramFlip   *Flip the ram path*

Description

Flip the ram path

Usage

```
ramFlip(input)
```

Arguments

input   An ram path

---

ramIndex   *To be added*

Description

To be added

Usage

```
ramIndex(input)
```

Arguments

input   To be added

---

ramLCM   *Conduct growth curve analysis*

Description

Conduct growth curve analysis

Usage

```
ramLCM(data, outcome, model = c("all", "no", "linear", "quadratic", "latent"),
basis = 0:(length(outcome) - 1), predictor, equal.var = TRUE, digits = 3,
ram.out = FALSE, ...)
```

Arguments

`data`	Data
`outcome`	Outcome variable indices
`model`	Models to fit
`basis`	Basis coefficients
`predictor`	Covariates as predictors
`equal.var`	Set residual variances to be equal
`digits`	Print digits
`ram.out`	Print ram matrices
`...`	Options can be used for lavaan

Value

`model`	The lavaan model specification of the bivariate latent change score model
`lavaan`	The lavaan output
`ram`	Output in terms of RAM matrices
`fit`	Model fit

References

Zhang, Z., Hamagami, F., Grimm, K. J., & McArdle, J. J. (2015). Using R package RAMpath for tracing SEM path diagrams and conducting complex longitudinal data analysis. Structural Equation Modeling, 22(1), 132-147. https://doi.org/10.1080/10705511.2014.935257

Examples

```
data(ex3)
## Example 3. Growth curve models
gcm.all<-ramLCM(ex3, 1:6, ram.out=TRUE)
## plot the path diagram
bridge<-ramPathBridge(gcm.all$ram$latent, FALSE, FALSE)
## uncomment to plot
## plot(bridge, 'latent')

##unequal variance
gcm.all<-ramLCM(ex3, 1:6, ram.out=TRUE, equal.var=FALSE)

## missing data
gcm.all<-ramLCM(ex3, c(1,2,4,6), basis=c(1,2,4,6), ram.out=TRUE)

gcm.l<-ramLCM(ex3, 1:6, model='linear', ram.out=TRUE)

## with a predictor
gcm.pred<-ramLCM(ex3, c(1,2,4,6), model='linear', basis=c(1,2,4,6),
                 predictor=c(3,5), ram.out=TRUE)
bridge3<-ramPathBridge(gcm.pred$ram$linear)
## uncomment to plot
## plot(bridge3, 'gcmlinear')
```

---

ramLCS   *Univariate latent change score model*

Description

Univariate latent change score model

Usage

```
ramLCS(data, y, timey, ram.out = FALSE, betay, my0, mys,
varey, vary0, varys, vary0ys, ...)
```

Arguments

data	data
y	y data
timey	time of y
ram.out	Whether print ram matrices
betay	Starting value
my0	Starting value
mys	Starting value
varey	Starting value
vary0	Starting value
varys	Starting value
vary0ys	Starting value
...	Options can be used for lavaan

Value

model	The lavaan model specification of the bivariate latent change score model
lavaan	The lavaan output
ram	Output in terms of RAM matrices

References

Zhang, Z., Hamagami, F., Grimm, K. J., & McArdle, J. J. (2015). Using R package RAMpath for tracing SEM path diagrams and conducting complex longitudinal data analysis. Structural Equation Modeling, 22(1), 132-147. https://doi.org/10.1080/10705511.2014.935257

Examples

```
data(ex3)
test.lcs<-ramLCS(ex3, 7:12)
summary(test.lcs$lavaan, fit=TRUE)

bridge<-ramPathBridge(test.lcs$ram, allbridge=FALSE, indirect=FALSE)
## uncomment to plot
## plot(bridge, 'lcs')
```

---

ramMatrix   *Generate ram matrices based on ram input*

Description

Generate ram matrices based on ram input

Usage

```
ramMatrix(model)
```

Arguments

model   An ram model

---

ramParseLavaan   *lavaan to ram*

Description

lavaan to ram matrices

Usage

```
ramParseLavaan(input, manifest, type = 0)
```

Arguments

input   lavaan input

manifest   observed variables

type   0: single headed arrow, ...

