

Package: mrPStrata (via r-universe)

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Type Package

Title Multiply robust estimation in causal survival analysis with treatment noncompliance

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Author Chao Cheng <c.cheng@yale.edu>, Bo Liu <bo.liu1997@duke.edu>, Fan Li <f135@duke.edu>, Fan Li <fan.f.li@yale.edu>

Maintainer Chao Cheng <c.cheng@yale.edu>

Description This package provides functions to calculate the multiply robust estimator of the principal survival causal effect among the always takers, compliers, and never takers.

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Encoding UTF-8

LazyData true

Depends survival, dplyr, boot, ggplot2, progress

Suggests knitr, rmarkdown, testthat (>= 3.0.0)

Config/testthat/edition 3

RoxygenNote 7.3.1

VignetteBuilder knitr

Repository <https://chaochengstat.r-universe.dev>

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BootEst.MO.SA	<i>Bootstrap confidence intervals for the bias-corrected multiply robust estimator under violations of monotonicity</i>
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Description

Bootstrap confidence intervals for the bias-corrected multiply robust estimator under violations of monotonicity

Usage

```
BootEst.MO.SA(
  times,
  propensity.model,
  principal.model,
  censor.model,
  failure.model,
  data,
  zeta,
  estimand = c("NACE", "CACE", "AAACE", "DACE"),
  bootstrap = 50
)
```

Arguments

times	a vector of time when the principal survival causal effects (PSCEs) are of interest
propensity.model	propensity score model
principal.model	principal score model
censor.model	censoring model
failure.model	outcome model
data	dataset
zeta	the sensitivity parameter zeta
estimand	the estimands of interest
bootstrap	number of bootstrap replications

Value

The bootstrap confidence intervals

BootEst.PI.SA *Bootstrap confidence intervals for the multiply robust estimator*

Description

Bootstrap confidence intervals for the multiply robust estimator

Usage

```
BootEst.PI.SA(
  times,
  propensity.model,
  principal.model,
  censor.model,
  failure.model,
  data,
  xi0,
  xi1,
  eta0,
  eta1,
  estimand = c("NACE", "CACE", "ACE"),
  bootstrap
)
```

Arguments

times	a vector of time when the principal survival causal effects (PSCEs) are of interest
propensity.model	propensity score model
principal.model	principal score model
censor.model	censoring model
failure.model	outcome model
data	dataset
xi0	sensitivity parameter xi_0
xi1	sensitivity parameter xi_1
eta0	sensitivity parameter eta_0
eta1	sensitivity parameter eta_1
estimand	the estimands of interest
bootstrap	number of bootstrap replications

Value

The bootstrap confidence intervals

 mrPStrata

Multiply robust estimator for calculating the principal survival causal effects among always takers, compliers, and never takers

Description

Multiply robust estimator for calculating the principal survival causal effects among always takers, compliers, and never takers

Usage

```
mrPStrata(
  times,
  data,
  Xpi_names,
  Xe_names,
  Xc_names,
  Xt_names,
  Z_name,
  S_name,
  U_name,
  delta_name,
  B = 100
)
```

Arguments

times	a vector of time when the principal survival causal effects (PSCEs) are of interest
data	the dataset
Xpi_names	names of the covariates for the propensity score model
Xe_names	names of the covariates for the principal score model
Xc_names	names of the covariates for the censoring model
Xt_names	names of the covariates for the failure outcome model
Z_name	name of the treatment assignment status
S_name	name of the true treatment receipt status
U_name	name of the observed failure time
delta_name	name of the censoring indicator
B	number of the bootstrap replications (default 100)

Value

The PSCE estimates and their 95% confidence intervals

Examples

```
# example code
attach(sim_data)
res = mrPStrata(times=c(1,2,3,4,5,6,7,8),
               data = sim_data,
               Xpi_names = c("X1", "X2", "X3", "X4", "X5"),
               Xe_names = c("X1", "X2", "X3", "X4", "X5"),
               Xc_names = c("X1", "X2", "X3", "X4", "X5"),
               Xt_names = c("X1", "X2", "X3", "X4", "X5"),
               Z_name = "z",
               S_name = "s",
               U_name = "U",
               delta_name = "delta",
               B=50)

print(res)
```

mrPStrata_MO_SA	<i>Bias-corrected multiply robust estimator of the PSCE under violation of monotonicity</i>
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Description

