

# 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

**URL** <http://www.r-project.org>

**NeedsCompilation** no

**Repository** CRAN

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QCSIS-package	<i>Sure Independence Screening via Quantile Correlation and Composite Quantile Correlation</i>
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## Description

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

## Details

Package: QCSIS  
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QCSIS	Quantile Correlation-Sure Independence Screening (QC-SIS)
QCSIS-package	Sure Independence Screening via Quantile Correlation and Composite Quantile Correlation
cqc	Composite Quantile Correlation
qc	Quantile Correlation

## 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.

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cqc	<i>Composite Quantile Correlation</i>
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**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.
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**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)
```

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

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### Description

The function implements 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  $x$  recruited 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
```

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qc	<i>Quantile Correlation</i>
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**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)
```

**Description**

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

**Usage**

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

**Arguments**

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

**Value**

<code>w</code>	The estimate of $w$ .
<code>M</code>	The subscript of $x$ recruited 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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