Package ‘cols’

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Type Package

Title Constrained Ordinary Least Squares

Version 1.1

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Depends R (>= 4.0)

Imports quadprog, Rfast2

Description Constrained ordinary least squares is performed. One constraint is that all beta coefficients (including the constant) cannot be negative. They can be either 0 or strictly positive. Another constraint is that the sum of the beta coefficients equals a constant. References: Hansen, B. E. (2022). Econometrics, Princeton University Press. <ISBN:9780691235899>.

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R topics documented:

`cols-package` *Constrained Ordinary Least Squares*

Description

Constrained ordinary least squares is performed. One constraint is that all beta coefficients (including the constant) cannot be negative. They can be either 0 or strictly positive. Another constraint is that the sum of the beta coefficients equals a constant. References: Hansen, B.E. (2022). Econometrics, Princeton University Press.

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Author(s)

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References

Hansen, B. E. (2022). Econometrics, Princeton University Press.

`Constrained least squares` *Constrained least squares*

Description

Constrained least squares.

Usage

```
cls(y, x, R, ca)
```

Arguments

`y`	The response variables, a numerical vector with observations.
`x`	A matrix with independent variables, the design matrix.
`R`	The R vector that contains the values that will multiply the beta coefficients. See details and examples.
`ca`	The value of the constraint, $R^T \beta = c$. See details and examples.

Details

This is described in Chapter 8.2 of Hansen (2019). The idea is to inimise the sum of squares of the residuals under the constraint $R^T \beta = c$. As mentioned above, be careful with the input you give in the x matrix and the R vector.

Value

A list including:

`bols`	The OLS (Ordinary Least Squares) beta coefficients.
`bcls`	The CLS (Constrained Least Squares) beta coefficients.

Author(s)

Michail Tsagris.

R implementation and documentation: Michail Tsagris `<mtsagris@uoc.gr>`.

References

Hansen, B. E. (2022). Econometrics, Princeton University Press.

See Also

`pls`

Examples

```
x <- as.matrix( iris[1:50, 1:4] )
y <- rnorm(50)
R <- c(1, 1, 1, 1)
cls(y, x, R, 1)
```

`Positively constrained least squares`
Positively constrained least squares

Description

Positively constrained least squares.

Usage

```
pls(y, x)
```

Arguments

`y`	The response variables, a numerical vector with observations.
`x`	A matrix with independent variables, the design matrix.

Details

The constraint is that all beta coefficients (including the constant) are positive.

Value

A list including:

`be`	The positively constrained beta coefficients.
`mse`	The mean squared error.

Author(s)

Michail Tsagris.

R implementation and documentation: Michail Tsagris <`mtsagris@uoc.gr`>.

See Also

`cls`

Examples

```
x <- as.matrix( iris[1:50, 1:4] )
y <- rnorm(50)
pls(y, x)
```

`Positively constrained least squares with a multivariate response`
Positively constrained least squares with a multivariate response

Description

Positively constrained least squares with a multivariate response.

Usage

```
mvpls(y, x)
```

Arguments

`y`	The response variables, a numerical matrix with observations.
`x`	A matrix with independent variables, the design matrix.

Details

The constraint is that all beta coefficients (including the constant) are positive.

Value

A list including:

`be`	The positively constrained beta coefficients.
`mse`	The mean squared error.

Author(s)

Michail Tsagris.

R implementation and documentation: Michail Tsagris <mtsagris@uoc.gr>.

See Also

`cls`

Examples

```
y <- as.matrix( iris[, 1:2] )
x <- as.matrix( iris[, 3:4] )
mvpls(y, x)
```

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