

Package ‘metaVAR’

June 20, 2024

Title Multivariate Meta-Analysis of Vector Autoregressive Model Coefficients
Version 0.9.1
Description Estimates the mean vector and covariance matrix of the multivariate meta-analysis of vector autoregressive model coefficients.
URL <https://github.com/jeksterslab/metaVAR>,
<https://jeksterslab.github.io/metaVAR/>
BugReports <https://github.com/jeksterslab/metaVAR/issues>
License MIT + file LICENSE
Encoding UTF-8
Roxygen list(markdown = TRUE)
Depends R (>= 3.5.0), OpenMx
Imports numDeriv, Matrix
Suggests knitr, rmarkdown, testthat, simStateSpace
RoxygenNote 7.3.1
NeedsCompilation no
Author Ivan Jacob Agaloos Pesigan [aut, cre, cph]
(<https://orcid.org/0000-0003-4818-8420>)
Maintainer Ivan Jacob Agaloos Pesigan <r.jeksterslab@gmail.com>

Contents

FitCTVAR	2
FitDTVAR	3
Meta	4
print.metavarmeta	5
summary.metavarmeta	5
Index	7

FitCTVAR

*Fit First Order Continuous-Time Vector Autoregressive Model by ID***Description**

Fit First Order Continuous-Time Vector Autoregressive Model by ID

Usage

```
FitCTVAR(
  data,
  observed,
  id,
  time,
  phi_start = NULL,
  phi_lbound = NULL,
  phi_ubound = NULL,
  sigma_start = NULL,
  sigma_lbound = NULL,
  sigma_ubound = NULL,
  try = 1000,
  ncores = NULL
)
```

Arguments

data	Data frame. A data frame object of data for potentially multiple subjects that contain a column of subject ID numbers (i.e., an ID variable), and at least one column of observed values.
observed	Character vector. A vector of character strings of the names of the observed variables in the data.
id	Character string. A character string of the name of the ID variable in the data.
time	Character string. A character string of the name of the TIME variable in the data.
phi_start	Optional starting values for phi.
phi_lbound	Optional lower bound for phi.
phi_ubound	Optional upper bound for phi.
sigma_start	Optional starting values for sigma.
sigma_lbound	Optional lower bound for sigma.
sigma_ubound	Optional upper bound for sigma.
try	Positive integer. Number of extra tries for OpenMx::mxTryHard() .
ncores	Positive integer. Number of cores to use.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

Other Meta-Analysis of VAR Functions: [FitDTVAR\(\)](#), [Meta\(\)](#)

FitDTVAR

Fit First Order Discrete-Time Vector Autoregressive Model by ID

Description

Fit First Order Discrete-Time Vector Autoregressive Model by ID

Usage

```
FitDTVAR(
  data,
  observed,
  id,
  beta_start = NULL,
  beta_lbound = NULL,
  beta_ubound = NULL,
  psi_start = NULL,
  psi_lbound = NULL,
  psi_ubound = NULL,
  try = 1000,
  ncores = NULL
)
```

Arguments

data	Data frame. A data frame object of data for potentially multiple subjects that contain a column of subject ID numbers (i.e., an ID variable), and at least one column of observed values.
observed	Character vector. A vector of character strings of the names of the observed variables in the data.
id	Character string. A character string of the name of the ID variable in the data.
beta_start	Optional starting values for beta.
beta_lbound	Optional lower bound for beta.
beta_ubound	Optional upper bound for beta.
psi_start	Optional starting values for psi.
psi_lbound	Optional lower bound for psi.
psi_ubound	Optional upper bound for psi.
try	Positive integer. Number of extra tries for OpenMx::mxTryHard() .
ncores	Positive integer. Number of cores to use.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

Other Meta-Analysis of VAR Functions: [FitCTVAR\(\)](#), [Meta\(\)](#)

Meta

Fit Multivariate Meta-Analysis

Description

This function estimates the mean and covariance matrix of a vector of coefficients using the estimated coefficients and sampling variance-covariance matrix from each individual.

Usage

```
Meta(object, mu_start = NULL, sigma_l_start = NULL, try = 1000, ncores = NULL)
```

Arguments

<code>object</code>	Object of class <code>metavardtvar</code> , that is, the output of FitDTVAR() .
<code>mu_start</code>	Numeric matrix. Matrix of starting values of μ .
<code>sigma_l_start</code>	Numeric matrix. Matrix of starting values of $t(\text{chol}(\Sigma))$.
<code>try</code>	Positive integer. Number of extra tries for OpenMx::mxTryHard() .
<code>ncores</code>	Positive integer. Number of cores to use.

Details

For $i = \{1, \dots, n\}$, the objective function used to estimate the mean μ and covariance matrix Σ of the random coefficients \mathbf{y}_i is given by

$$\ell(\mu, \Sigma \mid \mathbf{y}_i, \mathbb{V}(\mathbf{y}_i)) = -\frac{1}{2} \left[q \log(2\pi) + \log(|\mathbb{V}(\mathbf{y}_i) - \Sigma|) + (\mathbf{y}_i - \mu)' (\mathbb{V}(\mathbf{y}_i) - \Sigma)^{-1} (\mathbf{y}_i - \mu) \right]$$

where q is the number of unique elements in μ and Σ , and $\mathbb{V}(\mathbf{y}_i)$ is the sampling variance-covariance matrix of \mathbf{y}_i .

Value

Returns an object of class `metavarmeta` which is a list with the following elements:

call Function call.

args Function arguments.

fun Function used ("Meta").

output Fitted model.

transform Transformed estimates.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

Other Meta-Analysis of VAR Functions: [FitCTVAR\(\)](#), [FitDTVAR\(\)](#)

print.metavarmeta	<i>Print Method for Object of Class metavarmeta</i>
-------------------	-----------------------------------------------------

Description

Print Method for Object of Class metavarmeta

Usage

```
## S3 method for class 'metavarmeta'  
print(x, alpha = 0.05, digits = 4, ...)
```

Arguments

x	an object of class metavarmeta.
alpha	Numeric vector. Significance level α .
digits	Integer indicating the number of decimal places to display.
...	further arguments.

Author(s)

Ivan Jacob Agaloos Pesigan

summary.metavarmeta	<i>Summary Method for Object of Class metavarmeta</i>
---------------------	-------------------------------------------------------

Description

Summary Method for Object of Class metavarmeta

Usage

```
## S3 method for class 'metavarmeta'  
summary(object, alpha = 0.05, digits = 4, ...)
```

Arguments

<code>object</code>	an object of class <code>metavarmeta</code> .
<code>alpha</code>	Numeric vector. Significance level α .
<code>digits</code>	Integer indicating the number of decimal places to display.
<code>...</code>	further arguments.

Author(s)

Ivan Jacob Agaloos Pesigan

Index

* Meta-Analysis of VAR Functions

FitCTVAR, [2](#)

FitDTVAR, [3](#)

Meta, [4](#)

* fit

FitCTVAR, [2](#)

FitDTVAR, [3](#)

* metaVAR

FitCTVAR, [2](#)

FitDTVAR, [3](#)

Meta, [4](#)

* meta

Meta, [4](#)

* methods

print.metavarmeta, [5](#)

summary.metavarmeta, [5](#)

FitCTVAR, [2](#), [4](#), [5](#)

FitDTVAR, [3](#), [3](#), [5](#)

FitDTVAR(), [4](#)

Meta, [3](#), [4](#), [4](#)

OpenMx::mxTryHard(), [2–4](#)

print.metavarmeta, [5](#)

summary.metavarmeta, [5](#)