Package ‘condGEE’

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Title Parameter estimation in conditional GEE for recurrent event gap times
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Imports numDeriv, rootSolve
Description Solves for the mean parameters, the variance parameter, and their asymptotic variance in a conditional GEE for recurrent event gap times, as described by Clement and Strawderman (2009) in the journal Biostatistics. Makes a parametric assumption for the length of the censored gap time.
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R topics documented:

asthma ................................................................. 1
condGEE ............................................................. 2
condMoments ....................................................... 4

Index

asthma

Asthma recurrence in children

Description

This data set gives the start and stop times of recurrent asthma events in children. It also provides a subject ID, treatment indicator, censoring indicator, number of events per subject and a first event indicator.
condGEE

Parameter estimation in conditional GEE for recurrent event gap times

Description
Solves for the mean parameters (\( \theta \)), the variance parameter (\( \sigma^2 \)), and their asymptotic variance in a conditional GEE for recurrent event gap times, as described by Clement, D. Y. and Strawderman, R. L. (2009) Biostatistics 10, 451–467. Makes a parametric assumption for the length of the censored gap time, and assumes gap times within subject are conditionally uncorrelated.

Usage
condGEE(data, start, mu.fn=mu, mu.d=mu.d, var.fn=v, k1=K1.norm, k2=K2.norm, robust=TRUE, asymp.var=TRUE, maxiter=100, rtol=1e-6, atol=1e-8, ctol=1e-8, useFortran=TRUE)

Arguments
- **data**
  matrix of data with one row for each gap time; the first column should be a subject ID, the second column the gap time, the third column a completeness indicator equal to 1 if the gap time is complete and 0 if the gap time is censored, and the remaining columns the covariates for use in the mean and variance functions.
- **start**
  vector containing initial guesses for the unknown parameter vector.
- **mu.fn**
  the specification for the mean of the gap time; the default is a linear combination of the covariates; the function should take two arguments (\( \theta \), and a matrix of covariates with each row corresponding to one gap time) and it should return a vector of means.
- **mu.d**
  the derivative of **mu.fn** with respect to the parameter vector; the default corresponds to a linear mean function.
the specification for $V^2$, where the variance of the gap time is $\sigma^2 V^2$; the default is a vector of ones; the function should take two arguments ($\theta$, and a matrix of covariates with each row corresponding to one gap time) and it should return a vector of variances

the function to solve for the conditional mean length of the censored gap times; its sole argument should be the vector of standardized (i.e. $(Y - \mu)/(\sigma V)$) censored gap times; the default assumes the standardized censored gap times follow a standard normal distribution, but $K1.t3$ and $K1.exp$ are also provided in the package - they assume a standardized $t$ with 3 degrees of freedom and an exponential with mean 0 and variance 1 respectively

the function to solve for the conditional mean length of the square of the censored gap times; its sole argument should be the vector of standardized (i.e. $(Y - \mu)/(\sigma V)$) censored gap times; the default assumes the standardized censored gap times follow a standard normal distribution, but $K2.t3$ and $K2.exp$ are also provided in the package - they assume a standardized $t$ with 3 degrees of freedom and an exponential with mean 0 and variance 1 respectively

logical, if FALSE, the mean and variance parameters are solved for simultaneously, increasing efficiency, but decreasing the leeway to misguess start and still find the root of the GEE

logical, if FALSE, the function returns NULL for the asymptotic variance matrix

see multiroot; maximal number of iterations allowed

see multiroot; relative error tolerance

see multiroot; absolute error tolerance

see multiroot; if between two iterations, the maximal change in the variable values is less than this amount, then it is assumed that the root is found

see multiroot; logical, if FALSE, then an R implementation of Newton-Raphson is used

Uses the function multiroot in the rootSolve package to solve the conditional GEE. As in multiroot, there is no guarantee of finding the root.

A monotone increasing transformation can be applied to the observed gap times before calling condGEE.

When robust=TRUE, $\theta$ and $\sigma^2$ are solved for in an alternating fashion until convergence. Note that the estimating equation for the mean parameters depends on $\sigma^2$ through the censored gap time.

a list containing:

the parameter estimate $(\theta^T, \sigma^2)^T$

an estimate of the asymptotic variance matrix of the eta estimator

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condMoments

References

Examples
data(asthma)
demo(asthmaExample)

condMoments  First and second conditional moments for 3 distributions

Description
K1 provides \( E(Y|Y > w) \) and K2 provides \( E(Y^2|Y > w) \) for Y as standard normal, standardized \( t \) with 3 degrees of freedom, or an exponential with mean 0 and variance 1.

Usage
K1.norm(w)
K2.norm(w)
K1.t3(w)
K2.t3(w)
K1.exp(w)
K2.exp(w)

Arguments
w  a real-valued vector

Value
a vector of conditional moments

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Index

+Topic datasets
  asthma, 1

asthma, 1

condGEE, 2
condMoments, 4
K1.exp (condMoments), 4
K1.norm (condMoments), 4
K1.t3 (condMoments), 4
K2.exp (condMoments), 4
K2.norm (condMoments), 4
K2.t3 (condMoments), 4