Package 'tslars'

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Type Package

Title Least angle regression for time series analysis

Version 1.0

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Author Sarah Gelper

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Description This package will help you to carry out a time series LARS analysis.

License GPL

LazyLoad yes

Repository CRAN

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NeedsCompilation no

R topics documented:

`tslars-package` *The tslars package performs variable selection for high-dimensional linear time series models.*

Description

The tslars packages applies a dynamic variable selection procedure. It is an extension of the LARS algorithm of Efron et al (2004) which is designed for time series analysis. It provides a ranking of the predictors and a selection of which predictors to include in the final model as well as a selection of the appropriate lag length.

Details

Package:	tslars
Type:	Package
Version:	1.0
Date:	2009-02-06
License:	gpl
LazyLoad:	yes

The most improtant functions are `tslars` and `tslars.p`.

Author(s)

Sarah Gelper Maintainer: Sarah Gelper <gelper@ese.eur.nl>

References

Gelper, S. and Croux, C. (2009) Time series least angle regression for selecting predictive economic sentiment series. www.econ.kuleuven.be/sarah.gelper/public

`design` *Function to create a design matrix.*

Description

Given the lag length and the forecast horizon, the design-function will build the appropriate design matrix, which can then be used in a regression analysis.

Usage

```
design(x = NULL, y, p, h, ary = FALSE)
```

Arguments

x	the matrix of predictors
y	the vector of the response
p	the lag length
h	the forecast horizon
ary	logical, in ary=T, the design matrix corresponds to that of an autoregressive model.

Value

The design-function returns an appropriate matrix that can be used to fit a time series regression model. It includes laggen values of the response y and of all predictors in x up to lag p.

Author(s)

Sarah Gelper

Examples

```
y <- rnorm(100)
x <- matrix(rnorm(300),ncol=3)
designmatrix <- design(x,y,p=2,h=1,ary=FALSE)
```

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minindexmatrix *Function that returns the row and column where the matrix reaches its minimum*

Description

To find the row and column where a matrix reaches its minimum.

Usage

```
minindexmatrix(x)
```

Arguments

x	A matrix

Value

A vector of length two is returned, of which the first (second) element indicates at which row (column) the matrix x reaches its minimum.

Author(s)

Sarah Gelper

See Also

which.min

Examples

```
a <- matrix(rnorm(20),ncol=4)
m <- minindexmatrix(a)
```

Rsquared *Compute R^2*

Description

Function that returns an Rsquared of a linear OLS regression without intercept.

Usage

```
Rsquared(x, y)
```

Arguments

x	the matrix of predictors
y	the vector of the response

Value

The R^2 of regression y on x.

Author(s)

Sarah Gelper

Examples

```
y <- rnorm(100)
x <- matrix(rnorm(300),ncol=3)
Rsq <- Rsquared(x,y)
```

`tslars` *Function to obtain the selected model accoring the the time series LARS algorithm*

Description

The `tslars` function applies a dynamic variable selection procedure. It is an extension of the LARS algorithm of Efron et al (2004) which is designed for time series analysis. It provides a ranking of the predictors and a selection of which predictors to include in the final model as well as a selection of the appropriate lag length.

Usage

```
tslars(formula, h = 1, p.max = 5, max.x = 10, nr.rank = NA)
```

Arguments

`formula`	a formula describing the model to be fitted
`h`	the forecast horizon, defaults to 1.
`p.max`	the maximal number of lags to allow, defaults to 5.
`max.x`	the maximal number of predictors to include in the final model, defaults to 10.
`nr.rank`	the number of predictors to be ranked. This is especially interesting if the total number of predictors is really large.

Value

A `tslars`-object is returned, for which `print()`, `summary()`, `predict()` and `coef()` are available. An object of class "lm" is a list containing the following components:

`active`	the active set, a vector giving the TS-LARS ordering of the predictors, '0' indicates lagged values of the response.
`fixedp`	indicates whether the lag length was prespecified (`TRUE`) or not (`FALSE`).
`laglength.opt`	if `fixedp` is `TRUE`, the prespecified lag length. If `fixedp` is `FALSE`, the optimal lag length selected according to BIC.
`nrvar.opt`	the optimal number of predictors to include in the final model, according to the BIC.
`bic`	the BIC values for the nested models.
`h`	the forecast horizon used.
`call`	the matched call.
`response`	the response used.
`predictors`	the predictors used.

Author(s)

Sarah Gelper

References

Gelper, S. and Croux, C. (2009) Time series least angle regression for selecting predictive economic sentiment series. www.econ.kuleuven.be/sarah.gelper/public

Examples

```
n <- 100
m <- 10 #m>5
x <- matrix(rnorm(n*m), ncol=m)
coefs <- c(rep(1,5),rep(0,m-5))
y <- c(rnorm(1),crossprod(t(x[1:(n-1),]),coefs) + rnorm(n-1))

mytslars <- tslars(y~x)
summary(mytslars)
# To obtain an h-step-ahead prediction of the response using the selected model fitted by OLS:
myprediction <- predict(mytslars)
```

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