---

ramPathBridge   *Generate path and bridges*

Description

Generate path and bridges

Usage

```
ramPathBridge(rammatrix, allbridge = FALSE, indirect = TRUE)
```

Arguments

rammatrix	RAM matrices
allbridge	Generate all bridges
indirect	Generate all indirect effects

---

ramReFit   *Refit a model with additional paths*

Description

Generate a vector field plot based on the bivariate lcsm

Usage

```
ramReFit(object, add, ram.out=FALSE, ...)
```

Arguments

object	Output from any data analysis
add	Additional paths to be added, e.g., add='X1~~X2'.
ram.out	Whether to print the RAM matrices
...	Options for plot and arrows function.

Examples

```
data(ex3)
gcm.l<-ramLCM(ex3, 1:6, model='linear', ram.out=TRUE)
## Add correlated errors
ramReFit(gcm.l, add='X1~~X2')
```

---

ramRmOne   *Internal function*

Description

Internal function

Usage

```
ramRmOne(input)
```

Arguments

input   Internal function

---

ramShowModel   *Show the model using Lavvan model syntax*

Description

Show the model using Lavvan model syntax

Usage

```
ramShowModel(object)
```

Arguments

object   Output from any data analysis

References

Yves Rosseel (2012). lavaan: An R Package for Structural Equation Modeling. Journal of Statistical Software, 48(2), 1-36. URL http://www.jstatsoft.org/v48/i02/.

Zhang, Z., Hamagami, F., Grimm, K. J., & McArdle, J. J. (2015). Using R package RAMpath for tracing SEM path diagrams and conducting complex longitudinal data analysis. Structural Equation Modeling, 22(1), 132-147. https://doi.org/10.1080/10705511.2014.935257

Examples

```
data(ex3)
gcm.l<-ramLCM(ex3, 1:6, model='linear', ram.out=TRUE)
## Add correlated errors
ramShowModel(gcm.l)
```

---

ramUniquePath *Get the uniques paths*

Description

Get the uniques paths

Usage

```
ramUniquePath(tPathlist)
```

Arguments

tPathlist   The path list.

---

ramVF *Generate a vector field plot based on the bivariate lcsm*

Description

Generate a vector field plot based on the bivariate lcsm

Usage

```
ramVF(ramout, ylim, xlim, ninterval=10, scale=.1, length=.25,
scatter=TRUE, n=20, alpha=.95, ...)
```

Arguments

ramout	Output from the ramBLCS function
ylim	Range of y data, for example, c(0,80) from 0 to 80
xlim	Range of x data, for example, c(0,80) from 0 to 80
ninterval	Number of intervals for plotting. The default is 10.
scale	Time interval to calculate vector fields.
length	The length of arrows to plot
scatter	Whether to plot the data points
n	The number of data points to be plotted
alpha	The confidence level to calculate the ellipse
...	Options for plot and arrows function.

References

Zhang, Z., Hamagami, F., Grimm, K. J., & McArdle, J. J. (2015). Using R package RAMpath for tracing SEM path diagrams and conducting complex longitudinal data analysis. Structural Equation Modeling, 22(1), 132-147. https://doi.org/10.1080/10705511.2014.935257

Examples

```
data(ex3)
test.blcs<-ramBLCS(ex3, 1:6, 7:12, ram.out=TRUE)
ramVF(test.blcs, c(0,80),c(0,80), length=.05, xlab='X', ylab='Y',scale=.5, ninterval=9)
```

---

summary.RAMpath	*Calculate the total and individual contribution for each path and bridge*

Description

Calculate the total and individual contribution for each path and bridge

Usage

```
## S3 method for class 'RAMpath'
summary(object, from, to, type = c("path", "bridge"), se=FALSE, ...)
```

Arguments

object	Output from the ramPathBridge function
from	from variable: starting from this variable
to	to variable: end on this variable
type	path: to calculate the effect; bridge: to calculate the bridges
se	Whether to generate se for direct and indirect effects.
...	Other options

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