Bias-corrected multiply robust estimator of the PSCE under violation of monotonicity

Usage

```
mrPStrata_MO_SA(
  times,
  data,
  Xpi_names,
  Xe_names,
  Xc_names,
  Xt_names,
  Z_name,
  S_name,
  U_name,
  delta_name,
  zeta = 0.01,
  B = 100
)
```

Arguments

times	a vector of time when the principal survival causal effects (PSCEs) are of interest
data	the dataset
Xpi_names	names of the covariates for the propensity score model
Xe_names	names of the covariates for the principal score model

Xc_names	names of the covariates for the censoring model
Xt_names	names of the covariates for the outcome model
Z_name	name of the treatment assignment status
S_name	name of the true treatment receipt status
U_name	name of the observed failure time
delta_name	name of the censoring indicator
zeta	sensitivity parameter zeta
B	number of the bootstrap replications (default 100)

Value

The PSCE estimates and their 95% confidence intervals

mrPStrata_PI_SA	<i>Bias-corrected multiply robust estimator of the PSCE under violation of the principal ignorability assumption</i>
-----------------	--

Description

Bias-corrected multiply robust estimator of the PSCE under violation of the principal ignorability assumption

Usage

```
mrPStrata_PI_SA(
  times,
  data,
  Xpi_names,
  Xe_names,
  Xc_names,
  Xt_names,
  Z_name,
  S_name,
  U_name,
  delta_name,
  xi0 = 0,
  xi1 = 0,
  eta0 = 1,
  eta1 = 1,
  B = 100
)
```

Arguments

times	a vector of time when the principal survival causal effects (PSCEs) are of interest
data	the dataset
Xpi_names	names of the covariates for the propensity score model
Xe_names	names of the covariates for the principal score model
Xc_names	names of the covariates for the censoring model
Xt_names	names of the covariates for the outcome model
Z_name	name of the treatment assignment status
S_name	name of the true treatment receipt status
U_name	name of the observed failure time
delta_name	name of the censoring indicator
xi0	sensitivity parameter xi_0
xi1	sensitivity parameter xi_1
eta0	sensitivity parameter eta_0
eta1	sensitivity parameter eta_1
B	number of the bootstrap replications (default 100)

Value

The PSCE estimates and their 95% confidence intervals

plot.psce	<i>Plot of the PSCEs and their associated 95% pointwise confidence intervals</i>
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Description

Plot of the PSCEs and their associated 95% pointwise confidence intervals

Usage

```
## S3 method for class 'psce'
plot(res)
```

Arguments

res	an output from mrPStrata
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Value

The PSCE point estimates and 95% pointwise confidence intervals

PointEst.MO.SA	<i>Point estimation for the multiply robust estimator under violation of monotonicity assumption</i>
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Description

Point estimation for the multiply robust estimator under violation of monotonicity assumption

Usage

```
PointEst.MO.SA(
  times,
  propensity.model,
  principal.model,
  censor.model,
  failure.model,
  data,
  zeta,
  estimand = c("NACE", "CACE", "ACE", "DACE")
)
```

Arguments

times	a vector of time when the principal survival causal effects (PSCEs) are of interest
propensity.model	propensity score model
principal.model	principal score model
censor.model	censoring model
failure.model	outcome model
data	dataset
zeta	the sensitivity parameter zeta
estimand	the estimands of interest

Value

The PSCE point estimates

PointEst.PI.SA *Point estimation for the multiply robust estimator*

Description

Point estimation for the multiply robust estimator

Usage

```
PointEst.PI.SA(
  times,
  propensity.model,
  principal.model,
  censor.model,
  failure.model,
  data,
  xi0,
  xi1,
  eta0,
  eta1,
  estimand = c("NACE", "CACE", "ACE")
)
```

Arguments

times	a vector of time when the principal survival causal effects (PSCEs) are of interest
propensity.model	propensity score model
principal.model	principal score model
censor.model	censoring model
failure.model	outcome model
data	dataset
xi0	sensitivity parameter xi_0
xi1	sensitivity parameter xi_1
eta0	sensitivity parameter eta_0
eta1	sensitivity parameter eta_1
estimand	the estimands of interest

Value

The PSCE point estimates

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