Package 'HyperCube'

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Type Package

Title Hypercube estimator

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Description Hypercube estimator, Penalized least square and more.

Imports expm,
Matrix,
MASS

LazyData true

License GPL

Suggests knitr

VignetteBuilder knitr

R topics documented:

`bye` *Bye world*

Description

Bye world

Usage

```
bye(name)
```

Arguments

`name`	characters string

Examples

```
## Say Bye!
bye("Taeyen")
```

`canonicalForm` *Canonical Form*

Description

Canonical Form

Usage

```
canonicalForm(x, y, V)
```

Arguments

`x`	vector
`y`	observations
`V`	a symmetrix matrix whoes eigenvalues all lie in [0, 1]

dental *The hardness of 120 dental fillings*

Description

A dataset containing the response measures the hardness of dental filling obtained by 5 Dentists using 8 Gold alloys and 3 Condensation methods. The objective of the experiment was to find a dental gold filling with greater hardness.

Usage

```
dental
```

Format

A data frame with 120 rows and 4 variables:

y response mesures the hardness of dental fillings

G the indice of 8 Gold alloys

C the indice of 3 Condensation methods

D the indice of 5 Dentists

Details

Seheult and Tukey (2001) analyzed a three-factor layout in which the response measures the hardness of dental fillings obtained by 5 Dentists (D) using 8 Gold alloys (G) and 3 Condensation methods (C). The objective of the experiment was to find a dental gold lling with greater hardness. Condensation, properly carried out, was known to increase the hardness of a filling. The three condensation techniques used in the experiment were: (1) electromalleting, in which blows are delivered mechanically at a steady frequency; (2) hand malleting, in which a small mallet is used to deliver blows; and (3) hand condensation. The reported hardness observations are each averages of ten measurements that are not available. It was reported anecdotally that dentist 5 appeared to be physically tired before the experiment.

Source

Seheult and Tukey (2001)

diffMatrix *Difference Matrix*

Description

Difference Matrix

Usage

```
diffMatrix(p, dth)
```

Arguments

p	number of coefficients
dth	order of difference matrix

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estRisk *Estimate Risk*

Description

Estimate Risk

Usage

```
estRisk(X, y, A, estsig)
```

Arguments

X	design matrix
y	observation
A	hypercuber operator
estsig	estimated variance

Value

The estimated risk

References

Beran, Rudolf. "Hypercube estimators: Penalized least squares, submodel selection, and numerical stability." Computational Statistics & Data Analysis 71 (2014): 654-666.

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estRiskCanonical *Estimate Risk Canonical*

Description

Estimate Risk Canonical

Usage

```
estRiskCanonical(canonicalform, estsig)
```

Arguments

canonicalform	canonical form
estsig	estimated variance

estSigma *Estimate Variance*

Description

Estimate Variance

Usage

```
estSigma(mf)
```

Arguments

mf	model frame

Value

The estimated variance

References

Beran, Rudolf. "Hypercube estimators: Penalized least squares, submodel selection, and numerical stability." Computational Statistics & Data Analysis 71 (2014): 654-666.

hello *Hello world*

Description

Hello world

Usage

```
hello(name)
```

Arguments

name	characters string

Examples

```
## Say hello!
hello("Po")
```

`hypercube` *Hypercube generic*

Description

Hypercube generic

Hypercube Estimate

Usage

```
hypercube(...)

## Default S3 method:
hypercube(X, y, V, ...)

## S3 method for class 'formula'
hypercube(formula, data, V, ...)
```

Arguments

`...`	Object to be hypercube
`X`	design matrix
`y`	observation
`V`	sysmmetric matrix whose eigenvalues all lie in [0,1]
`formula`	formula to get estimate
`data`	data you want to analysis
`...`	other optional arguments

Methods (by class)

- `default`:
- `formula`:

References

Beran, Rudolf. "Hypercube estimators: Penalized least squares, submodel selection, and numerical stability." Computational Statistics & Data Analysis 71 (2014): 654-666.

hypercubeEst *Hypercube Estimate*

Description

Hypercube Estimate

Usage

```
hypercubeEst(X, y, V, ...)
```

Arguments

X	design matrix
y	observation
V	sysmmetric matrix whose eigenvalues all lie in [0,1]
...	other optional arguments

