Package ‘cmprskcoxmsm’

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cif_est

Estimated cumulative incidence function

description

cif_est estimates the cumulative incidence function (CIF, i.e. risk) based on the cause-specific regression results with 95% confidence intervals, it also calculates the risk ratio and risk difference for the specific time point.

Usage

cif_est(data =
    time, time2 = NULL,
    Event.var, Events, cif.event,
    weight.type,
    ties = NULL,
    risktab = TRUE, risk.time = NULL)

Arguments

data The dataset, output of doPS

time See weight_cause_cox.

time2 See weight_cause_cox.

Event.var The variable name for the event indicator which typically has at least 3 levels.

Events The vector of all the event name, the rest of levels in the Event.var will be treated as loss to follow up (i.e. right censoring).

cif.event Value of event of interest for the CIF.

weight.type See weight_cause_cox.

ties See weight_cause_cox.

risktab Indicator whether the risk ratio and risk difference table should be returned.

risk.time If risktab, the specific time point for calculating the risk ratio and risk difference.

Details

After estimating the parameters in the cause-specific hazard \( \lambda_j^a \) using IPW, we could estimate the corresponding CIF:

\[
P(T^a < t, J^a = j) = \int_0^t \hat{S}^a(u) d\hat{\Lambda}_j^a(u),
\]

where \( \hat{S}^a \) is the estimated overall survival function for \( T^a, \hat{S}^a(u) = e^{-\sum_j \hat{\Lambda}_j^a(u), \hat{\Lambda}_j^a(u) = \hat{\Lambda}_0(u)e^{\beta_j^a}, and \hat{\Lambda}_0(u) is a Breslow-type estimator of the baseline cumulative hazard.\]
**doPS**

**Value**

Returns a table containing the estimated CIF for the event of interest for control and treated group and their 95% confidence intervals.

If `risktab`, will return the risk ratio and risk difference at time `risk.time`, and their 95% confidence intervals.

**References**


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**doPS**

*Generate the Inverse Probability Treatment Weights*

**Description**

doPS calculates the unstabilized and stabilized inverse probability treatment weights (IPW) for average treatment effect using propensity score. The propensity score is calculated by `twang` package using the boosted logistic regression.

**Usage**

doPS(data, Trt, Trt.name, VARS.)

**Arguments**

- **data** The dataset, includes treatment assignment as well as covariates.
- **Trt** The name of the treatment variable in the dataset.
- **Trt.name** The treated group name of the treatment variable in the dataset.
- **VARS.** The vector of the name of potential confounding variables in the dataset.

**Details**

The treatment variable should only contain 2 levels of treatment, and one should be viewed as treated group and another is control group.

For stabilized weights:

For the treated individuals, we assign the IPW: \( w = \Pr(T=1)/\Pr(T=1|X=x) \), for control individuals, the stabilized weight is: \( w = (1-\Pr(T=1))/(1-\Pr(T=1|X=x)) \).
doPS returns an object of class "PS". An object of class "PS" is a list containing the following components:

- **Data**: A new dataset which excludes all the missing value on the potential confounders from input data, add the propensity score and IPW into the new dataset.
- **ps_ate**: The estimated propensity scores with estimand of interest as ATE
- **ipw_ate_unstab**: Unstabilized ipw calculated from ps_ate
- **ipw_ate_stab**: Stabilized ipw calculated from ps_ate
- **ps**: An object of class ps, See the help for ps for details of the ps class.

