Package 'IPWpn'

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Type Package

Title Inverse-Propensity-Weighting for Partially Nested Designs

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Description Use inverse-propensity-weighted estimation approaches to estimating the treatment effect from a partially nested design where one study arm (the treatment arm) is nested and the other study arm (the control arm) is not. Two estimators are provided: IPW mean difference and IPW multilevel modeling. <https://github.com/xliu12/IPWpn>.

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Encoding UTF-8

LazyData true

Imports MplusAutomation, tidyverse, mvtnorm, stats, utils, dplyr, tibble, tidyr

RoxygenNote 7.1.1

Suggests knitr, rmarkdown, testthat (>= 2.0.0)

VignetteBuilder knitr

Config/testthat/edition 2

Depends R (>= 2.10)

NeedsCompilation no

Repository CRAN

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R topics documented:

dat_obs — *Observed data in a partially nested design.*

Description

A dataset simulated from a partially nested design containing two types of pre-treatment confounders, treatment assignments, treatment cluster assignments, and outcome scores.

Usage

```
data("dat_obs")
```

Format

A data frame with 200 observations on the following 5 variables.

`Trt` a numeric vector

`clus` a numeric vector

`Y` a numeric vector

`Ly` a numeric vector

`Lz` a numeric vector

Examples

```
data(dat_obs)
```

IPW.meandifference — *Estimating the treatment effect from a partially nested design using the inverse-propensity-weighted mean difference estimation approach*

Description

IPW.meandifference is used to estimate the treatment effect from a partially nested design (where the treatment arm has multiple treatment clusters, and the control arm has no clusters) with the inverse-propensity-weighted mean difference estimation approach adapted to the partially nested design feature.

Usage

```
IPW.meandifference(
  Y,
  Trt,
  clus,
  Lyz,
  Ly
)
```

Arguments

Y	An outcome variable
Trt	Treatment assignment indicator (1 for treatment and 0 for control). The treatment arm has multiple treatment clusters, and the control arm has no clusters.
clus	Observed treatment cluster assignment. clus = 0 for the control arm
Lyz	A matrix containing pre-treatment covariates. Lyz can contain two types of covariates. The first type of covariates affect both the treatment assignment and outcome directly. The second type of covariates do not affect the outcome in a given treatment cluster directly, but affect both the treatment assignment and treatment cluster assignment.
Ly	A matrix containing the pre-treatment covariates that affect both the treatment assignment and outcome directly. Ly is the first type of covariates contained in Lyz.

Details

The sandwisch type standard error estimation does not account for the clustering in the treatment arm.

Value

IPW.meandifference returns a list "ipw10.md" containing the following components:

meanDiff	the treatment effect estimate, i.e., the mean difference between the treatment and control arm.
se_sw	the sandwich-type standard error estimate of the treatment effect estimate.
z.wald	the Wald statistic (i.e., meanDiff/se_sw).

Examples

```
data(dat_obs)
head(dat_obs)
IPW.meandifference(Y=dat_obs$Y,
                   Trt=dat_obs$Trt,
                   clus=dat_obs$clus,
                   Lyz=dat_obs[,c('Ly','Lz')],
                   Ly=dat_obs[,c('Ly')] )
```

IPW.MLMPN *Estimating the treatment effect from a partially nested design with the inverse-propensity-weighted multilevel modeling estimation approach*

Description

IPW.MLMPN is used to estimate the treatment effect from a partially nested design (where the treatment arm has multiple treatment clusters, and the control arm has no clusters) with the inverse-propensity-weighted multilevel modeling (where a multilevel model is specified for the treatment arm and a regression model is specified for the control arm) estimation approach.

Usage

```
IPW.MLMPN(
  Y,
  Trt,
  clus,
  Lyz,
  Ly
)
```

Arguments

Y	An outcome variable
Trt	Treatment assignment indicator (1 for treatment and 0 for control). The treatment arm has multiple treatment clusters, and the control arm has no clusters.
clus	Observed treatment cluster assignment. clus = 0 for the control arm
Lyz	A matrix containing pre-treatment covariates. Lyz can contain two types of covariates. The first type of covariates affect both the treatment assignment and outcome directly. The second type of covariates do not affect the outcome in a given treatment cluster directly, but affect both the treatment assignment and treatment cluster assignment.
Ly	A matrix containing the pre-treatment covariates that affect both the treatment assignment and outcome directly. Ly is the first type of covariates contained in Lyz.

Details

The sandwisch type standard error estimation accounts for the clustering in the treatment arm.

Value

IPW.MLMPN returns a list "ipw10.mlmpn" containing the following components:

gammDiff	the treatment effect estimate, i.e., the mean difference between the treatment and control arm.
se_sw	the sandwich-type standard error estimate of the treatment effect estimate.
z.wald	the Wald statistic (i.e., gammDiff/se_sw).

Examples

```
data(dat_obs)
head(dat_obs)
IPW.MLMPN(Y=dat_obs$Y,
                  Trt=dat_obs$Trt,
                  clus=dat_obs$clus,
                  Lyz=dat_obs[,c('Ly','Lz')],
                  Ly=dat_obs[,c('Ly')] )
```

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