Package 'MRStdLCRT'

January 15, 2026

Type Package

Title Model-Robust Standardization for Longitudinal Cluster-Randomized Trials

Version 0.1.0

Description Provides estimation and leave-one-cluster-out jackknife standard errors for four longitudinal cluster-randomized trial estimands: horizontal individual average treatment effect (h-iATE), horizontal cluster average treatment effect (h-cATE), vertical individual average treatment effect (v-iATE), and vertical cluster-period average treatment effect (v-cATE), using unadjusted and augmented (model-robust standardization) estimators. The working model may be fit using linear mixed models for continuous outcomes or generalized estimating equations and generalized linear mixed models for binary outcomes. Period inclusion for aggregation is determined automatically: only periods with both treated and control clusters are included in the construction of the marginal means and treatment effect contrasts. See Fang et al. (2025) <doi:10.48550/arXiv.2507.17190>.

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Encoding UTF-8

LazyData true

Depends R (>= 4.1.0)

Imports reformulas, dplyr (>= 1.1.0), tidyr (>= 1.3.0), rlang (>= 1.1.0), tidyselect, gee, lme4 (>= 1.1-30), ggplot2 (>= 3.4.0), stats, utils

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

RoxygenNote 7.3.3

NeedsCompilation no

Author Xi Fang [aut, cre], Fan Li [aut]

Maintainer Xi Fang <x.fang@yale.edu>

Repository CRAN

Date/Publication 2026-01-15 17:50:06 UTC

Contents

`mrstdlcrt_fit` *Fit model-robust standardization for longitudinal CRTs*

Description

Fit model-robust standardization for longitudinal CRTs

Usage

```
mrstdlcrt_fit(
  data,
  formula,
  cluster_id = "cluster",
  period = "period",
  trt = "trt",
  method = c("gee", "lmer", "glmer"),
  family = c("gaussian", "binomial"),
  corstr = "independence",
  scale = c("RD", "RR", "OR")
)
```

Arguments

`data`	data.frame with outcome, treatment, period, cluster, covariates.
`formula`	model formula; may include interactions and random effects.
`cluster_id`	cluster id column name.
`period`	period column name.
`trt`	treatment column name (0/1).
`method`	"gee","lmer","glmer".
`family`	"gaussian","binomial".
`corstr`	gee correlation.
`scale`	For binomial: "RD","RR","OR" (RR/OR are on log scale).

Value

Object of class "mrs".

---

plot.mrs *Plot method for mrs objects*

Description

Plot method for mrs objects

Usage

```
## S3 method for class 'mrs'
plot(x, level = 0.95, estimand = NULL, point_size = 2.8, ...)
```

Arguments

x	An object of class "mrs".
level	Confidence level.
estimand	Subset of estimands to plot.
point_size	Point size.
...	Unused.

Value

ggplot object invisibly.

---

print.mrs *Print method for mrs objects*

Description

Print method for mrs objects

Usage

```
## S3 method for class 'mrs'
print(x, ...)
```

Arguments

x	An object of class "mrs".
...	Unused.

Value

x invisibly.

summary.mrs *Summarize an mrs fit*

Description

Summarize an mrs fit

Usage

```
## S3 method for class 'mrs'
summary(
  object,
  level = 0.95,
  estimand = NULL,
  digits = 6,
  show_counts = TRUE,
  ...
)
```

Arguments

object	An object of class "mrs".
level	Confidence level.
estimand	Optional subset of estimands.
digits	Digits to print.
show_counts	Print counts tables.
...	Unused.

Value

Invisibly returns a list of printed tables and metadata.

sw_b *Example stepped wedge CRT dataset with binary outcome*

Description

A toy dataset with cluster, period, and individual records for illustrating estimands in stepped wedge CRT with a binary outcome.

Usage

```
data(sw_b)
```

Format

A data frame with columns:

cluster Cluster identifier (integer).

period Period index (integer).

id Individual identifier within cluster-period (integer).

trt Treatment indicator (0/1).

x1 Auxiliary covariate (0/1).

x2 Auxiliary covariate (numeric).

y Outcome (0/1, binary).

Examples

```
data(sw_b)
head(sw_b)
```

---

sw_c *Example of stepped wedge CRT dataset for continuous outcome*

Description

A toy dataset with cluster, period, and individual records for illustrating estimands in stepped wedge CRT with a continuous outcome.

Usage

```
data(sw_c)
```

Format

A data frame with columns:

cluster Cluster identifier (integer).

period Period index (integer).

id Individual identifier within cluster-period (integer).

trt Treatment indicator (0/1).

x1 Auxiliary covariate (0/1).

x2 Auxiliary covariate (numeric).

y Outcome (numeric, continuous).

Examples

```
data(sw_c)
head(sw_c)
```

xo_b — *Example crossover cluster-randomized trial dataset with binary outcome*

Description

A small simulated 2×2 crossover trial dataset with a binary outcome.

Usage

```
xo_b
```

Format

A tibble/data.frame with one row per subject and the following columns:

h Integer cluster ID (hospital)

p Integer period (1 or 2)

k Integer subject index within cluster-period

trt Treatment indicator (0 = control, 1 = treatment)

x_c01, x_c02 Continuous covariates

x_b01 Binary covariate (0/1)

x_cat1_2, x_cat1_3 Dummy variables for a 3-level categorical covariate (level 1 is reference)

y_bin Observed binary outcome (0/1)

Examples

```
data(xo_b)
str(xo_b)
head(xo_b)
```

xo_c — *Example crossover cluster-randomized trial dataset with continuous outcome*

Description

A small simulated 2×2 crossover trial dataset with a continuous outcome.

Usage

```
xo_c
```

Format

A tibble/data.frame with one row per subject and the following columns:

h Integer cluster ID (hospital)

p Integer period (1 or 2)

k Integer subject index within cluster-period

trt Treatment indicator (0 = control, 1 = treatment)

x_c01, x_c02 Continuous covariates

x_b01 Binary covariate (0/1)

x_cat1_2, x_cat1_3 Dummy variables for a 3-level categorical covariate (level 1 is reference)

y_cont Observed continuous outcome

Examples

```
data(xo_c)
str(xo_c)
head(xo_c)
```

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