# Package: Mmcsd (via r-universe)

August 23, 2024

**Title** Modeling Complex Longitudinal Data in a Quick and Easy Way

**Version** 1.0.0

**Description** Matching longitudinal methodology models with complex
sampling design. It fits fixed and random effects models and
covariance structured models so far. It also provides tools to
perform statistical tests considering these specifications as
described in : Pacheco, P. H. (2021). ``Modeling complex
longitudinal data in R: development of a statistical package.''
<[https://repositorio.ufjf.br/jspui/bitstream/ufjf/13437/1/](https://repositorio.ufjf.br/jspui/bitstream/ufjf/13437/1/pedrohenriquedemesquitapacheco.pdf)
[pedrohenriquedemesquitapacheco.pdf](https://repositorio.ufjf.br/jspui/bitstream/ufjf/13437/1/pedrohenriquedemesquitapacheco.pdf)>.

**License** GPL (>= 3)

**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 7.2.3

**Imports** dplyr, knitr, magrittr, methods, purrr, rlist, stats, tibble,
tidyr

**Depends** R (>= 2.10)

**Suggests** rmarkdown, simstudy, kableExtra, tidyverse

**VignetteBuilder** knitr

**NeedsCompilation** no

**Author** Pedro Pacheco [aut, cre]
(<[https://orcid.org/0000-0003-4804-1576](https://orcid.org/0000-0003-4804-1576)>), Marcel Vieira [aut]
(<[https://orcid.org/0000-0002-0456-380X](https://orcid.org/0000-0002-0456-380X)>), Gustavo Silva [aut]

**Maintainer** Pedro Pacheco <gustavoaeida2002@gmail.com>

**Date/Publication** 2023-03-31 08:10:02 UTC

**Repository** https://gustavo039.r-universe.dev

**RemoteUrl** https://github.com/cran/Mmcsd

**RemoteRef** HEAD

**RemoteSha** facc01c8d798c409e656ae445caf670d20b7cb0a

# Contents

---

cov_mmcsd                                       *Fit covariance structered longitudinal model.*

---

## Description

Responsible for performing the modeling of the model's covariance matrix through the use of co-
variance structures.

## Usage

```
cov_mmcsd(fit, fittingType, sigmaThetaExpr, optimParams)
```

## Arguments

| | |
|---|---|
| fit | A fit model with class 'mmcsd' |
| fittingType | A character with the fitting function type. See optins above |
| sigmaThetaExpr | A character with the covariance structure type or a list of expressions |
| optimParams | A list with configuration for optim function. 'Par' is required. |

## Value

The fit model with class 'mmcsd.theta'.

## Examples

```
fit <- mmcsd(
 score ~ wave + ageg + ecacg + qualifg,
 waves = wave, ids = id,
 weights = weight, stratum = strata, cluster = cluster,
 data = example_data, sigma = "exchangeable"
)
fitTheta_ucm <- cov_mmcsd(fit,
 fittingType = "PML", sigmaThetaExpr = "UCM",
 optimParams = list(par = c(7, 5))
)
```

---

example_data | *A longitudinal example dataset.*

---

## Description

An example dataset containing the individuals scores for certain subject.

## Usage

```
example_data
```

## Format

A data frame with 6700 rows and 9 variables:

**id** respondent id

**wave** wave number

**score** respondent score

**weight** sampling weight

**strata** strata variable

**cluster** cluster variable

**ageg** cathegorical age

**ecacg** educational level

**qualifg** economic activity

---

mmcsd | *Fit fixed and random effects longitudinal model.*

---

## Description

Estimate the fixed effects of the model, also known as B parameters of the regression,taking into account the sampling plan of the research, and also estimating the covariance matrix of the model considering the estimates of B

## Usage

```
mmcsd(formula, waves, ids, weights, stratum, cluster, data, sigma = "identity")
```

## Arguments

| | |
|---|---|
| `formula` | A formula |
| `waves` | a dataframe column or an array |
| `ids` | a dataframe column or an array |
| `weights` | a dataframe column or an array |
| `stratum` | a dataframe column or an array |
| `cluster` | a dataframe column or an array |
| `data` | A dataframe or tibble |
| `sigma` | A character or a square matrix |

## Value

The fit model with class 'mmcsd'.

## Examples

```
fit <- mmcsd(
 score ~ wave + ageg + ecacg + qualifg,
 waves = wave, ids = id,
 weights = weight, stratum = strata, cluster = cluster,
 data = example_data, sigma = "exchangeable"
)
```

---

| sigmaThetaExpr_viewer | *covariance structure viewer to preview sigmaThetaExpr to be used in 'cov_mmcsd'.* |
|---|---|

---

## Description

Knowing the difficulty of visualizing the covariance structure, especially when the user chooses to determine his own structure. This function was developed,that allows the user to view the provided structure even before it is evaluated, that is, through mathematics symbolic.

## Usage

```
sigmaThetaExpr_viewer(sigmaThetaExpr, numWaves = NULL)
```

## Arguments

| | |
|---|---|
| `sigmaThetaExpr` | A character with the covariance structure type or a list of expressions |
| `numWaves` | An integer with the size of the square matrix to be printed. |

## Value

Return NULL and print in terminal the sigmaThetaExpr.

## Examples

```
sigmaThetaExpr_viewer("UCM", 5)
```

---

summary.mmcsd                 *Summarise the results of 'mmcsd' fit.*

---

## Description

Summarise the results of 'mmcsd' fit.

## Usage

```
## S3 method for class 'mmcsd'
summary(object, ...)
```

## Arguments

| object | A mmcsd fitted model |
|--------|----------------------|
| ...    | Additional params passed to summary |

## Value

Return NULL and print in terminal the results.

## Examples

```
fit <- mmcsd(
 score ~ wave + ageg + ecacg + qualifg,
 waves = wave, ids = id,
 weights = weight, stratum = strata, cluster = cluster,
 data = example_data, sigma = "exchangeable"
)
summary(fit)
```

---

summary.mmcsd.theta     *Summarise the results of 'cov_mmcsd' fit.*

---

## Description

Summarise the results of 'cov_mmcsd' fit.

## Usage

```
## S3 method for class 'mmcsd.theta'
summary(object, ...)
```

## Arguments

| | |
|---|---|
| `object` | A mmcsd.theta fitted model |
| `...` | Additional params passed to summary |

## Value

Return NULL and print in terminal the results.

## Examples

```
fit <- mmcsd(
 score ~ wave + ageg + ecacg + qualifg,
 waves = wave, ids = id,
 weights = weight, stratum = strata, cluster = cluster,
 data = example_data, sigma = "exchangeable"
)
fitTheta_ucm <- cov_mmcsd(fit,
 fittingType = "PML", sigmaThetaExpr = "UCM",
 optimParams = list(par = c(7, 5))
)
summary(fitTheta_ucm)
```

# Index