Package 'metaVAR'

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Title Multivariate Meta-Analysis of Vector Autoregressive Model Estimates

Version 0.0.0.9000

Description Fits fixed-, random-, or mixed-effects multivariate meta-analysis models using vector autoregressive model estimates from each individual.

URL https://github.com/jeksterslab/metaVAR, https://jeksterslab.github.io/metaVAR/

BugReports https://github.com/jeksterslab/metaVAR/issues

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Encoding UTF-8

Roxygen list(markdown = TRUE)

Depends R (>= 3.5.0), OpenMx

Imports Matrix, fitDTVARMx, fitCTVARMx

Remotes jeksterslab/fitDTVARMx, jeksterslab/fitCTVARMx

Suggests knitr, rmarkdown, testthat, simStateSpace

RoxygenNote 7.3.2

NeedsCompilation no

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coef.metavarmeta *Estimated Parameter Method for an Object of Class* metavarmeta

Description

Estimated Parameter Method for an Object of Class metavarmeta

Usage

```
## S3 method for class 'metavarmeta'
coef(object, ...)
```

Arguments

object	an object of class metavarmeta.
...	further arguments.

Value

Returns a vector of estimated parameters.

Author(s)

Ivan Jacob Agaloos Pesigan

Meta *Fit Multivariate Meta-Analysis*

Description

This function estimates fixed-, random-, or mixed-effects meta-analysis parameters using the estimated coefficients and sampling variance-covariance matrix from each individual.

Usage

```
Meta(
  y,
  v,
  x = NULL,
  beta0_values = NULL,
  beta0_free = NULL,
  beta0_lbound = NULL,
  beta0_ubound = NULL,
  beta1_values = NULL,
  beta1_free = NULL,
```

```
  beta1_lbound = NULL,
  beta1_ubound = NULL,
  tau_values = NULL,
  tau_free = NULL,
  tau_lbound = NULL,
  tau_ubound = NULL,
  random = TRUE,
  diag = FALSE,
  try = 1000,
  ncores = NULL,
  ...
)
```

Arguments

y	A list. Each element of the list is a numeric vector of estimated coefficients.
v	A list. Each element of the list is a sampling variance-covariance matrix of y.
x	An optional list. Each element of the list is a numeric vector of covariates for the mixed-effects model.
beta0_values	Numeric vector. Optional vector of starting values for beta0.
beta0_free	Logical vector. Optional vector of free (TRUE) parameters for beta0.
beta0_lbound	Numeric vector. Optional vector of lower bound values for beta0.
beta0_ubound	Numeric vector. Optional vector of upper bound values for beta0.
beta1_values	Numeric matrix. Optional matrix of starting values for beta1.
beta1_free	Logical matrix. Optional matrix of free (TRUE) parameters for beta1.
beta1_lbound	Numeric matrix. Optional matrix of lower bound values for beta1.
beta1_ubound	Numeric matrix. Optional matrix of upper bound values for beta1.
tau_values	Numeric matrix. Optional matrix of starting values for t(chol(tau_sqr)).
tau_free	Numeric matrix. Optional matrix of free (TRUE) parameters for t(chol(tau_sqr)).
tau_lbound	Numeric matrix. Optional matrix of lower bound values for t(chol(tau_sqr)).
tau_ubound	Numeric matrix. Optional matrix of upper bound values for t(chol(tau_sqr)).
random	Logical. If random = TRUE, estimates random effects. If random = FALSE, tau_sqr is a null matrix.
diag	Logical. If diag = TRUE, tau_sqr is a diagonal matrix. If diag = FALSE, tau_sqr is a symmetric matrix.
try	Positive integer. Number of extra optimization tries.
ncores	Positive integer. Number of cores to use.
...	Additional optional arguments to pass to mxTryHardctsem.

Author(s)

Ivan Jacob Agaloos Pesigan

References

Cheung, M. W.-L. (2015). *Meta-analysis: A structural equation modeling approach*. Wiley. doi:10.1002/9781118957813

Neale, M. C., Hunter, M. D., Pritikin, J. N., Zahery, M., Brick, T. R., Kirkpatrick, R. M., Estabrook, R., Bates, T. C., Maes, H. H., & Boker, S. M. (2015). OpenMx 2.0: Extended structural equation and statistical modeling. *Psychometrika*, *81*(2), 535–549. doi:10.1007/s1133601494358

See Also

Other Meta-Analysis of VAR Functions: `MetaVARMx()`

`MetaVARMx` *Fit Multivariate Meta-Analysis*

Description

This function estimates fixed-, random-, or mixed-effects meta-analysis parameters using the estimated coefficients and sampling variance-covariance matrix from each individual fitted using the `fitDTVARMx::FitDTVARIDMx()` or `fitCTVARMx::FitCTVARIDMx()` functions.

