Package ‘wqs’

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Type Package
Title Weighted Quantile Sum Regression
Version 0.0.1
Date 2015-10-05
Author Jenna Czarnota, David Wheeler
Maintainer Jenna Czarnota <jennaczarnota@gmail.com>
Description Fits weighted quantile sum regression models, calculates weighted quantile sum index and estimated component weights.
Depends R (>= 3.2.1)
Imports Rsolnp, glm2
License GPL (>= 2)
LazyLoad yes
NeedsCompilation no
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Description

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Details

The DESCRIPTION file:

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License: GPL (>=2)
LazyLoad: yes

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WQSdata Simulated data to test WQS
wqs-package Weighted Quantile Sum Regression
wqs.est Weighted Quantile Sum Regression

This package performs weighted quantile sum (WQS) regression, by fitting a WQS regression model for a continuous outcome variable. The components (e.g. chemicals) to be combined into an index are scored into quantiles and then used in the estimation of empirically derived weights and a final WQS index through bootstrap sampling. The weights are constrained to sum to 1 and be between 0 and 1, and can be used to identify important (highly weighted) components and those with no association with outcome (components receiving zero or negligible weight). Inference is constrained in a single direction and the index is interpretable as a measure of the mixture effect.

Author(s)

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References


Examples

data(WQSdata)
y.train <- WQSdata[,\'y\']
x.train <- WQSdata[,\'-10\']
output <- wqs.est(y.train, x.train, B = 10)

wqs.est  Weighted Quantile Sum Regression

Description

This function fits a weighted quantile sum regression model.

Usage

wqs.est(y.train, x.train, z.train = NULL, y.valid = y.train, x.valid = x.train, z.valid = z.train, n.quantiles = 4, B = 100, b1.pos = TRUE)

Arguments

- **y.train**: vector of the continuous explanatory variable from training data
- **x.train**: matrix of explanatory variables (to be combined into an index) from training data
- **z.train**: vector or matrix of covariates from training data
- **y.valid**: vector of the continuous explanatory variable from validation data
- **x.valid**: matrix of explanatory variables (to be combined into an index) from validation data
- **z.valid**: vector or matrix of covariates from validation data
- **n.quantiles**: number of quantiles to be used (needs to be between 2 and 10)
- **B**: number of bootstrap samples to be used in estimation (needs to be greater than 1)
- **b1.pos**: TRUE if the index is expected to be positively related to the outcome
Value

A list with the following items:

- `q.train`: matrix of quantiles for training data
- `q.valid`: matrix of quantiles for validation data
- `wts.matrix`: matrix of estimated weights; each row corresponds to a bootstrap sample
- `weights`: final estimated weights used in calculating the WQS index
- `WQS`: weighted quantile sum estimate based on calculated weights
- `fit`: WQS model fit to validation data

Author(s)

Jenna Czarnota, David Wheeler

References


Examples

data(WQSdata)
y.train <- WQSdata[, 'y']
x.train <- WQSdata[, -10]
output <- wqs.est(y.train, x.train, B = 10)
**WQSdata**

**Format**

A data frame with 1000 observations on the following 10 variables.

- X1 a numeric vector
- X2 a numeric vector
- X3 a numeric vector
- X4 a numeric vector
- X5 a numeric vector
- X6 a numeric vector
- X7 a numeric vector
- X8 a numeric vector
- X9 a numeric vector
- y a numeric vector; the outcome variable

**Details**

Correlation and concentration patterns were loosely based on NHL data.

**References**


**Examples**

```r
data(WQSdata)
```
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