

Package ‘smlePH’

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Type Package

Title Sieve Maximum Full Likelihood Estimation for the Right-Censored Proportional Hazards Model

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Description Fitting the full likelihood proportional hazards model and extracting the residuals.

URL <https://github.com/taehwa015/smlePH/>

BugReports <https://github.com/taehwa015/smlePH/issues/>

License GPL (>= 3)

Encoding UTF-8

RoxygenNote 7.2.3

Suggests knitr, rmarkdown

Imports MASS, splines2, stats

VignetteBuilder knitr

NeedsCompilation no

Repository CRAN

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smle_ph

*Fit the full likelihood proportional hazards model***Description**

Fit the proportional hazards model with maximum full likelihood estimation. Sieve estimation is used for estimating the baseline hazard function.

Usage

```
smle_ph(y, d, x)
```

Arguments

y	survival time (> 0).
d	right-censoring indicator, 1: observed; 0: right-censored.
x	p-dimensional covariates matrix.

Details

see Halabi et al., (2024+) for detailed method explanation.

Value

smle_ph returns a list containing the following components:

- Coef: regression estimator and its inferential results.
- Cum.hazard: baseline cumulative hazard function estimates.

References

Halabi et al., (2024+) Sieve maximum full likelihood estimation for the proportional hazards model

Examples

```
library(smlePH)
set.seed(111)
n = 200
beta = c(1, -1, 0.5, -0.5, 1)
p = length(beta)
beta = matrix(beta, ncol = 1)
R = matrix(c(rep(0, p^2)), ncol = p)
diag(R) = 1
mu = rep(0, p)
SD = rep(1, p)
S = R * (SD %>% t(SD))
x = MASS::mvrnorm(n, mu, S)
T = (-log(runif(n)) / (2 * exp(x %>% beta)))^(1/2)
```

```
C = runif(n, min = 0, max = 2.9)
y = apply(cbind(T,C), 1, min)
d = (T <= C)+0
ord = order(y)
y = y[ord]; x = x[ord,]; d = d[ord]
smle_ph(y = y, d = d, x = x)
```

smle_resid*Extract residuals of the full likelihood proportional hazards model*

Description

This function extracts residuals of the full likelihood proportional hazards model estimated by the sieve estimation. Deviance-type and score-type residuals are available.

Usage

```
smle_resid(y, d, x, fit, type = c("score", "deviance"))
```

Arguments

y	survival time (> 0).
d	right-censoring indicator, 1: observed; 0: right-censored.
x	p-dimensional covariates matrix.
fit	an object comes from the function smle_ph.
type	type of residual, either deviance or score.

Details

see Halabi et al., (2024+) for detailed method explanation.

Value

smle_resid returns a numeric vector (if type = "deviance") or a matrix (if type = "score") of residuals extracted from the object.

References

Halabi et al., (2024+) Sieve maximum full likelihood estimation for the proportional hazards model

Examples

```
library(smlePH)
# The 'fit' comes from an example description of smle_ph()
smle_resid(y = y, d = d, x = x, fit = fit, type = "deviance")
smle_resid(y = y, d = d, x = x, fit = fit, type = "score")
```

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