Usage

```
MetaVARMx(
  object,
  x = NULL,
  beta0_values = NULL,
  beta0_free = NULL,
  beta0_lbound = NULL,
  beta0_ubound = NULL,
  beta1_values = NULL,
  beta1_free = NULL,
  beta1_lbound = NULL,
  beta1_ubound = NULL,
  tau_values = NULL,
  tau_free = NULL,
  tau_lbound = NULL,
  tau_ubound = NULL,
  random = TRUE,
  diag = FALSE,
  intercept = FALSE,
  noise = FALSE,
  error = FALSE,
  try = 1000,
  ncores = NULL,
  ...
)
```

Arguments

object	Output of the fitDTVARMx::FitDTVARIDMx() or fitCTVARMx::FitCTVARIDMx() functions.
x	An optional list. Each element of the list is a numeric vector of covariates for the mixed-effects model.
beta0_values	Numeric vector. Optional vector of starting values for beta0.
beta0_free	Logical vector. Optional vector of free (TRUE) parameters for beta0.
beta0_lbound	Numeric vector. Optional vector of lower bound values for beta0.
beta0_ubound	Numeric vector. Optional vector of upper bound values for beta0.
beta1_values	Numeric matrix. Optional matrix of starting values for beta1.
beta1_free	Logical matrix. Optional matrix of free (TRUE) parameters for beta1.
beta1_lbound	Numeric matrix. Optional matrix of lower bound values for beta1.
beta1_ubound	Numeric matrix. Optional matrix of upper bound values for beta1.
tau_values	Numeric matrix. Optional matrix of starting values for t(chol(tau_sqr)).
tau_free	Numeric matrix. Optional matrix of free (TRUE) parameters for t(chol(tau_sqr)).
tau_lbound	Numeric matrix. Optional matrix of lower bound values for t(chol(tau_sqr)).
tau_ubound	Numeric matrix. Optional matrix of upper bound values for t(chol(tau_sqr)).
random	Logical. If random = TRUE, estimates random effects. If random = FALSE, tau_sqr is a null matrix.
diag	Logical. If diag = TRUE, tau_sqr is a diagonal matrix. If diag = FALSE, tau_sqr is a symmetric matrix.
intercept	Logical. If intercept = TRUE, include estimates of the process intercept vector, if available. If intercept = FALSE, exclude estimates of the process intercept vector.
noise	Logical. If noise = TRUE, include estimates of the process noise matrix, if available. If noise = FALSE, exclude estimates of the process noise matrix.
error	Logical. If error = TRUE, include estimates of the measurement error matrix, if available. If error = FALSE, exclude estimates of the measurement error matrix.
try	Positive integer. Number of extra optimization tries.
ncores	Positive integer. Number of cores to use.
...	Additional optional arguments to pass to mxTryHardctsem.

Author(s)

Ivan Jacob Agaloos Pesigan

References

Cheung, M. W.-L. (2015). *Meta-analysis: A structural equation modeling approach*. Wiley. doi:10.1002/9781118957813

Neale, M. C., Hunter, M. D., Pritikin, J. N., Zahery, M., Brick, T. R., Kirkpatrick, R. M., Estabrook, R., Bates, T. C., Maes, H. H., & Boker, S. M. (2015). OpenMx 2.0: Extended structural equation and statistical modeling. *Psychometrika*, *81*(2), 535–549. doi:10.1007/s1133601494358

See Also

Other Meta-Analysis of VAR Functions: `Meta()`

Examples

```
## Not run:
# Generate data using the simStateSpace package------------------------------
beta_mu <- matrix(
  data = c(
    0.7, 0.5, -0.1,
    0.0, 0.6, 0.4,
    0, 0, 0.5
  ),
  nrow = 3
)
beta_sigma <- diag(3 * 3)
beta <- simStateSpace::SimBetaN(
  n = 5,
  beta = beta_mu,
  vcov_beta_vec_l = t(chol(beta_sigma))
)
sim <- simStateSpace::SimSSMVARIVary(
  n = 5,
  time = 100,
  mu0 = list(rep(x = 0, times = 3)),
  sigma0_l = list(t(chol(diag(3)))),
  alpha = list(rep(x = 0, times = 3)),
  beta = beta,
  psi_l = list(t(chol(diag(3))))
)
data <- as.data.frame(sim)

# Fit the model--------------------------------------------------------------
library(fitDTVARMx)
fit <- FitDTVARIDMx(
  data = data,
  observed = c("y1", "y2", "y3"),
  id = "id"
)

# Multivariate meta-analysis-------------------------------------------------
library(metaVAR)
meta <- MetaVARMx(fit)
print(meta)
summary(meta)
coef(meta)
vcov(meta)

## End(Not run)
```

print.metavarmeta *Print Method for Object of Class* metavarmeta

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.

Value

Returns a matrix of estimates, standard errors, test statistics, degrees of freedom, p-values, and confidence intervals.

Author(s)

Ivan Jacob Agaloos Pesigan

summary.metavarmeta *Summary Method for Object of Class* metavarmeta

Description

Summary Method for Object of Class metavarmeta

Usage

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

Arguments

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

Value

Returns a matrix of estimates, standard errors, test statistics, degrees of freedom, p-values, and confidence intervals.

Author(s)

Ivan Jacob Agaloos Pesigan

`vcov.metavarmeta` *Variance-Covariance Matrix Method for an Object of Class* `metavarmeta`

Description

Variance-Covariance Matrix Method for an Object of Class `metavarmeta`

Usage

```
## S3 method for class 'metavarmeta'
vcov(object, ...)
```

Arguments

`object`	an object of class `metavarmeta`.
`...`	further arguments.

Value

Returns the sampling variance-covariance matrix of the estimated parameters.

Author(s)

Ivan Jacob Agaloos Pesigan

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