Package 'tauProcess'

September 18, 2023

Title Tau Measure with Right-Censored Data

Version 2.1.3

Description A clinically meaningful measures of treatment effects for right-censored data are provided, based on the concept of Kendall's tau, along with the corresponding inference procedures.
Two plots of tau processes, with the option to account for the cure fraction or not, are available. The plots of tau processes serve as useful graphical tools for monitoring the relative performances over time.

URL https://github.com/s07308/tauProcess

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Imports stats, survival

Depends R (>= 2.10)

LazyData true

NeedsCompilation no

Author Yi-Cheng Tai [aut, cre, cph] (<https://orcid.org/0000-0003-3298-0552>),
Weijing Wang [aut] (<https://orcid.org/0000-0001-6569-083X>),
Martin T. Wells [aut] (<https://orcid.org/0000-0002-9750-9529>)

Maintainer Yi-Cheng Tai <s07308@gmail.com>

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R topics documented:

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pbc *Mayo Clinic Primary Biliary Cholangitis Data*

Description

This dataset is obtained from 'pbc' in package 'survival' by excluding the non-randomized individuals. For background and details of the original dataset, please refer to the document page of 'survival'.

Usage

```
pbc
```

Format

pbc**:**

A data frame with 258 rows and 3 columns:

surv.time the survival of each subject in the trial (days)

event censoring indicator (1: dead; 0: censored)

arm treatment arm (1: D-penicillamine; 0: placebo)

Source

https://cran.r-project.org/package=survival

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plot.tauFit *Plot the Tau Process*

Description

This function plot the estimated tau process obtained from `tau.fit`. It can be used to monitor the progression of treatment effect.

Usage

```
## S3 method for class 'tauFit'
plot(x, ...)
```

Arguments

x	an object of class "tauFit", returned by `tau.fit` function
...	additional arguments passed to underlying plot method

Value

a list with components x and y.

Examples

```
fit <- tau.fit(data = pbc)
plot(fit, type = "b")
```

`plot.tau_process` *Plot the Tau Process with/without cure fraction*

Description

This function plot the estimated tau process with/withour cure fraction obtained from `tau_proc`. It can be used to monitor the progression of treatment effect (for susceptible subgroups).

Usage

```
## S3 method for class 'tau_process'
plot(x, ...)
```

Arguments

x	an object of class "tau_process", returned by `tau_proc` function
...	additional arguments passed to underlying plot method

Value

a list with components x and y.

Examples

```
fit <- tau_proc(data = pbc)
plot(fit)
```

print.summaryTauFit *Print Method for "summaryTauFit" Objects*

Description

user-friendly format to present the inference results obtained from `summary.tauFit`.

Usage

```
## S3 method for class 'summaryTauFit'
print(x, ...)
```

Arguments

`x`	an object of class "summaryTauFit"
`...`	additional arguments passed to underlying `printCoefmat` method.

Value

None

Examples

```
fit <- tau.fit(data = pbc)
summary(fit)
```

summary.tauFit *Summarize the Inference Result of Tau Process at Last Specified Time*

Description

This function summarizes the inference results obtained from `tau.fit`. The results under random grouping design (complete randomization design) and fixed grouping design (random allocation rule / urn model) would be almost the same with large sample size.

Usage

```
## S3 method for class 'tauFit'
summary(object, conf.int = 0.95, ...)
```

Arguments

`object`	an object of class "tauFit"
`conf.int`	the significance level of the confidence interval
`...`	additional arguments passed to underlying summary method

Value

an object of class "summaryTauFit"

Examples

```
fit <- tau.fit(data = pbc)
summary(fit)
```

`tau.fit` *Estimate the Tau Process*

Description

Estimate the tau process at specified time points. The estimated variances at the last time point under complete randomization design and random allocation rule (urn model) are provided.

Usage

```
tau.fit(data, t = numeric())
```

Arguments

`data`	a data.frame consisting of `arm`, `surv.time`, `event`.
`t`	a sequence of specified times. If the user do not specify the sequence, the default is an equally-spaced sequence from 0 to the last identified time.

Details

The estimation and inference procedure are proposed by Yi-Cheng Tai, Weijing Wang and Martin T. Wells. The value of tau measure serves as a clinically meaningful measure of treatment effect. It supplements the traditional hazard ratio (HR) under nonproportional hazard scenario.

Value

an object of class "tauFit" with components

`N0`	number of individuals with arm=0
`N1`	number of individuals with arm=1
`t`	the specified truncation time
`tau`	the estimated value of tau measure
`var.r`	the estimated variance under random grouping design (complete randomization design)
`var.f`	the estimated variance under fixed grouping design (random allocation rule / urn model)

Examples

```
tau.fit(data = pbc)
```

`tau_proc` *Estimate the Tau Process with/without cure fraction*

Description

Estimate the Tau Process with/without cure fraction

Usage

```
tau_proc(data, t = NULL, cure = FALSE)
```

Arguments

`data`	a data.frame consisting of `arm`, `surv.time`, `event`.
`t`	a sequence of specified times. If the user do not specify the sequence, the default is an equally-spaced sequence from 0 to the last identified time.
`cure`	a boolean variable indicating whether to consider the cure fractions.

Details

The estimation method proposed by Yi-Cheng Tai, Weijing Wang and Martin T. Wells to estimate tau process with or without cure fraction.

Value

an object of class "tau_process" with components

`t`	the specified sequence of time points
`vals_tau_proc`	the estimated value of tau measure at given time
`cure`	a boolean variable indicating whether to consider the cure fraction
`cure_rates`	the estimated cure rates for Group 0 and Group 1, respectively

Examples

```
tau_proc(data = pbc)
```

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