

# Package ‘metaVAR’

August 6, 2024

**Title** Multivariate Meta-Analysis of Vector Autoregressive Model Coefficients

**Version** 0.0.0.9000

**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** Matrix, fitDTVARMx, fitCTVARMx

**Remotes** jeksterslab/fitDTVARMx, jeksterslab/fitCTVARMx

**Suggests** knitr, rmarkdown, testthat, simStateSpace, MASS

**RoxygenNote** 7.3.2

**NeedsCompilation** no

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coef.metavarmeta	<i>Estimated Parameter Method for an Object of Class metavarmeta</i>
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### 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

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Meta	<i>Fit Multivariate Meta-Analysis</i>
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### 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 $t(\text{chol}(\text{tau\_sqr}))$ .
tau_free	Numeric matrix. Optional matrix of free (TRUE) parameters for $t(\text{chol}(\text{tau\_sqr}))$ .
tau_lbound	Numeric matrix. Optional matrix of lower bound values for $t(\text{chol}(\text{tau\_sqr}))$ .
tau_ubound	Numeric matrix. Optional matrix of upper bound values for $t(\text{chol}(\text{tau\_sqr}))$ .
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 <code>mTryHardctsem</code> .

### Author(s)

Ivan Jacob Agaloos Pesigan

## References

Cheung, M. W.-L. (2015). *Meta-analysis: A structural equation modeling approach*. Chichester, West Sussex: John Wiley & Sons, Inc.

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\(\)](#)

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MetaVARMx

*Fit Multivariate Meta-Analysis*

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## 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 <code>fitDTVARMx::FitDTVARIDMx()</code> or <code>fitCTVARMx::FitCTVARIDMx()</code> 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 $t(\text{chol}(\text{tau\_sqr}))$ .
tau_free	Numeric matrix. Optional matrix of free (TRUE) parameters for $t(\text{chol}(\text{tau\_sqr}))$ .
tau_lbound	Numeric matrix. Optional matrix of lower bound values for $t(\text{chol}(\text{tau\_sqr}))$ .
tau_ubound	Numeric matrix. Optional matrix of upper bound values for $t(\text{chol}(\text{tau\_sqr}))$ .
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 <code>mxTryHardCtsem</code> .

**Author(s)**

Ivan Jacob Agaloos Pesigan

**References**

- Cheung, M. W.-L. (2015). *Meta-analysis: A structural equation modeling approach*. Chichester, West Sussex: John Wiley & Sons, Inc.
- 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)
```

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print.metavarmeta	<i>Print Method for Object of Class metavarmeta</i>
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**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 $\alpha$ .
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

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summary.metavarmeta	<i>Summary Method for Object of Class metavarmeta</i>
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**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 $\alpha$ .
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

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vcov.metavarmeta	<i>Variance-Covariance Matrix Method for an Object of Class metavarmeta</i>
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**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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