

Package ‘coxphm’

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Type Package

Title Time-to-Event Data Analysis with Missing Survival Times

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Description Fits a pseudo Cox proportional hazards model that allow us to analyze time-to-event data when survival times are missing for control groups.

License GPL (>= 2)

Depends R (>= 4.2.0), survival, MASS, stats

NeedsCompilation no

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Description

Fits a pseudo Cox proportional hazards model that allow us to analyze time-to-event data when survival times are missing for control groups.

Usage

```
coxphm(time, status, trt, z, beta0=NULL, time0=NULL, s=NULL, maxiter=1000, eps=0.01)
```

Arguments

time	Right-censored survival time (time is observed if trt=1. time is not observed if trt=0.)
status	Event indicator (status=1 if event, status=0 otherwise.)
trt	Treatment (or missing) indicator: trt=1 if treatment group (or no missing), trt=0 if control group (missing survival time).
z	Predictors (vector or matrix).
beta0	Initial value of regression parameters. (If beta0=NULL, estimated coefficient(s) from the logistic regression with status and z is used.)
time0	Initial value of (pseudo) survival times for trt=0. (If time=NULL, randomly selected time with replacement for trt=1 is used.)
s	Smoothed parameter. (If s=NULL, $s=1/\sqrt{qnorm(1-n^{-2})}$ *0.01 is used.)
maxiter	Number of maximim iteration.
eps	Stopping critiera.

Details

Cox's proportional hazards model is not directly used to estimate a treatment effect when survival times for subjects in the control group(s) are missing. By regarding these missing survival times as nuisance parameters, the pseudo partial likelihood function is employed, which allows us to estimate the regression and nuisance parameters simultaneously with an unspecified baseline hazard function. In the pseudo partial likelihood, the smoothed parameter s is used to approximate risk sets as cumulative normal distributions with scale parameter s . Choosing a sufficient small s ensures that the pseudo partial likelihood is a good approximation of the partial likelihood. It is important to choose the initial value as close to the true value as possible. The estimated pseudo survival times range between 0 and T_{max} , where T_{max} is the maximum value of observed survival times for the treatment group.

Value

conv	Algorithm convergence: yes or not.
beta	Estimated regression parameter(s): beta: estimated coefficient, se: standard error; lcl: lowr confidence limit, ucl: upper confidence limit, statistics: test statistics; pvalue: pvalue.
eta	Estimated pseudo survival time.
loglik	Log pseudo-partial-likelihood value.
iter	Number of iterations.

Author(s)

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References

Proportional hazards model when time-origin is not identifiable for control group (in-progress)

Examples

```
#Mayo's pbc dataset from the survival package.
pbc1=pbc[1:200,] #first 200 patients

time=pbc1$time
status=pbc1$status
status[which(status==1)]=0 #transplant
status[which(status==2)]=1 #death

trt=pbc1$trt
trt[which(trt==2)]=0 #0 for placebo, 1 for treatment

age=pbc1$age
z=cbind(trt,age)
colnames(z)=c("trt", "age")

#0. Cox model
fit0=coxph(Surv(time,status)~z)

#1. Pseudo-Cox model
#1.1. initial value
beta0=fit0$coefficients
time0=time[which(trt==0)]

#1.2. Survival times are missing if trt=0
time[which(trt==0)]=NA

#1.3. fits pseudo-Cox
fit1=coxphm(time, status, trt=trt, z=z, beta0=beta0, time0=time0)

#2. Cox vs pseudo-cox (almost identical)
print(summary(fit0)$coefficient)
print(fit1$beta)
print(time0-fit1$eta)

#3. Subsequent analyses after fitting pseudo-cox
time[which(trt==0)]=fit1$eta
survfit(Surv(time,status)~trt) #Kaplan-Meiere
survdif(Surv(time,status)~trt)#Log-rank test
```

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