Package ‘erfe’

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Type Package

Title Fits Expectile Regression for Panel Fixed Effect Model

Version 0.0.1

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Description Fits the Expectile Regression for Fixed Effect (ERFE) estimator. The ERFE model extends the within-transformation strategy to solve the incidental parameter problem within the expectile regression framework. The ERFE model estimates the regressor effects on the expectiles of the response distribution. The ERFE estimate corresponds to the classical fixed-effect within-estimator when the asymmetric point is 0.5. The paper by Barry, Oualkacha, and Charpentier (2021, <arXiv:2108.04737>) gives more details about the ERFE model.

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BugReports https://github.com/amadoudiogobarrie/erfe/issues

Depends R (>= 2.10)

Imports Matrix, mvtnorm, stats

Suggests covr, testthat (>= 3.0.0)

Config/testthat/edition 3

Encoding UTF-8

Language en-US

LazyData true

RoxygenNote 7.2.1

NeedsCompilation no

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### dexpectilizeMatR

**Description**

This function is part of the erfe package. It de-expectilizes a matrix of data vector-wise, which means subtracting the expectile of level $\tau \in (0, 1)$ to every vector of the matrix column-wise. When $\tau = 0.5$ then the process of de-expectilizing corresponds to the process of demeaning the matrix column-wise. That is, subtracting the mean-column from the column vector.

**Usage**

```r
dexpectilizeMatR(ymat, aweight, panSizeVec)
```

**Arguments**

- `ymat` numeric matrix to de-expectilize column-wise.
- `aweight` numeric vector of individual asymmetric weight.
- `panSizeVec` numeric vector of individual panel size.

**Value**

Return a de-expectilized matrix of the matrix `ymat`.

**Author(s)**

Amadou Barry, <barryhafia@gmail.com>

**References**

**Examples**

```r
set.seed(13)
temps_obs <- 5
n_subj <- 50
id <- rep(1:n_subj, each=temps_obs)
asymp <- 0.5
panSizeVec <- unname(unlist(lapply(split(id, id), function(x) length(x))))
ymat <- matrix(NA, nrow = n_subj * temps_obs, ncol = 5)
ymat <- matrix(mvtnorm::rmvnorm(n_subj * ncol(ymat),
                          sigma = diag(rep(1, temps_obs))), ncol = ncol(ymat))
aweight <- rep(asymp, temps_obs * n_subj)
aweight[!(ymat[, 1] > mean(ymat[, 1]))] = 1 - asymp
dexpectilizeMatR(ymat, aweight, panSizeVec)
```

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**dexpectilizeVecR**

*Dexpectilize a vector according to a single asymmetric point \( \tau \in (0,1) \).*

**Description**

This function is part of the erfe package. It de-expectilizes a vector of data, which means subtracting the expectile of level \( \tau \in (0,1) \) of the vector to the vector itself. When \( \tau = 0.5 \) then the process of de-expectilizing corresponds to the process of deamining the vector. That is, subtracting the mean of the vector from the vector itself.

**Usage**

```r
dexpectilizeVecR(yvec, aweight, panSizeVec)
```

**Arguments**

- `yvec` Numeric vector to de-expectilize.
- `aweight` Numeric vector of individual asymmetric weight.
- `panSizeVec` Numeric vector of individual panel size.

**Value**

Return a de-expectilized vector of the vector `yvec`.

**Author(s)**

Amadou Barry, <barryhafia@gmail.com>

**References**

Examples

```r
set.seed(13)
temps_obs <- 5 # panel size
n_subj <- 50 # sample size
id <- rep(1:n_subj, each = temps_obs)
asymp <- 0.5
panSizeVec <- unname(unlist(lapply(split(id, id), function(x) length(x))))
yvec <- c(mvtnorm::rmvnorm(n_subj, sigma = diag(rep(1, temps_obs))))
aweight <- rep(asymp, temps_obs * n_subj)
aweight[!(yvec > mean(yvec))] = 1 - asymp
dexpectilizeVecR(yvec, aweight, panSizeVec)
```
erfeVecR

Examples

```r
set.seed(13)
temps_obs <- 5
n_subj <- 50
sig <- diag(rep(1,temps_obs))
id <- rep(1:n_subj, each=temps_obs)
rvec <- c(mvtnorm::rmvnorm(n_subj, sigma = sig))
fvec <- (1 + rep(rnorm(n_subj) , each=temps_obs))
predictors <- cbind(rt(n_subj * temps_obs, df=2, ncp=1.3),
  1.2 * fvec + rnorm(n_subj * temps_obs, mean = 0.85, sd = 1.5) )
response <- 0.6 * predictors[, 1] + predictors[, 2] + fvec + rvec
asymp <- c(0.25,0.5,0.75)
erfe(predictors, response, asym=c(0.25,0.5,0.75), id)
```

Description

This function is part of the erfe package. It estimates the ERFE model for a panel dataset and for a single asymmetric point $\tau \in (0, 1)$. When $\tau = 0.5$ the function estimate the classical within-transformation estimator and its sandwich covariance matrix.

Usage

```
erfeVecR(xmat, yvec, panSizeVec, asym, id)
```

Arguments

- `xmat` Numeric vector to de-expectilize.
- `yvec` Numeric vector of individual asymmetric weight.
- `panSizeVec` Numeric vector to individual panel size.
- `asym` Numeric vector to individual panel size.
- `id` Numeric vector to individual panel size.

Value

Return a list of objects related to the erfe model such as the asymmetric point, the coefficient-estimate, the standard deviation, the estimated covariance.

Author(s)

Amadou Barry, <barryhafia@gmail.com>

References

set.seed(13)
temps_obs <- 5
n_subj <- 50
sig <- diag(rep(1,temps_obs))
id <- rep(1:n_subj, each=temps_obs)
rvec <- c(mvtnorm::rmvnorm(n_subj, sigma = sig))
fvec <- (1 + rep(rnorm(n_subj) , each=temps_obs))
xmat <- cbind(rt(n_subj*temps_obs, df=2, ncp=1.3),
    1.2 * fvec + rnorm(n_subj * temps_obs, mean = 0.85, sd = 1.5) )
yvec <- 0.6*xmat[, 1] + xmat[, 2] + fvec + rvec
asm <- 0.5
panSizeVec <- unname(unlist(lapply(split(id, id), function(x) length(x))))
erfeVecR(xmat, yvec, panSizeVec, asym, id)
$\texttt{sim\_panel\_data}$

Examples

\texttt{data(sim\_panel\_data)}
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