Package ‘DTDA.cif’

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Title  Doubly Truncated Data Analysis, Cumulative Incidence Functions

Version  1.0.2

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License  GPL-2

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DTDA.cif-package

Doubly Truncated Data Analysis, Cumulative Incidence Functions

Description

Nonparametric estimator of the cumulative incidences of competing risks under double truncation. The estimator generalizes the Efron-Petrosian NPMLE (Non-Parametric Maximum Likelihood Estimator) to the competing risks setting.

Details

- Package: ‘DTDA.cif’
- Version: 1.0.2
- Maintainer: José Carlos Soage González <jsoage@uvigo.es>
- License: GPL-2

Value

- ‘DTDAcif’
- ‘plot.DTDAcif’
- ‘summary.DTDAcif’

Acknowledgements

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Author(s)

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References

**DTDAcif**

*Doubly Truncated Data Analysis, Cumulative Incidence Functions*

**Description**

This function computes a nonparametric estimator of the cumulative incidences of competing risks under double truncation. The estimator generalizes the Efron-Petrosian NPMLE (Non-Parametric Maximum Likelihood Estimator) to the competing risks setting.

**Usage**

```r
DTDAcif(x, u, v, comp.event, method = c("indep", "dep"), boot = F,
        B = 300, N.iter = 100, error = 1e-06)
```

**Arguments**

- `x` Numeric vector corresponding to the variable of ultimate interest.
- `u` Numeric vector corresponding to the left truncation variable.
- `v` Numeric vector corresponding to the right truncation variable.
- `comp.event` Competing risk indicator.
- `method` The method used to compute the nonparametric estimator. Use ‘indep’ for independent truncation variables and “dep” for truncation variables possibly depending on the competing risk.
- `boot` Logical. If TRUE the bootstrap standard deviation of the cumulative incidences is calculated.
- `B` Number of bootstrap replicates.
- `N.iter` Maximum number of iterations.
- `error` Error criterion for convergence.

**Details**

The nonparametric estimator is based on the Efron-Petrosian NPMLE (Efron and Petrosian, 1999). Actually, each pair (Xi,Zi) -where Xi stands for the variable of interest and Zi is the competing event indicator- is weighted by the jump of the Efron-Petrosian NPMLE at Xi (method="indep"), or by a normalized version of the Efron-Petrosian NPMLE computed from the subset of (Xs,Zs)’s such that Zs=Zi (method="dep”). The former is suitable when the truncating couple (U,V) is independent of (X,Z), while the latter is recommended when (U,V) and X are only conditionally independent given Z; see de Uña-Álvarez (2019) for a full description of the estimators and of their properties. When the competing event indicator is missing, the function simply computes the Efron-Petrosian NPMLE and the argument method has no role.
Value

A list containing:

- method: The method used to compute the estimator.
- biasf: The biasing function which reports the sampling probability for each \( Xi \).
- cif.mas: The mass attached to each \( (Xi,Zi) \). The cumsum of cif.mas for \( Zi=j \) is the estimator of the \( j \)-th cumulative incidence function.
- data: The data corresponding to \( (X,Z) \) ordered with respect to \( X \) within each \( Z \)-value.
- sd.boot: The bootstrap standard deviation.

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References


Examples

```r
set.seed(1234)
n <- 50  # sample size
x <- runif(n, 0, 1)  # time variable of interest
z <- rbinom(n, 1, 1 / 4)  # competing event indicator

# truncation variables
u <- runif(n, -.25, .5)  # left truncation variable
v <- u + .75  # right truncation variable
```
# note: (u,v) is independent of (x,z) so both estimation methods are consistent

# truncating the sample:

for (i in 1:n) {
  while (u[i] > x[i] | v[i] < x[i]) {
    x[i] <- runif(1, 0, 1)
    z[i] <- rbinom(1, 1, 1 / 4)
    u[i] <- runif(1, -.25, .5)
    v[i] <- u[i] + .75
  }
}

# note: (u,v) since is independent of (x,z)
# both estimation methods are consistent:

res.i <- DTDAcif(x, u, v, z, method = "indep", boot = TRUE)
res.d <- DTDAcif(x, u, v, z, method = "dep", boot = TRUE)

oldpar <- par(mfrow=c(1,2))
plot(res.i, main = "Indep trunc", intervals = TRUE)
plot(res.d, main = "Cond indep trunc", intervals = TRUE)
summary(res.i)
summary(res.d)

plot(res.i$data$x, res.i$biasf, type = "s") # the observational bias
# the observational bias, event 1
plot(res.d$data$x[res.d$data$z == 1], res.d$biasf$biasf_1, type = "s")
# the observational bias, event 2
lines(res.d$data$x[res.d$data$z == 2], res.d$biasf$biasf_2, type = "s", col = 2)
par(oldpar)

Description

S3 method to plot a DTDAcif object by using the generic plot function.

Usage

## S3 method for class 'DTDAcif'
plot(x, intervals = FALSE, level = 0.95, main = "", xlab = "", ylab = ", ylim, xlim, ...)
Arguments

- **x**: DTDAcif object.
- **intervals**: Logical. If TRUE confidence intervals are calculated if standard deviation was calculated before.
- **level**: Confidence level of the standard deviation of the cifs. Default is 0.95.
- **main**: An overall title for the plot.
- **xlab**: A title for the x axis.
- **ylab**: A title for the y axis.
- **ylim**: Limit over the y axis.
- **xlim**: Limit over the x axis.
- **...**: Additional parameters.

Author(s)

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Description

S3 method to summarize a DTDAcif object by using the generic summary function.

Usage

```r
## S3 method for class 'DTDAcif'
summary(object, ...)
```

Arguments

- **object**: DTDAcif object.
- **...**: Additonal parameters.

Author(s)

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