References

Beran, Rudolf. "Hypercube estimators: Penalized least squares, submodel selection, and numerical stability." Computational Statistics & Data Analysis 71 (2014): 654-666.

hypercubeOp *Hypercube Operator*

Description

Hypercube Operator

Usage

```
hypercubeOp(X, V)
```

Arguments

X	design matrix
V	sysmmetric matrix whose eigenvalues all lie in [0,1]

References

Beran, Rudolf. "Hypercube estimators: Penalized least squares, submodel selection, and numerical stability." Computational Statistics & Data Analysis 71 (2014): 654-666.

hypercubeOptimization *Hypercube Optimization*

Description

give the component which minimizing the risk

Usage

```
hypercubeOptimization(formula, data, sigma = NULL)
```

Arguments

formula	formula
data	data
sigma	estimated variance

References

Beran, Rudolf. "Hypercube estimators: Penalized least squares, submodel selection, and numerical stability." Computational Statistics & Data Analysis 71 (2014): 654-666.

litter *Weigth gain of 61 infant rat litters*

Description

A dataset containing the (average) wight gain of an infant rat litter when the infants in the litter are nursed by a rat foster-mother

Usage

```
litter
```

Format

A data frame with 61 rows and 3 variables:

weight the (averge) weight gain of an infant rat litter

mother the genotype of the foster-mother nursing the infants

infant the genotype of the infant litter

Details

The rat litter data treated by Scheffe (1959) form an unbalnced two-way layout Each response recorded is the average weight-gain of a rat litter when the infants in the litter are nursed by a rat foster-mother. Factor1 with four levels, is the genotype of the foster-moather. Factor2 with the same levels, in the genotype of the infant litter.

The response measured in the experiment is the (average) weight gain of an infant rat litter when the infants in the litter are nursed by a rat foster-mother. Factor 1 is the genotype of the foster-mother nursing the infants. Factor 2 is the genotype of the infant litter.

Source

printed on p. 140 of H. Scheffe'ss text,comes from a Ph.D. thesis The Inheritance of Maternal Influences on the Growth of the Rat by D. W. Bailey (1953).

`modelMatrix` *Generate model matrix*

Description

generate model matrix given formula and data

Usage

```
modelMatrix(formula, data)
```

Arguments

`formula`	formula
`data`	data

`monkey` *Response of 5 different monkey-pairs*

Description

A dataset containing reports responses to a certain stimulus that were measured for 5 different monkey-pairs (the subjects) in 5 different periods under 5 different conditions

Usage

```
monkey
```

Format

A data frame with 25 rows and 4 variables:

cond the condition

monkeys the monkey pair

period the monkey pair

response responses to a certain stimulus

Source

p. 189 of Scheffes text and reformatted in monkey.RData

motor *Accelations over time*

Description

A dataset containing 133 observation of motorsycle acceleration against time in a simulated motorcycle accident. The p = 277 possible observation times constitute the vector t = (1, 2, ... , 277) Accelerations were observed at only q < p of these equally spaced time, sometimes with replication.

Usage

```
motor
```

Format

A data frame with 133 rows and 2 variables:

t possible observation times

accel acceleration against time

Source

adapted from Silverman (1985)

plsW2V *Generate V matrix*

Description

covert W matrix to V matrix

Usage

```
plsW2V(W)
```

Arguments

W	a matrix, penalized least square

polyRegMatrix *Polynomial Regression*

Description

Create V to fit polynomial submodel

Usage

```
polyRegMatrix(deg, x)
```

Arguments

deg	the highest order of polynomial
x	covariates

subX2V *Submodel function*

Description

submodel fitting

Usage

```
subX2V(X, L)
```

Arguments

X	design matrix
L	coefficients of linear combination of columns of X

vineyard *Prices of 50,000 round cut diamonds.*

Description

A dataset containing records the grape yield harvested in each row of a vinyard in three succes years

Usage

```
vineyard
```

Format

A data frame with 52 rows and 4 variables:

row the vineyard row number

year1 reporting the harvest yield in first year

year2 reporting the harvest yield in second year

year3 reporting the harvest yield in third year

Source

vineyard

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