Package 'clogitrr'

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Type Package

Title Conditional Logistic Regression with Augmented Pseudo-Observations for Risk Ratio Estimation

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Maintainer Hisashi Noma <noma@ism.ac.jp>

Description Conditional logistic regression has been widely applied as a multivariable method for analyzing stratified binary outcome data. However, the resulting odds ratio estimator can only be interpreted as an approximation to the risk ratio under the rare-event assumption and cannot generally serve as a direct effect measure. To address this limitation, Noma (2025) proposed a novel approach that yields a consistent risk ratio estimator by incorporating pseudo-observations into conditional logistic regression. A key advantage of this method is that it can be implemented directly in standard statistical software for conditional logistic regression simply by modifying the dataset. This package provides computational tools for applying the proposed risk ratio estimation method within the conditional logistic regression framework.

Depends R (>= 3.5.0)

Imports stats, survival, medicaldata, doSNOW, doParallel

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Encoding UTF-8

LazyData true

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clogitrr-package   *The 'clogitrr' package*

Description

Conditional logistic regression has been widely applied as a multivariable method for analyzing stratified binary outcome data. However, the resulting odds ratio estimator can only be interpreted as an approximation to the risk ratio under the rare-event assumption and cannot generally serve as a direct effect measure. To address this limitation, Noma (2025) proposed a novel approach that yields a consistent risk ratio estimator by incorporating pseudo-observations into conditional logistic regression. A key advantage of this method is that it can be implemented directly in standard statistical software for conditional logistic regression simply by modifying the dataset. This package provides computational tools for applying the proposed risk ratio estimation method within the conditional logistic regression framework.

References

Noma, H. (2025). Conditional logistic regression with augmented pseudo-observations for risk ratio estimation. Forthcoming.

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adpdt   *Creating a dataset for the conditional logistic regression with augmented pseudo-observations for risk ratio estimation*

Description

Creating a dataset for fitting the augmented conditional logistic regression to estimate risk ratios. Pseudo-observations are added to the original dataset object.

Usage

```
adpdt(y, data=NULL)
```

Arguments

y   The outcome variable (should be coded as 0 or 1 contained in the dataset objecet.

data   The dataset object.

Value

A data frame object added the pseudo-observations for fitting the conditional logistic regression to estimate risk ratios.

Examples

```
library("survival")
library("medicaldata")

data(indo_rct)
indo_rct$y <- as.numeric(indo_rct$outcome=="1_yes")

indo_e <- adpdt(y, data=indo_rct)
 # Adding pseudo-observations to the original dataset
gm2 <- clogit(y ~ rx + age + gender + risk + pep + psphinc
 + amp + prophystent + strata(site), data=indo_e)

scoef(gm2, eform=TRUE)
 # Risk-ratio estimates; 95%CIs and P-values are incorrect
 # (based on the naive model variances)
```

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scoef	*Computation of the ordinary confidence intervals and P-values for the conditional logistic regression using the model variance estimator*

Description

Confidence intervals and P-values for the conditional logistic regression can be calculated using the ordinary model variance estimators. Through simply entering the output objects of `clogit`, the inference results are fastly computed. The Wald-type confidence intervals and P-values based on the asymptotic normal approximation are computed. The resultant coefficients and confidence limits can be transformed to exponential scales by specifying `eform`.

Usage

```
scoef(x, eform=FALSE, conf.level=0.95, digit=3)
```

Arguments

x	An output object of `clogit`.
eform	A logical value that specify whether the outcome should be transformed by exponential function (default: `FALSE`)
conf.level	Confidence level for calculating confidence intervals (default: 0.95)
digit	Number of decimal places in the output (default: 3).

Value

Results of inferences of the regression coefficients using the ordinary model variance estimators.

- coef: Coefficient estimates; transformed to the exponential scale if `eform=TRUE`.
- SE: Standard error estimates for `coef`.
- CL: Lower limits of confidence intervals.
- CU: Upper limits of confidence intervals.
- P-value: P-values for the coefficient tests.

Examples

```
library("survival")
library("medicaldata")

data(indo_rct)
indo_rct$y <- as.numeric(indo_rct$outcome=="1_yes")

indo_e <- adpdt(y, data=indo_rct)
 # Adding pseudo-observations to the original dataset
gm2 <- clogit(y ~ rx + age + gender + risk + pep + psphinc
 + amp + prophystent + strata(site), data=indo_e)

scoef(gm2, eform=TRUE)
# Risk-ratio estimates; 95%CIs and P-values are incorrect
# (based on the naive model variances)
```

| stboot | *Perform the bootstrap resampling from stratified data* |

Description

Bootstrap resampling from stratified data is performed from the corresponding dataset.

Usage

```
stboot(strata, data=NULL)
```

Arguments

strata	The variable specifying strata contained in the dataset objecet.
data	The dataset object.

Value

A data frame object obtained by bootstrap resamling.

Examples

```
library(medicaldata)
data(indo_rct)

stboot(strata=site, data=indo_rct)
```

| sumboot | *Computation of the bootstrap confidence intervals and P-values* |

Description

Bootstrap confidence intervals and P-values are calculated by coefficient estimates obtained by bootstrap.

Usage

```
sumboot(x, eform=FALSE, conf.level=0.95, digit=3)
```

Arguments

x	An array-type object involving coefficient estimates obtained by bootstrap.
eform	A logical value that specify whether the outcome should be transformed by exponential function (default: FALSE)
conf.level	Confidence level for calculating confidence intervals (default: 0.95)
digit	Number of decimal places in the output (default: 3).

Value

Results of bootstrap inferences of the regression coefficients.

- CL: Lower limits of confidence intervals.
- CU: Upper limits of confidence intervals.
- P-value: P-values for the coefficient tests.

Examples

```
R1 <- data.frame(rnorm(100),rnorm(100,sd=3),runif(100))

sumboot(R1)      # toy example
sumboot(R1,eform=TRUE)
```

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