

Package ‘gfiUltra’

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Title Generalized Fiducial Inference for Ultrahigh-Dimensional Regression

Version 1.0.0

Description Variable selection for ultrahigh-dimensional (“large p small n”) linear Gaussian models using a fiducial framework allowing to draw inference on the parameters. Reference: Lai, Hannig & Lee (2015) <doi:10.1080/01621459.2014.931237>.

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Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

Depends R (>= 3.5.0)

Imports SIS, stats, utils, lazyeval, mvtnorm

URL <https://github.com/stla/gfiUltra>

BugReports <https://github.com/stla/gfiUltra/issues>

NeedsCompilation no

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Repository CRAN

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R topics documented:

gfiConfInt	2
gfiEstimates	2
gfiUltra	3

Index	5
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gfiConfInt

Fiducial confidence intervals for ultrahigh-dimensional regression

Description

Fiducial confidence intervals of the selected parameters of a ultrahigh-dimensional regression.

Usage

```
gfiConfInt(gfi, conf = 0.95)
```

Arguments

gfi	an output of gfiUltra
conf	confidence level

Value

The confidence intervals in a matrix.

See Also

[gfiEstimates](#)

gfiEstimates

Fiducial estimates for ultrahigh-dimensional regression

Description

Fiducial estimates of the selected parameters of a ultrahigh-dimensional regression.

Usage

```
gfiEstimates(gfi)
```

Arguments

gfi	an output of gfiUltra
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Value

The estimates in a matrix.

See Also

[gfiConfInt](#)

gfiUltra

*Generalized fiducial inference for ultrahigh-dimensional regression***Description**

Generates the fiducial simulations of the parameters of a "large p - small n" regression model and returns the selected models with their probability.

Usage

```
gfiUltra(formula, data, nsims = 1000L, verbose = FALSE, gamma = 1, ...)
```

Arguments

formula	a formula describing the model
data	dataframe in which to search the variables of the model
nsims	number of fiducial simulations
verbose	whether to print the messages generated by the screening procedure
gamma	tuning parameter; for expert usage only
...	named arguments passed to SIS , such as <code>penalty = "lasso"</code>

Value

A list with two elements: the fiducial simulations in a matrix (`fidSims`) and a vector giving the probabilities of the selected models (`models`).

References

Randy C. S. Lai, Jan Hannig & Thomas C. M. Lee. *Generalized Fiducial Inference for Ultrahigh-Dimensional Regression*. *Journal of the American Statistical Association*, Volume 110, 2015 - Issue 510, 760-772. <doi:10.1080/01621459.2014.931237>

Examples

```
# data ####
set.seed(666L)
n <- 300L
p <- 1000L
X <- matrix(rnorm(n * p), nrow = n, ncol = p)
colnames(X) <- paste0("x", 1L:p)
beta <- c(4, 5, 6, 7, 8)
y <- X[, 1L:5L] %*% beta + rnorm(n, sd = 0.9)
dat <- cbind(y, as.data.frame(X))
# fiducial simulations ####
gfi <- gfiUltra(y ~ ., data = dat, nsims = 10000L)
# selected models
gfi$models
```

```
# fiducial confidence intervals
gfiConfInt(gfi)
# fiducial estimates
gfiEstimates(gfi)
```

Index

[gfiConfInt](#), [2](#), [2](#)
[gfiEstimates](#), [2](#), [2](#)
[gfiUltra](#), [2](#), [3](#)
[SIS](#), [3](#)