See Also

- ps

---

**Follicular cell lymphoma study**

Description

Competing risk data set involving follicular cell lymphoma from Pintilie (2007)

Usage

data(follic)

Format

A data frame containing:

- age: age
- hgb: hemoglobin (g/l)
- clinstg: clinical stage: 1=stage I, 2=stage II
- ch: chemotherapy
- rt: radiotherapy
- time: first failure time
- status: Reason of failure: 1: Relapse, 2: Death, 0: No response

References

### plot.PS

**Plotting histogram of propensity score and balancing plot for covariates in the propensity score model**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays a the histogram plots for the propensity score, stratified by treated and control group and a graph of standardized mean difference of potential confounders before and after weighting.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Usage</th>
</tr>
</thead>
</table>
| ```r
## S3 method for class 'PS'
plot(x,...)
``` |

<table>
<thead>
<tr>
<th>Arguments</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
</tr>
<tr>
<td>...</td>
</tr>
</tbody>
</table>

| The results of doPS function |

| ... |
| the other arguments you want to put in the built-in plot function |

<table>
<thead>
<tr>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>The standardized mean difference (SMD), defined as the (weighted) treatment group mean minus the (weighted) control group mean divided by the (weighted) pooled sample (treatment and control) standard deviation. SMD between -0.1 and 0.1 typically indicates good balance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histogram of propensity score and balancing plot for covariates in the propensity score model corresponding to the output from doPS.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>See Also</th>
</tr>
</thead>
<tbody>
<tr>
<td>bal.table</td>
</tr>
</tbody>
</table>

### plot_est_cif

**ggplot method for cif_est objects**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>This function produces a CIF plots for cif_est objects.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Usage</th>
</tr>
</thead>
</table>
| ```r
plot_est_cif(cif.data, color = color, ci.cif = FALSE)
``` |
Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cif.data</td>
<td>The dataset, output of cif_est</td>
</tr>
<tr>
<td>color</td>
<td>Color for control and treatment group, has to be a vector of length 2.</td>
</tr>
<tr>
<td>ci.cif</td>
<td>Indicator whether to plot the 95% confidence interval area for the CIF.</td>
</tr>
</tbody>
</table>

Value

A cumulative incidence function plot (with 95% confidence interval area) corresponding to the output from cif_est.

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pvalFormat  

Adjust p-value format

Description

Formats p-values for reports, can report adjusted pvalues

Usage

pvalFormat(p.values, method = 'none', replace = FALSE)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>p.values</td>
<td>p-value</td>
</tr>
<tr>
<td>method</td>
<td>pvalue adjustment, passed to p.adjust.methods</td>
</tr>
<tr>
<td>replace</td>
<td>if TRUE, replaces p-values with their adjusted value</td>
</tr>
</tbody>
</table>

Value

Return the formatted p-value: round the p-value, assign the significance sign to the p-value based on the significant level. Can be used directly to the LaTeX report.

Examples

```r
p <- 0.002354
test <- pvalFormat(p)
print(p.1 <- pvalFormat(p))
```
weight_cause_cox

Description

weight_cause_cox fits the marginal structural proportional cause-specific hazards model using the inverse probability treatment weights.

Usage

weight_cause_cox(data = ,
  time, time2 = NULL,
  Event.var, Event,
  weight.type,
  ties = NULL)

Arguments

data The dataset, output of doPS
time See also Surv, for right censored data, this is the follow up time. For interval data, the first argument is the starting time for the interval.
time2 See also Surv, ending time of the interval for interval censored or counting process data only. Intervals are assumed to be open on the left and closed on the right, (start, end]. For counting process data, event indicates whether an event occurred at the end of the interval.
Event.var The variable name for the event indicator which typically has at least 3 levels.
Event Event of interest, the rest of the event are treating as competing event.
weight.type Type of inverse probability weights. Possible values are "Unstabilized" and "Stabilized".
ties See also coxph, a character string specifying the method for tie handling. If there are no tied death times all the methods are equivalent.

Details

The marginal structural cause-specific Cox model for cause $j$ usually has the form:

$$\lambda_j^a(t) \equiv \lambda_{T^a,J^a=j}(t) = \lambda_{0j}e^{\beta \alpha},$$

where $T^a, J^a$ is the counterfactual survival time and cause for treatment $a(= 0, 1)$, $\lambda_{0j}$ is the unspecified baseline cause-specific hazard for cause $j$, and $\beta$ is the treatment effect.

Value

Returns a table containing the estimated coefficient of the treatment effect, the robust standard error of the coefficient, estimated hazard ratio and 95% CI for the hazard ratio.
See Also

coxph
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