Package 'GFabs'

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Type Package

Title GFabs

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Description Variable selection for high dimensional varying coefficient smoothed partial rank estimator. The B-splines are used to approximate varying coefficient function. Group Lasso penalty is used to generate a sparse solution.

License GPL (>= 2)

Imports splines, Matrix

Repository github

Encoding UTF-8

LazyData true

RoxygenNote 7.0.2

R topics documented:

`GFabs` *A Group Forward and Backward Stagewise (GFabs) algorithm for Group penalized problem.*

Description

A Group Forward and Backward Stagewise (GFabs) algorithm for Group penalized problem.

Usage

```
GFabs(
  W,
  y,
  group,
  status = NULL,
  sigma = NULL,
  weight = NULL,
  model = c("spr", "square", "cox", "logistic"),
  back = TRUE,
  stoping = TRUE,
  eps = 0.01,
  xi = 10^-6,
  iter = 10^4,
  lambda.min = NULL
)
```

Arguments

W	The design matrix.
y	The survival outcome.
group	The grouping vector.
status	The censoring indicator.
sigma	The smoothing parameter in SPR.
weight	The weight vector of groups.
model	The loss function used.
back	The indicator of whether to take backward steps.
stoping	The indicator of whether to stop iteration when lambda is less than lambda.min.
eps	The step size for GFabs.
xi	The threshhold for GFabs.
iter	The maximum number of outer-loop iterations allowed.
lambda.min	The smallest value for lambda, as a fraction of lambda.max.

Value

A list.

- Beta - The standardized estimation of covariates.
- beta - The optimal standardized estimation of covariates.
- lambda - Lambda sequence.
- direction - Direction of GFabs.
- active - Active set for each step.
- iter - Iterations.
- BIC - The bic for each solution.
- group - The grouping vector.
- opt - Position of the optimal tuning based on BIC.

Examples

```
library(mvtnorm)
sigma = outer(1:20, 1:20, FUN = function(x, y) 0.3^(abs(x - y)))
x     = rmvnorm(100, mean = rep(0,20), sigma = sigma)
b     = c(5, -5, 5, -5, rep(0, 16))
error = c(0.7*rnorm(100)+0.3*rcauchy(100))
y     = x %*% b + error
group = seq(1, 20)
fit   <- GFabs(x, y, group)
```

GFabs_vc *A Group Forward and Backward Stagewise (GFabs) algorithm for Group penalized varying coefficient problem.*

Description

A Group Forward and Backward Stagewise (GFabs) algorithm for Group penalized varying coefficient problem.

Usage

```
GFabs_vc(
  X,
  y,
  u,
  status = NULL,
  sigma = NULL,
  weight = NULL,
  bs.df = 5,
  bs.degree = 3,
  model = c("spr", "square", "cox", "logistic"),
  back = TRUE,
  stoping = TRUE,
  eps = 0.01,
  xi = 10^-6,
  iter = 10^4,
  lambda.min = NULL,
  design = FALSE
)
```

Arguments

X	The covariates matrix.
y	The survival outcome.
u	The expose variable.
status	The censoring indicator.
sigma	The smoothing parameter for SPR.
weight	The weight vector of groups.
bs.df	The degree of freedom of B-splines.

bs.degree	The degree of the B-splines.
model	The loss function used.
back	The indicator of whether to take backward steps.
stoping	The indicator of whether to stop iteration when lambda is less than lambda.min.
eps	The step size for GFabs.
xi	The threshhold for GFabs.
iter	The maximum number of outer-loop iterations allowed.
lambda.min	The smallest value for lambda, as a fraction of lambda.max.
design	The indicator of whether to return the design matrix after spline expansion.

Value

A list.

- W - The design matrix after spline expansion.
- theta - estimation of the new design matrix W.
- beta - The optimal standardized estimation of covariates.
- lambda - Lambda sequence.
- direction - Direction of GFabs.
- active - Active set for each step.
- iter - Iterations.
- BIC - The bic for each solution.
- group - The grouping vector.
- opt - Position of the optimal tuning based on BIC.
- phi - The spline basis.

Examples

```
library(mvtnorm)
sigma = outer(1:20, 1:20, FUN = function(x, y) 0.3^(abs(x - y)))
x     = rmvnorm(100, mean = rep(0,20), sigma = sigma)
u     = runif(100)
b     = cbind(5*sin(2*pi*u), 5*cos(2*pi*u), 5, -5, matrix(0, 100, 16))
error = c(0.7*rnorm(100)+0.3*rcauchy(100))
y     = rowSums(x * b) + error
fit   <- GFabs_vc(x, y, u)
```

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standard *Within group standardization*

Description

Within group standardization

Usage

```
standard(W, group)
```

Arguments

W	A matrix.
group	The grouping vector.

Value

A list

- xx - The standardized matrix.
- center - The colmeans of the original matrix.
- scale - A list whose i^th element is the transformation matrix of the i^th group.

Examples

```
W = matrix(rnorm(200), 10, 20)
group <- rep(c(1:10), each = 2)
W_tilde <- standard(W, group)
```

Index