Package 'QCSIS'

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Type Package

Title Sure Independence Screening via Quantile Correlation and Composite Quantile Correlation

Version 0.1

Date 2015-12-02

Author Xuejun Ma, Jingxiao Zhang, Jingke Zhou

Maintainer Xuejun Ma <yinuoyumi@163.com>

Description
Quantile correlation-sure independence screening (QC-SIS) and composite quantile correlation-sure independence screening (CQC-SIS) for ultrahigh-dimensional data.

License GPL-2

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Author(s)

Xuejun Ma, Jingxiao Zhang, Jingke Zhou

Maintainer: Xuejun Ma <yinuoyumi@163.com>

References

Xuejun Ma and Jingxiao Zhang. Robust model-free feature screening via quantile correlation. Journal of Multivariate Analysis. Online, 2015.

Xuejun Ma et al.. Robust feature screening via composite quantile correlation learning. In submission.

cqc *Composite Quantile Correlation*

Description

cqc is used to compute the composite quantile correlation.

Usage

```
cqc(x, y)
```

Arguments

x	The covariate variable.
y	The response variable.

Value

cqc	The value of composite quantile correlation.

Author(s)

Xuejun Ma, Jingxiao Zhang, Jingke Zhou

References

Xuejun Ma et al.. Robust feature screening via composite quantile correlation learning. In submission.

Examples

```
x <- rnorm(100)
y <- rnorm(100)
cqc(x = x, y = y)
```

CQCSIS *Compsote Quantile Correlation-Sure Independence Screening (CQC-SIS)*

Description

The function implemrnts the composite quantile correlation-sure independence screening (CQC-SIS).

Usage

```
CQCSIS(x, y, d)
```

Arguments

x	The design matrix, of dimensions n * p, without an intercept.
y	The response vector of dimension n * 1.
d	The tuning parameter used to covarites had significant effect on the response variable, such as [n/log(n)], or n-1.

Value

w	The estimate of w.
M	The subscript of x recuited by CQC-SIS.

Author(s)

Xuejun Ma, Jingxiao Zhang, Jingke Zhou

References

Xuejun Ma et al.. Robust feature screening via composite quantile correlation learning. In submission.

Examples

```
n <- 20
p <- 200
x <- matrix(rnorm(n * p), n, p)
e <-  rnorm(n, 0, 1)
beta1 <- 3 - runif(1)
beta2 <- 3 - runif(1)
beta3 <- 3 - runif(1)
y <- beta1 * x[, 1] + beta2 * x[, 2] + beta3 * x[, 3] + e
d <- 19
fit.CQCSIS <- CQCSIS(x = x, y = y, d = d)
fit.CQCSIS$M
```

qc *Quantile Correlation*

Description

qc is used to compute the quantile correlation with given quantiles.

Usage

```
qc(x, y, tau)
```

Arguments

x	The covariate variable.
y	The response variable.
tau	The quantile(s) to be estimated.

Value

tau	The quantile(s).
rho	The value of quantile correlation.

Author(s)

Xuejun Ma, Jingxiao Zhang, Jingke Zhou

References

Li et al.. Quantile correlations and quantile autoregressive modeling. Journal of the American Statistical Association,2015,110(509):246–261.

Examples

```
n   <- 1000
x   <- rnorm(n)
y   <- 2 * x + rt(n,df = 1)
tau <- 1:9 / 10
qc(x = x, y = y, tau = tau)
```

QCSIS *Quantile Correlation-Sure Independence Screening (QC-SIS)*

Description

The function implemrnts the quantile correlation-sure independence screening (QC-SIS).

Usage

```
QCSIS(x, y, tau, d)
```

Arguments

x	The design matrix, of dimensions n * p, without an intercept.
y	The response vector of dimension n * 1.
tau	The quantile(s) to be estimated. By default, tau=1:(n-1)/n.
d	The tuning parameter used to covarites had significant effect on the response variable, such as [n/log(n)],or n-1

Value

w	The estimate of w.
M	The subscript of x recuited by QC-SIS.

Author(s)

Xuejun Ma, Jingxiao Zhang, Jingke Zhou

References

Xuejun Ma and Jingxiao Zhang. Robust model-free feature screening via quantile correlation. Journal of Multivariate Analysis. Online, 2015.

Examples

```
n <- 20
p <- 200
r <- 0.05
x <- matrix(rnorm(n * p), n, p)
e <- rnorm(n, 0, 1)
inde <- sample(n, r * n)
x[inde, 1] <- 2 * sqrt(rchisq(r * n, df = p))
y <- 5 * x[, 1] + 5 * x[, 2] + 5 * x[, 3] + e
d <- 19
fit.QCSIS <- QCSIS(x = x, y = y, d = d)
fit.QCSIS$M
```

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