Package: ivsacim (via r-universe)

Type Package

Title Structural Additive Cumulative Intensity Models with IV

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Description An instrumental variable estimator under structural
cumulative additive intensity model is fitted, that leverages
initial randomization as the IV. The estimator can be used to
fit an additive hazards model under time to event data which
handles treatment switching (treatment crossover) correctly. We
also provide a consistent variance estimate.

License GPL (>= 2)

Imports Rcpp

LinkingTo Rcpp, RcppArmadillo

Depends R (>= 4.0)

RoxygenNote 7.1.2

Encoding UTF-8

NeedsCompilation yes

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Repository https://andrewyyp.r-universe.dev

RemoteUrl https://github.com/cran/ivsacim

RemoteRef HEAD

RemoteSha ad7d169809a566b41acc8aab446641acc827d662

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ivsacim   *Fitting a Cumulative Intensity Model for Exposure Effects with Instru-mental Variables*

Description

ivsacim is used to fit cumulative intensity models for exposure effects with instrumental variables.

Usage

```
ivsacim(
  time,
  event,
  instrument,
  IV_valid = TRUE,
  treatment_init,
  treatment_shift_time = NULL,
  max_time = NULL,
  max_time_bet = NULL,
  n_sim = 0,
  weights = NULL
)
```

Arguments

time	the censored event time
event	event indicator
instrument	the instrumental variable
IV_valid	whether assuming IV satisfies the exclusion restriction
treatment_init	the initial treatment assignment
treatment_shift_time	
	the shift time of each subject, if no shift for a subject, set as 0
max_time	the max time that we threshold for nonconstant effect
max_time_bet	the max time that we threshold for constant effect
n_sim	the number of resampling, set as 0 if no resampling is needed
weights	optional weights used in the estimating equation

Value

ivsacim returns an object of class "ivsacim". An object of class "ivsacim" is a list containing the following components:

stime	an estimate of the baseline hazards function
dB_D	an estimate of the increment of the treatment effect

B_D	an estimate of the treatment effect
beta_D	an estimate of the constant treatment effect
B_D_se	an estimate of the variance covariance matrix of B_D
beta_D_se	an estimate of the constant treatment effect
by_prod	a byproduct, that will used by other functions

Examples

```
n = 400
event = rbinom(n, 1, 0.8)
IV = rbinom(n, 1, 0.5)
trt_init = IV
trt_shift = rep(0, n)
time = rexp(n)/(0.5 + trt_init * 0.2)
max_t = 3
max_t_bet = 3
n_sim = 0
fit <- ivsacim(time, event, IV, TRUE, trt_init,
trt_shift, max_t, max_t_bet, n_sim)
```

| plot.ivsacim | *Plotting Estimated Cumulative Intensity function with Pointwise Confidence Intervals* |

Description

The function will plot the estimated cumulative intensity function of the treatment after fitting. Corresponding pointwise confidence intervals at level alpha are also included.

Usage

```
## S3 method for class 'ivsacim'
plot(x, gof = FALSE, ...)
```

Arguments

x	the fitting object after fitting IVSACIM model
gof	whether to draw the goodness-of-fit plot
...	the other arguments you want to put in the built-in plot function

Value

No return value, called for side effects

Examples

```
n = 400
event = rbinom(n, 1, 0.8)
IV = rbinom(n, 1, 0.5)
trt_init = IV
trt_shift = rep(0, n)
time = rexp(n)/(0.5 + trt_init * 0.2)
max_t = 3
max_t_bet = 3
n_sim = 100
fit <- ivsacim(time, event, IV, IV_valid = TRUE, trt_init, trt_shift, max_t, max_t_bet, n_sim)
plot(fit, main = "", xlab = "Time", ylab = "Cumulative Intensity Function")
plot(fit, gof = TRUE, xlab = "Time", ylab = "")
```

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summary.ivsacim | *Summarizing Cumulative Intensity Function of Treatment with Instrumental Variables Estimation Using Structural Additive Cumulative Intensity Models*

Description

summary method for class "ivsacim".

Usage

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

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

Arguments

object   an object of class "ivsacim", usually, a result of a call to ivsacim.

...   further arguments passed to or from other methods.

x   an object of class "summary.ivsacim", usually, a result of a call to summary.ivsacim.

Details

print.summary.ivsacim tries to be smart about formatting coefficients, an estimated variance covariance matrix of the coeffieients, Z-values and the corresponding P-values.

Value

The function summary.ivsacim computes and returns a list of summary statistics of the fitted model given in object.

Examples

```
n = 400
event = rbinom(n, 1, 0.8)
IV = rbinom(n, 1, 0.5)
trt_init = IV
trt_shift = rep(0, n)
time = rexp(n)/(0.5 + trt_init * 0.2)
max_t = 3
max_t_bet = 3
n_sim = 0
fit <- ivsacim(time, event, IV, IV_valid = TRUE, trt_init, trt_shift, max_t, max_t_bet, n_sim)
summary(fit)
```

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