

Package: erfe (via r-universe)

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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](https://arxiv.org/abs/2108.04737)>) gives more details about the ERFE model.

License GPL-3

URL <https://arxiv.org/abs/2108.04737>

BugReports <https://github.com/amadoudiogobarry/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

Repository <https://amadoudiogobarry.r-universe.dev>

RemoteUrl <https://github.com/amadoudiogobarry/erfe>

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dexpectilizeMatR	<i>Dexpectilize a matrix according the a single asymmetric point $\tau \in (0, 1)$.</i>
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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 deaminging the matrix column-wise. That is, subtracting the mean-column from the column vector.

Usage

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

Arguments

<code>ymat</code>	Numeric matrix to de-expectilize column-wise.
<code>aweight</code>	Numeric vector of individual asymmetric weight.
<code>panSizeVec</code>	Numeric vector of individual panel size.

Value

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

Author(s)

Amadou Barry, <barryhafia@gmail.com>

References

Barry, Amadou, Oualkacha, Karim, and Charpentier Arthur. (2022). *Weighted asymmetric least squares regression with fixed-effects*. arXiv preprint arXiv:2108.04737

Examples

```

set.seed(13)
temps_obs <- 5
n_subj <- 50
id <- rep(1:n_subj, each=temps_obs)
asym <- 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(asym, temps_obs * n_subj)
aweight[!(ymat[, 1] > mean(ymat[, 1]))] = 1 - asym
dexpectilizeMatR(ymat, aweight, panSizeVec)

```

dexpectilizeVecR	<i>Dexpectilize a vector according the a single asymmetric point $\tau \in (0, 1)$.</i>
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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 deaminging the vector. That is, subtracting the mean of the vector from the vector itself.

Usage

```
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, <barryhafiah@gmail.com>

References

Barry, Amadou, Oualkacha, Karim, and Charpentier Arthur. (2022). *Weighted asymmetric least squares regression with fixed-effects*. arXiv preprint arXiv:2108.04737

Examples

```
set.seed(13)
temps_obs <- 5 # panel size
n_subj <- 50 # sample size
id <- rep(1:n_subj, each = temps_obs)
asym <- 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(asym, temps_obs * n_subj)
aweight[!(yvec > mean(yvec))] = 1 - asym
dexpectilizeVecR(yvec, aweight, panSizeVec)
```

erfe

Dexpectilize a vector according the a single asymmetric point

Description

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

Usage

```
erfe(predictors, response, asymp = c(0.25, 0.5, 0.75), id)
```

Arguments

<code>predictors</code>	Numeric matrix of covariates/regressors.
<code>response</code>	Numeric vector of response variable.
<code>asymp</code>	Sequence of asymmetric points.
<code>id</code>	Ordered vector of subject ids.

Value

Returns a list of list according to the asymmetric points. Each list has 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

Barry, Amadou, Oualkacha, Karim, and Charpentier Arthur. (2022). *Weighted asymmetric least squares regression with fixed-effects*. arXiv preprint arXiv:2108.04737

Examples

```

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
asympt <- c(0.25, 0.5, 0.75)
erfe(predictors, response, asympt=c(0.25, 0.5, 0.75), id)

```

erfeVecR

*Deexpectilize a vector according the a single asymmetric point***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

Barry, Amadou, Oualkacha, Karim, and Charpentier Arthur. (2022). *Weighted asymmetric least squares regression with fixed-effects*. arXiv preprint arXiv:2108.04737

Examples

```

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
asym <- 0.5
panSizeVec <- unname(unlist(lapply(split(id, id), function(x) length(x))))
erfeVecR(xmat, yvec, panSizeVec, asym, id)

```

sim_panel_data

sim_panel_data for the erfe package

Description

Simulated toy data that comes with the erfe package. The dataset is generated according to a location-shift Gaussian model which corresponds to model I of the manuscript simulation section. The dataset is a balanced panel with 50 units and 5 within observations. The dataset has 6 variables: id, pred1, pred2, resp, nob, and year. The variable id is the unit's ids, pred1 and pred2 are the main regressors. The response variable is generated by two regressors (pred1 and pred2), and one fixed-effect and a Gaussian error. The variable nob is the number of units and year is the panel number.

Usage

```
data(sim_panel_data)
```

Format

An object of class "data.frame"

id The variable id is the unit's ids.

pred1 The first regressor.

pred2 The second regressor.

resp The response variable.

nob The number of units.

year The time ou panel variable.

References

This data set was artificially created for the erfe package.

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Examples

```
data(sim_panel_data)
```

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