Package ‘robcor’

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Type Package

Title Robust Correlations

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Description Robust pairwise correlations based on estimates of scale, particularly on ``FastQn'' one-step M-estimate.

Suggests MASS, robustbase, sfsmisc

Depends R (>= 2.10.0), stats

License GPL (>= 2)

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Description

Compute the robust scale estimator FastQn, an efficient alternative to the MAD, a fast alternative to the Qn.

Usage

FastQn(x, center = median(x), scale = mad(x, center))

fqn(x, center = median(x), scale = mad(x, center))

s_FastQn(x, mu.too = FALSE, center = median(x), ...)  

Arguments

x          numeric vector of observations.
center    optionally, the center: defaults to the median.
scale      optionally, the basic scale: defaults to the median absolute deviation.
mu.too   logical indicating if the center should also be returned for s_FastQn().
...       potentially further arguments for s_FastQn() passed to FastQn().

Details

This function computes one-step M-estimate of scale based on provided robust estimate (defaults to the MAD). It gives 50% breakdown point and Gaussian efficiency about 80%.

The fqn function is a shorter alias, like sd and mad.

Value

FastQn() returns a number, the FastQn robust scale estimator.

s_FastQn(x, mu.too=TRUE) returns a length-2 vector with location and scale; this is typically only useful for covOGK(*, sigmamu = s_FastQn) or robcor(*, scaler = s_FastQn).

Author(s)

Paul Smirnov <s.paul@mail.ru>

References

psdcor

See Also

mad, Qn.

Examples

```
set.seed(153)
x <- sort(c(rnorm(80), rt(20, df = 1)))
s_FastQn(x, mu too=TRUE)
FastQn(x)
```

---

**psdcor**  
*Positive Semidefinite Correlation Matrix Correction*

**Description**

Correct pseudo-correlation matrices to make them positive semidefinite ones.

**Usage**

```
psdcor(m, method = c("higham", "eigen"), ...)
```

**Arguments**

- `m`  
  pseudo-correlation matrix to correct.
- `method`  
  optionally, correction method to use.
- `...`  
  potentially further arguments for the particular correction method.

**Details**

This function applies transformation to the given matrix in order to make it positive semidefinite correlation matrix.

When method is `higham`, use Higham projections algorithm via `nearPD()` function.

When method is `eigen`, use direct eigenvalues correction via `posdefify()` function.

**Value**

The corrected matrix.

**Author(s)**

Paul Smirnov <s.paul@mail.ru>
robacf

Robust Autocovariance and Autocorrelation Function Estimation

Description

Compute (and by default plot) an estimate of the autocovariance or autocorrelation function.

Usage

robacf(x, lag.max = NULL, type = c("correlation", "covariance"), plot = TRUE,
       scaler = "s_FastQn", ...)

Arguments

x a univariate numeric time series object or a numeric vector.
lag.max maximum lag at which to calculate the acf. Default is \(10 \times \log_{10}(N)\) where \(N\) is the number of observations. Will be automatically limited to one less than the number of observations in the series.
type character string giving the type of acf to be computed. Allowed values are "correlation" (the default) or "covariance".
plot logical. If TRUE (the default) the acf is plotted.
scaler location-scale estimator to use in the algorithm. By default, \(s_{FastQn}\) is used.
... further arguments to be passed to \(plot.acf\).

Details

This function is a robust replacement for \(acf()\).

Note, that implementation and documentation is not finished/polished yet.

Value

A list of class "acf". For description of elements see \(acf()\).

Note

WORK-IN-PROGRESS status.

Author(s)

Paul Smirnov <s.paul@mail.ru>

References

Description
Fit an autoregressive time series model to the data using robust algorithms.

Usage
robar(x, order = 2, scaler = "s_FastQn")

Arguments
- x: a univariate time series.
- order: an order of model to fit.
- scaler: location-scale estimator to use in the algorithm. By default, s_FastQn() is used.

Details
This function is a robust replacement for ar().
Note, that implementation and documentation is not finished/polished yet.

Value
A list of class "ar". For description of elements see ar().

Note
WORK-IN-PROGRESS status.

Author(s)
Paul Smirnov <s.paul@mail.ru>

References

Examples
n <- 100
set.seed(361)
eps <- as.ts(rnorm(n))
x <- arima.sim(list(ar=c(1,-0.9)), n, innov=eps) # basic signal
z <- as.ts(rbinom(n, 1, 0.1) * rnorm(n, sd=10)) # noise
y <- x + z
spec.ar(robar(y, order=2))
**robcor**

*Robust Pairwise Correlations.*

**Description**

Compute a robust estimate of the correlation coefficient or correlation matrix via pairwise correlations.

**Usage**

```r
robcor(x, y = NULL, method = c("ssd", "quadrant", "mcd"), partial = FALSE, 
       post = "psdcor", scaler = "s_FastQn", regress = "lmrob")
```

**Arguments**

- `x` a numeric vector, matrix or data frame.
- `y` NULL (default) or a vector, matrix or data frame with compatible dimensions to `x`. The default is equivalent to `y = x` (but more efficient).
- `method` a character string indicating which correlation coefficient is to be computed.
- `partial` logical. Should a partial correlation algorithm be used?
- `post` function to apply after the matrix is built or NULL. By default, positive semidefinite correction is applied (`psdcor()`).
- `scaler` function to use as a location-scale estimator in "ssd" method. By default, `s_FastQn()` is used.
- `regress` function to use as a regression estimator in partial correlations algorithm. By default, `lmrob()` is used.

**Details**

This function is a robust replacement for `cor()`.

Note, that implementation and documentation is not finished/polished yet.

**Value**

Either a single correlation coefficient or a correlation matrix estimate.

**Note**

WORK-IN-PROGRESS status.

**Author(s)**

Paul Smirnov <s.paul@mail.ru>
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