Package 'crrcbcv'

October 12, 2022

Title Bias-Corrected Variance for Competing Risks Regression with Clustered Data

Version 1.0

Description A user friendly function 'crrcbcv' to compute bias-corrected variances for competing risks regression models using proportional subdistribution hazards with small-sample clustered data. Four types of bias correction are included: the MD-type bias correction by Mancl and DeRouen (2001) <doi:10.1111/j.0006-341X.2001.00126.x>, the KC-type bias correction by Kauermann and Carroll (2001) <doi:10.1198/016214501753382309>, the FG-type bias correction by Fay and Graubard (2001) <doi:10.1111/j.0006-341X.2001.01198.x>, and the MBN-type bias correction by Morel, Bokossa, and Neerchal (2003) <doi:10.1002/bimj.200390021>.

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Encoding UTF-8

LazyData true

RoxygenNote 7.1.2

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NeedsCompilation no

Author Xinyuan Chen [aut, cre, cph],
Fan Li [aut]

Maintainer Xinyuan Chen <xchen@math.msstate.edu>

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R topics documented:

cls *Clustered competing risks simulated data*

Description

sample of 20 clusters with an average cluster size of 20

Usage

```
data(cls)
```

Format

A data frame containing 20 clusters with an average cluster size of 20 and the following five variables. Simulation is detailed in the paper Finite-sample adjustments in variance estimators for clustered competing risks regression. Chen, Li. 2022. Under Review. Statistics in Medicine.

`I` id of clusters

`X_1` a cluster-level covariate generated from the standard normal distribution

`X_2` an individual-level covariate generated from the standard normal distribution

`eps` event type. 0=censored, 1, 2

`T_obs` observed event time

Author(s)

Xinyuan Chen, <xchen@math.msstate.edu>

Fan Li, <fan.f.li@yale.edu>

References

Chen X, Li F. (2022). Finite-sample adjustments in variance estimators for clustered competing risks regression. Statistics in Medicine. 00(Under Review): 1-24.

Examples

```
data(cls)
```

`crrcbcv` *Bias-Corrected Variance for Competing Risks Regression with Clustered Data*

Description

Small-sample bias-corrected variance for regression modeling using proportional subdistribution hazards with clustered right censored data. (Zhou et al., 2012) Failure times within the same cluster are dependent.

Four types of bias correction are included: the MD-type correction by Mancl and DeRouen (2001), the KC-type correction by Kauermann and Carroll (2001), the FG-type correction by Fay and Graubard (2001), and the MBN-type correction by Morel, Bokossa, and Neerchal (2003).

Usage

```
crrcbcv(
  beta,
  ftime,
  fstatus,
  cov1,
  cov2,
  tf,
  cluster,
  failcode = 1,
  cencode = 0,
  subset,
  na.action = na.omit,
  var.type = "MD"
)
```

Arguments

`beta`	the estimated regression coefficients from `crrc`
`ftime`	vector of failure/censoring times
`fstatus`	vector with a unique code for each failure type and a separate code for censored observations
`cov1`	matrix (nobs x ncovs) of fixed covariates (either cov1, cov2, or both are required)
`cov2`	matrix of covariates that will be multiplied by functions of time; if used, often these covariates would also appear in cov1 to give a prop hazards effect plus a time interaction
`tf`	functions of time. A function that takes a vector of times as an argument and returns a matrix whose jth column is the value of the time function corresponding to the jth column of cov2 evaluated at the input time vector. At time `tk`, the model includes the term `cov2[,j]*tf(tk)[,j]` as a covariate
`cluster`	clustering indicator

failcode	code of fstatus that denotes the failure type of interest
cencode	code of fstatus that denotes censored observations
subset	a logical vector specifying a subset of cases to include in the analysis
na.action	a function specifying the action to take for any cases missing any of ftime, fstatus, cov1, cov2, cengroup, or subset
var.type	a string or a vector of strings with value(s) selected from {"MD", "KC", "FG", "MBN"}

Value

Returns a list of class crr, with components corresponding to var.type

$MD the MD-type bias-corrected variance covariance matrix for beta

$KC the KC-type bias-corrected variance covariance matrix for beta

$FG the FG-type bias-corrected variance covariance matrix for beta

$MBN the MBN-type bias-corrected variance covariance matrix for beta

Author(s)

Xinyuan Chen, <xchen@math.msstate.edu>

Fan Li, <fan.f.li@yale.edu>

References

Chen X, Li F. (2022). Finite-sample adjustments in variance estimators for clustered competing risks regression. Statistics in Medicine. 00(Under Review): 1-24.

Zhou B, Fine J, Latouche A, Labopin M. (2012). Competing risks regression for clustered Data. Biostatistics. 13(3): 371-383.

See Also

crrSC

Examples

```
library(crrcbcv)
data(cls)
mod.est = crrc(ftime=cls$T_obs, fstatus=cls$eps, cov1=cls[,c('X_1','X_2')], cluster=cls$I)
crrcbcv(beta=mod.est$coef, ftime=cls$T_obs, fstatus=cls$eps, cov1=cls[,c('X_1','X_2')],
cluster=cls$I, var.type=c('MD','KC','FG','MBN'))
```

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