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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NeedsCompilation no

Repository CRAN

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R topics documented:

`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.

Usage

```
asthma
```

Format

A data frame with 1037 rows and 7 columns. See asthma.txt header for details.

Source

http://www.blackwellpublishing.com/rss/

References

Duchateau et al. *JRSSC* 2003. Volume 52, 355–363.

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condGEE *Parameter estimation in conditional GEE for recurrent event gap times*

Description

Solves for the mean parameters (θ), the variance parameter (σ^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 (θ, 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

var.fn	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 (θ, and a matrix of covariates with each row corresponding to one gap time) and it should return a vector of variances
k1	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
k2	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
robust	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
asymp.var	logical, if FALSE, the function returns NULL for the asymptotic variance matrix
maxiter	see multiroot; maximal number of iterations allowed
rtol	see multiroot; relative error tolerance
atol	see multiroot; absolute error tolerance
ctol	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
useFortran	see multiroot; logical, if FALSE, then an R implementation of Newton-Raphson is used

Details

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, θ and σ^2 are solved for in an alternating fashion until convergence. Note that the estimating equation for the mean parameters depends on σ^2 through the censored gap time.

Value

a list containing:

eta	the parameter estimate $(\theta^T, \sigma^2)^T$
a.var	an estimate of the asymptotic variance matrix of the eta estimator

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References

Clement, D. Y. and Strawderman, R. L. 2009 *Biostatistics* **10**, 451–467.

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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