

Package ‘WR’

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Type Package

Title Win Ratio Analysis

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Description Contains win-ratio analysis routines for prioritized composite time-to-event outcomes, e.g., death and non-fatal events. These routines include functions to fit the proportional win-fractions (PW) model and to compute and plot the standardized score process to assess the proportionality assumption.

License GPL (>= 2)

Encoding UTF-8

LazyData true

Depends R (>= 2.10), survival

RoxygenNote 6.1.1

Suggests knitr, rmarkdown

VignetteBuilder knitr

NeedsCompilation no

Repository CRAN

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non_ischemic	<i>A subset of the HF-ACTION study data on non-ischemic heart failure patients</i>
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Description

These are a subset of the data on the non-ischemic patients in the HF-ACTION study.

Usage

```
non_ischemic
```

Format

A data frame with 751 rows and 16 variables:

ID subject IDs

time event times

status event status

trt_ab treatment indicator: 1=exercise training; 0=usual care

age patient age in years

sex 1=female; 2=male

Black.vs.White 1=black; 0=otherwise

Other.vs.White 1=race other than black or white; 0=otherwise

bmi body mass index

bipllvf (biplane) left-ventricular ejection fraction

hyperten indicator for history of hypertension

COPD indicator for history of COPD

diabetes indicator for history of diabetes

acei indicator for current use of ACE inhibitors

betab indicator for current use of beta blockers

smokecurr indicator for current smoker

References

O'Connor, C. M., Whellan, D. J., Lee, K. L., Keteyian, S. J., Cooper, L. S., Ellis, S. J., Leifer, E. S., Kraus, W. E., Kitzman, D. W., Blumenthal, J. A. et al. (2009). "Efficacy and safety of exercise training in patients with chronic heart failure: HF-ACTION randomized controlled trial". *Journal of the American Medical Association*, 301, 1439–1450.

plot.pwreg.score *Plot the standardized score processes*

Description

Plot the standardized score processes.

Usage

```
## S3 method for class 'pwreg.score'
plot(x, k, xlab = "Time",
     ylab = "Standardized score", lty = 1, frame.plot = TRUE,
     add = FALSE, ylim = c(-3, 3), xlim = NULL, lwd = 1, ...)
```

Arguments

x	an object of class pwreg.score.
k	A positive integer indicating the order of covariate to be plotted. For example, k=3 requests the standardized score process for the third covariate in the covariate matrix Z.
xlab	a title for the x axis.
ylab	a title for the y axis.
lty	the line type. Default is 1.
frame.plot	a logical variable indicating if a frame should be drawn in the 1D case.
add	a logical variable indicating whether add to current plot?
ylim	a vector indicating the range of y-axis. Default is (-3,3).
xlim	a vector indicating the range of x-axis. Default is NULL.
lwd	the line width, a positive number. Default is 1.
...	further arguments passed to or from other methods

Value

a plot of the standardized score process for object pwreg.score.

See Also

[score.proc](#)

Examples

```
# see the example for score.proc
```

print.pwreg *Print the results of the proportional win-fractions regression model*

Description

Print the results of the proportional win-fractions regression model

Usage

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

Arguments

x an object of class pwreg.
... further arguments passed to or from other methods

Value

print the results of pwreg object

See Also

[pwreg](#)

Examples

```
# see the example for pwreg
```

print.pwreg.score *Print information on the content of the pwreg.score object*

Description

Print information on the content of the pwreg.score object

Usage

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

Arguments

x A object of class pwreg.score.
... further arguments passed to or from other methods

Value

print the results of pwreg.score object

See Also

[score.proc](#)

Examples

```
# see the example for score.proc
```

pwreg	<i>Fit priority-adjusted proportional win-fractions (PW) regression model</i>
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Description

Fit priority-adjusted proportional win-fractions (PW) regression model.

Usage

```
pwreg(time, status, Z, ID, rho = 0, eps = 1e-04, maxiter = 50)
```

Arguments

time	a vector of all the event times.
status	a vector of the status for all the event. 0: censoring, 1:death and 2: non-fatal event.
Z	a matrix or a vector of covariates.
ID	a vector of unique subject-level identifiers.
rho	a non-negative number as the power of the survival function used in the weight. Default (rho=0) is recommended.
eps	precision for the convergence of Newton-Raphson algorithm.
maxiter	maximum number of iterations allowe for the Newton-Raphson algorithm.

Value

An object of class pwreg with the following components. beta:a vector of estimated regression coefficients. Var:estimated covariance matrix for beta. conv: boolean variable indicating whether the algorithm converged within the maximum number of iterations.

References

Mao, L. and Wang, T. (2020+). "A class of proportional win-fractions regression models for composite outcomes". Under review.

See Also

[score.proc](#)

Examples

```
library(WR)
head(non_ischemic)
id_unique <- unique(non_ischemic$ID)

# Randomly sample 200 subjects from non_ischemic data
set.seed(2019)
id_sample <- sample(id_unique, 200)
non_ischemic_reduce <- non_ischemic[non_ischemic$ID %in% id_sample, ]

# Use the reduced non_ischemic data for analysis
nr <- nrow(non_ischemic_reduce)
p <- ncol(non_ischemic_reduce)-3
ID <- non_ischemic_reduce[, "ID"]
time <- non_ischemic_reduce[, "time"]
status <- non_ischemic_reduce[, "status"]
Z <- as.matrix(non_ischemic_reduce[, 4:(3+p)], nr, p)
pwreg.obj <- pwreg(time=time, status=status, Z=Z, ID=ID)
print(pwreg.obj)
```

score.proc

Computes the standardized score processes

Description

Computes the standardized score processes for the covariates.

Usage

```
score.proc(obj, t = NULL)
```

Arguments

obj	an object of class pwreg.
t	a vector containing times. If not specified, the function will use all unique event times from the data.

Value

An object of class pwreg.score consisting of t: a vector of times; and score: a matrix whose rows are the standardized score processes as a function of t.

References

Mao, L. and Wang, T. (2020+). "A class of proportional win-fractions regression models for composite outcomes". Under review.

See Also

[pwreg](#)

Examples

```
library(WR)
head(non_ischemic)

# Randomly sample 200 subjects from non_ischemic data
id_unique <- unique(non_ischemic$ID)
set.seed(2019)
id_sample <- sample(id_unique, 200)

non_ischemic_reduce <- non_ischemic[non_ischemic$ID %in% id_sample, ]
# Use the reduced non_ischemic data for analysis
nr <- nrow(non_ischemic_reduce)
p <- ncol(non_ischemic_reduce)-3
ID <- non_ischemic_reduce[, "ID"]
time <- non_ischemic_reduce[, "time"]
status <- non_ischemic_reduce[, "status"]
Z <- as.matrix(non_ischemic_reduce[, 4:(3+p)], nr, p)
pwreg.obj <- pwreg(time=time, status=status, Z=Z, ID=ID)
score.obj <- score.proc(pwreg.obj)
#plot the standardized score process for the first covariate
plot(score.obj, k = 1)
```

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