Package ‘pass’

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Type Package

Title Prediction and Stability Selection of Tuning Parameters

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Author Yixin Fang, Wei Sun, Junhui Wang

Maintainer Yixin Fang <yixin.fang@nyumc.org>

Description To implement two methods, Kappa and PASS, for selecting tuning parameters in regularized procedures such as LASSO, SCAD, adaptive LASSO, aiming for variable selection in regularized regression

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LazyLoad yes

Depends R (>= 2.10.0), MASS, lars, ncvreg

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agreeNtwosets

Agreement of Two Subsets

Description
To calculate Cohen’s Kappa coefficients of two subsets

Usage
agreeNtwosets(aset1, aset2, p.tot)

Arguments
aset1 The first subsets
aset2 The second subsets
p.tot The total number of variables

Value
ratio The Kappa coefficient of the input two subsets

References

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cvNtwosets

Two-fold Cross-Validation

Description
To calculate two-fold cross-validation based on a random splitting

Usage
cv.twosets(data1, beta1.hat, data2, beta2.hat)

Arguments
data1 The first subsample
beta1.hat The sparse solution obtained from the first subsample
data2 The second subsample
beta2.hat The sparse solution obtained from the second subsample

Value
cv.value The two-fold cross-validation value.
Description

To perform two methods, Kappa and PASS, for selecting tuning parameters in regularized procedures such as LASSO, SCAD, and adaptive LASSO

Usage

```r
pass(data, base = "LASSO", lambda.grid=NULL, num.grid=20, num.split = 20, alpha = 0.1)
## S3 method for class 'pass'
print(x, ...)
## S3 method for class 'pass'
plot(x, ...)
```

Arguments

- `data`: It is an n by (p+1) matrix, where the first p columns form the design matrix and the last column is response vector.
- `base`: It is the base procedure used for variable selection. Three choices of base are "LASSO", "SCAD", and "aLASSO".
- `lambda.grid`: It is a vector consisting of the values of tuning parameter lambda to be evaluated. If lambda.grid=NULL, a grid of lambda's will be decided automatically, with specified number of lambda's to be considered.
- `num.grid`: It is the number of lambda's to be considered, where a grid of lambda's is decided manually or automatically. The default value is 20.
- `num.split`: It is the number of random half-half splittings. The default value is 20.
- `alpha`: It is the threshold only used for the Kappa selection method. It is not a tuning parameter. The default value is 0.1.
- `x`: This is the output object of class "pass" to be used in print.pass and plot.pass.
- `...`: Not used.

Details

Because the data matrix will be centerized so that the column means are zero, there is no need an intercept column in the data matrix. Function print.lass(x) prints the two estimated optimal values of tuning parameter lambda and function plot.lass(x) plots the two tuning parameter selection processes, where x is the output of function pass.
Value

**pass.values**  The values evaluated over lambda.grid using the PASS criterion. A curve based on these values can be drawn using function `plot.pass`. The maximum point is selected as the estimated optimal value for the tuning parameter lambda.

**kappa.values**  The values evaluated over lambda.grid using the Kappa criterion. A curve based on these values can be drawn using function `plot.pass`. The maximum point (adjusted for the threshold alpha) is selected as the estimated optimal value for the tuning parameter lambda.

**lambda.pass**  The estimated optimal value for the tuning parameter lambda using the PASS criterion

**lambda.kappa**  The estimated optimal value for the tuning parameter lambda using the Kappa criterion (adjusted for the threshold alpha)

**beta.pass**  The estimated coefficients using selected lambda by the PASS criterion

**beta.kappa**  The estimated coefficients using selected lambda by the Kappa criterion (adjusted for the threshold alpha)

**subset.pass**  The selected submodel by the PASS criterion

**subset.kappa**  The selected submodel by the Kappa criterion (adjusted for the threshold alpha)

Author(s)

Yixin Fang, Wei Sun, Junhui Wang

References


Examples

```r
library(MASS)
library(lars)
library(ncvreg)

beta=c(3,1.5,0,0,2,0,0,0)
p=8
n=100
sigma=1
rho=0.5

set.seed(100)
x=matrix(0, n, p)
x[,1]<-rnorm(n, 0, 1)
for (i in 2:p) x[,i]<-rho*x[,i-1]+sqrt(1-rho^2)*rnorm(n, 0, 1)
y=x%*%beta+sigma*sqrt(1-rho)*x+rnorm(n, 0, 1)
data<-cbind(x,y)
```
lambda.grid=10^seq(-2,2,length=20)
results<-pass(data=data, base="LASSO", lambda.grid=lambda.grid, num.grid=20, num.split=20)
print(results)
plot(results)
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