Package 'FreqIDSpline'

January 8, 2019

Title Illness-death models accommodating weights and flexible B-spline parameterizations of the baseline hazards

Version 0.2.0

Date 2019-01-08

Author Ina Jazic

Maintainer Ina Jazic <inj466@mail.harvard.edu>

Description Multistate models are considered to perform the analysis of semi-competing risks data. The functions contained in this package will be included in an upcoming release of the SemiCompRisks R package. This package extends the flexibility of frequentist illness-death models by (1) accommodating user-specified weights, permitting the analysis of semi-competing risks data arising from a nested case-control study, and (2) parameterizing the baseline hazards using B-splines.

Depends R (>= 2.11.0), Formula, nleqslv, splines2

Imports Rcpp (>= 0.11.0)

LinkingTo Rcpp, RcppGSL

License GPL (>= 2)

NeedsCompilation yes

RoxygenNote 6.1.1

R topics documented:

`FreqID_HRegSplines` *The function to fit flexible parametric B-spline models for the frequentist anlaysis of semi-competing risks data arising from cohort or nested case-control studies.*

Description

Independent semi-competing risks data can be analyzed using hierarchical models. As currently implemented, the semi-Markov assumption can be adopted for the conditional hazard function for time to the terminal event given time to non-terminal event. This function is a flexible parametric analog of `FreqID_HReg` in the R package `SemiCompRisks` that accommodates user-specified weights, permitting the analysis of semi-competing risks data arising from a nested case- control study.

Usage

```
FreqID_HRegSplines(Formula, data, wts, nKnots, startvals,
  penalty = FALSE, Kappa = c(0, 0, 0), na.action = "na.fail",
  subset = NULL)
```

Arguments

`Formula`	a `Formula` object of the form $y_1+\delta_1 \vert y_2+\delta_2 \sim x_1 \vert x_2 \vert x_3$. See the `SemiCompRisks` package for more details.
`data`	a data.frame in which to interpret the variables named in `Formula`.
`wts`	a vector of weights for each individual in `data`. Must be of length `nrow(data)`.
`nKnots`	a vector of length 3 giving the number of knots used in the B-spline specification of each baseline hazard. The length of $\phi_i, i \in \{1,2,3\}$ in `startvals` is equal to `nKnots[i]+1`, which includes an intercept.
`startvals`	a vector of starting values in the order $(\log\theta, \beta_1, \beta_2, \beta_3, \phi_1, \phi_2, \phi_3)$, where β represent regression coefficients and ϕ represent the B-spline coefficients.
`penalty`	an indicator of whether penalized maximum likelihood estimates are to be used. Defaults to `FALSE`.
`Kappa`	a vector of length 3 providing values of smoothing parameters. Defaults to `c(0,0,0)`.
`na.action`	how NAs are treated. See `model.frame`.
`subset`	a specification of the rows to be used: defaults to all rows. See `model.frame`.

Value

`FreqID_HRegSplines` returns a list with two elements. The first element provides maximum likelihood or maximum penalized likelihood estimates of the parameters, in the order $(\log\theta, \beta_1, \beta_2, \beta_3, \phi_1, \phi_2, \phi_3)$. The second element is a vector of sandwich estimates of the standard error, in the same order.

Examples

```
data(IDSplineData)
form <- Formula(y1 + delta1 | y2 + delta2 ~ cov1 + cov2 | cov1 + cov2 | cov1 + cov2)
### starting values for the baseline hazard components (phi)
### based on a spline approximation to a BayesID fit in SemiCompRisks. many other strategies possible.
### each is length nKnots[i]+1
phi1.start <- c(-9.488466, -7.372098, -6.656212, -5.972695, -5.622274, -5.417296, -5.340710)
phi2.start <- c(-8.641889, -6.842977, -6.234473, -5.653484, -5.355626, -5.181395, -5.116297)
phi3.start <- c(-4.563376, -3.004653, -3.035086, -2.379959, -2.498012, -2.083923, -2.279812)
### starting values
startvals <- c(log(3), c(1,1), c(-1,-1), c(-0.5,-0.5), phi1.start, phi2.start, phi3.start)
###
```

```
fit1<- FreqID_HRegSplines(Formula=form, data=IDSplineData, wts=rep(1,nrow(IDSplineData)),
nKnots=rep(6,3), startvals=startvals, penalty=FALSE)
```

`IDSplineData` *A simulated semi-competing risks data set*

Description

Simulated semi-competing risks data

Usage

```
data(IDSplineData)
```

Format

a data frame with 10000 observations on the following 14 variables.

`y1` the time to non-terminal event

`delta1` the censoring indicators for the non-terminal event time; 1=event observed, 0=censored/truncated

`y2` the time to terminal event

`delta2` the censoring indicators for the terminal event time; 1=event observed, 0=censored

`cov1` a vector of binary covariates

`cov2` a vector of binary covariates

Examples

```
data(IDSplineData)
```

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