# Package 'RAMpath'

October 5, 2016

**Type** Package

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

**Version** 0.4

**Date** 2016-10-01

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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

**URL** http://nd.psychstat.org

**NeedsCompilation** no

**Repository** CRAN

**Date/Publication** 2016-10-05 16:36:45

## R topics documented:

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`RAMpath-package` *RAMpath for SEM analysis*

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## Description

RAMpath is a rewrite of RAMpath software developed by John McArdle and Steven Boker.

## Details

| | |
|---|---|
| Package: | RAMpath |
| Type: | Package |
| Version: | 0.1.6 |
| Date: | 2012-05-29 |
| License: | GPL |

## Author(s)

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## 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 http://www.jstatsoft.org/v48/i02/.

Zhang, Z., Hamagami, F., Grimm, K. J., & McArdle, J. J. (2013). Using R Package RAMpath for Tracing SEM Path Diagrams and Conducting Complex Longitudinal Data Analysis. Structural Equation Modeling.

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# ex1 *Example data set 1*

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## Description

Three variables in the data set:

age:

hvlt: Hopkins Verbal Learning Test

ept: Everyday problem solving test

## Usage

```
data(ex1)
```

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# 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. (2013). Using R Package RAMpath for Tracing SEM Path Diagrams and Conducting Complex Longitudinal Data Analysis. Structural Equation Modeling.

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`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. (2013). Using R Package RAMpath for Tracing SEM Path Diagrams and Conducting Complex Longitudinal Data Analysis. Structural Equation Modeling.

## 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. (2013). Using R Package RAMpath for Tracing SEM Path Diagrams and Conducting Complex Longitudinal Data Analysis. Structural Equation Modeling.

## 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. (2016). Sample Size Planning for Latent Change Score Models through Monte Carlo Simulation.

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;<br>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. (2013). Using R Package RAMpath for Tracing SEM Path Diagrams and Conducting Complex Longitudinal Data Analysis. Structural Equation Modeling.

## 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. (2016). Sample Size Planning for Latent Change Score Models through Monte Carlo Simulation.

## 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. (2016). Sample Size Planning for Latent Change Score Models through Monte Carlo Simulation.

## 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. (2013). Using R Package RAMpath for Tracing SEM Path Diagrams and Conducting Complex Longitudinal Data Analysis. Structural Equation Modeling.

---

`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. (2013). Using R Package RAMpath for Tracing SEM Path Diagrams and Conducting Complex Longitudinal Data Analysis. Structural Equation Modeling.

## 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)
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. |

---

# ramFit *Fit a model using lavaan based on ram input*

---

## 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. (2013). Using R Package RAMpath for Tracing SEM Path Diagrams and Conducting Complex Longitudinal Data Analysis. Structural Equation Modeling.

## 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
plot(bridge, 'ex1')

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

## plot the bridges for ept
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)
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. (2013). Using R Package RAMpath for Tracing SEM Path Diagrams and Conducting Complex Longitudinal Data Analysis. Structural Equation Modeling.

## 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)
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)
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. (2013). Using R Package RAMpath for Tracing SEM Path Diagrams and Conducting Complex Longitudinal Data Analysis. Structural Equation Modeling.

## Examples

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

bridge<-ramPathBridge(test.lcs$ram, allbridge=FALSE, indirect=FALSE)
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. (2013). Using R Package RAMpath for Tracing SEM Path Diagrams and Conducting Complex Longitudinal Data Analysis. Structural Equation Modeling.

### 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. (2013). Using R Package RAMpath for Tracing SEM Path Diagrams and Conducting Complex Longitudinal Data Analysis. Structural Equation Modeling.

## 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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