Package 'MaximinInfer'

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Type Package

Title Inference for Maximin Effect in high-dimensional settings

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Description Provides functionality for the paper. The function is used to compute the bias corrected estimator of ridge-penalized maximin effect and the point estimator of its linear contrast. It also constructs the confidence interval for the linear contrast.

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Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

Suggests knitr,
rmarkdown

VignetteBuilder knitr

Imports MASS,
stats,
scalreg,
flare

Depends CVXR,
glmnet,
intervals,
SIHR

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infer *Maximin Inference*

Description

'infer' is a generic function for inference for Maximin model.

Usage

```
infer(object, ...)
```

Arguments

object	a "Maximin" object
...	additional arguments affecting inference

infer.Maximin *Inference method for Maximin*

Description

Point estimator and Confidence interval based on Maximin object

Usage

```
## S3 method for class 'Maximin'
infer(object, gen.size = 500, delta = -1, threshold = 2, alpha = 0.01, ...)
```

Arguments

object	Object of class inheriting from "Maximin"
gen.size	The generated sample size
delta	The ridge penalty. If set as negative value, the penalty is decided data-dependently. (Default = -1)
threshold	Should generated samples be filter or not? If 0, do not filter; if 1, use chi-square threshold to filter; if 2, use normal threshold to filter. (Default = 2)
alpha	confidence value to select generated samples
...	further arguments passed

Value

delta	The ridge penalty used
weight	The weight vector for groups, of length L
point	The point estimator of the linear contrast
mm.effect	The aggregated maximin effect (coefficients), of length p or $p+1$
CI	Confidence interval for the linear contrast

Examples

```
## number of groups
L=2
## dimension
p=500
## sample size for each group of source data
ns.source = c(500, 400)
## sample size for target data
n.target=1000

A1gen <- function(rho,p){
  A1=matrix(0,p,p)
  for(i in 1:p){
    for(j in 1:p){
      A1[i,j]<-rho^(abs(i-j))
    }
  }
  return(A1)
}
## mean vector
mean.source = rep(0, p)
mean.target = rep(0, p)
## covariate shifts
cov.source = A1gen(0.6, p)
cov.target = diag(p)
## true coefficients
Bs = matrix(0, p, L)
Bs[1:10,1] = seq(1:10)/40
Bs[1:10,2] = -seq(1:10)/40
## Data
X.source = MASS::mvrnorm(sum(ns.source), mu=mean.source, Sigma=cov.source)
X.target = MASS::mvrnorm(n.target, mu=mean.target, Sigma=cov.target)
idx.source = rep(1:L, times=ns.source)
Y.source = rep(0, sum(ns.source))
for(l in 1:L){
  idx.l = which(idx.source==l)
  Y.source[idx.l] = X.source[idx.l, ] %*% Bs[,l] + rnorm(ns.source[l])
}
loading = rep(0, p)
loading[1:5] = 1
mm <- Maximin(X.source, Y.source, idx.source, loading, X.target, covariate.shift = TRUE)
mmInfer <- infer(mm, gen.size=100, delta=0)
```

`Maximin` *Class Maximin*

Description

Class Maximin

Usage

```
Maximin(
```

```
  X.source,
  Y.source,
  idx.source,
  loading,
  X.target = NULL,
  cov.target = NULL,
  covariate.shift = TRUE,
  lam.value = c("CV", "CV.min", "scalreg", "slim"),
  intercept = TRUE,
  intercept.loading = FALSE
)
```

Arguments

X.source	Design matrix for source data, of dimension $n.source$ x p
Y.source	Outcome vector for source data, of length $n.source$
idx.source	Indicator vector of groups for source data, of length $n.source$
loading	Loading, of length p
X.target	Design matrix for target data, of dimension $n.target$ x p (default = 'NULL')
cov.target	Covariance matrix for target data, of dimension p x p. If set as 'NULL', 'cov.target' is unknown. (default = 'NULL')
covariate.shift	Covariate shifts or not between source and target data (default = 'TRUE")
lam.value	The method to be used to obtain each group's intial estimator
intercept	Should intercept be fitted for the initial estimator (default = 'TRUE')
intercept.loading	Should intercept be included for the loading (default = 'FALSE')

Value

'Maximin' returns an object of class "Maximin". The function 'infer' is used to do further inference.\ An object of class "Maximin" is a list containing the following components.

Gamma.prop	The proposed debiased Weight matrix
Coef.est	The initial estimators for each group
Point.vec	The point estimator for each group
L	The number of groups
gen.mu	The mean vector for sampling method
gen.Cov	The variance matrix for sampling method

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