Package 'pqrfe'

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Type Package

Title Penalized quantile regression with fixed effects

Version 1.0

Date 2022-08-23

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Maintainer Ian Meneghel Danilevicz <iandanilevicz@gmail.com>

Description This package solves quantile regression with fixed effects under penalization by Lasso, adaptive Lasso or without constriction. The penalization is restricted to intercepts.

License GPL (>= 2)

Imports Rcpp (>= 1.0.5), MASS (>= 7.3-49)

LinkingTo Rcpp, RcppArmadillo

RoxygenNote 7.2.1

NeedsCompilation yes

R topics documented:

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Details

The DESCRIPTION file:

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Index of help topics:

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mpqr              multiple penalized quantile regression
plot_taus         plot multiple penalized quantile regression
pqr               Penalized quantile regression with fixed
                  effects
pqrfe-package     Penalized quantile regression with fixed
                  effects
```

This section should provide a more detailed overview of how to use the package, including the most important functions.

Author(s)

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References

This optional section can contain literature or other references for background information.

See Also

Optional links to other man pages

Examples

```
## Optional simple examples of the most important functions
## Use \dontrun{} around code to be shown but not executed
```

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mpqr   *multiple penalized quantile regression*

Description

Estimate QR for several taus

Usage

```
mpqr(x, y, subj, tau = 1:9/10, effect = "simple", c = 0)
```

Arguments

x	Numeric matrix, covariates
y	Numeric vector, outcome.
subj	Numeric vector, identifies the unit to which the observation belongs.
tau	Numeric vector, identifies the percentiles.
effect	Factor, "simple" simple regression, "fixed" regression with fixed effects, "lasso" penalized regression with fixed effects.
c	Numeric, 0 is quantile, Inf is expectile, any number between zero and infinite is M-quantile.

Value

Beta Numeric array, with three dimmensions: 1) tau, 2) coef., lower bound, upper bound, 3) exploratory variables.

Examples

```
n = 10
m = 5
d = 4
N = n*m
L = N*d
x = matrix(rnorm(L), ncol=d, nrow=N)
subj = rep(1:n, each=m)
alpha = rnorm(n)
beta = rnorm(d)
eps = rnorm(N)
y = as.vector(x %*% beta + rep(alpha, each=m) + eps)

Beta = mpqr(x,y,subj,tau=1:9/10, effect="fixed", c = 1.2)
Beta
```

---

plot_taus   *plot multiple penalized quantile regression*

Description

plot QR for several taus

Usage

```
plot_taus(
  Beta,
  tau = 1:9/10,
  D,
  col = 2,
  lwd = 1,
  lty = 2,
  pch = 1,
  cex.axis = 1,
  cex.lab = 1,
  main = ""
)
```

Arguments

Beta	Numeric array, with three dimmensions: 1) tau, 2) coef., lower bound, upper bound, 3) exploratory variables.
tau	Numeric vector, identifies the percentiles.
D	covariate's number.
col	color.
lwd	line width.
lty	line type.
pch	point character.
cex.axis	cex axis length.
cex.lab	cex axis length.
main	title.

Examples

```
n = 10
m = 5
d = 4
N = n*m
L = N*d
x = matrix(rnorm(L), ncol=d, nrow=N)
subj = rep(1:n, each=m)
```

```
alpha = rnorm(n)
beta = rnorm(d)
eps = rnorm(N)
y = as.vector(x %*% beta + rep(alpha, each=m) + eps)

Beta = mpqr(x,y,subj,tau=1:9/10, effect="lasso", c = Inf)
plot_taus(Beta,tau=1:9/10,D=1)
```

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pqr	*Penalized quantile regression with fixed effects*

Description

Estimate parameters and tuning parameter.

Usage

```
pqr(x, y, subj, tau = 0.5, effect = "simple", c = 1)
```

Arguments

x	Numeric matrix, covariates
y	Numeric vector, outcome.
subj	Numeric vector, identifies the unit to which the observation belongs.
tau	Numeric scalar between zero and one, identifies the percentile.
effect	Factor, "simple" simple regression, "fixed" regression with fixed effects, "lasso" penalized regression with fixed effects.
c	Numeric, 0 is quantile, Inf is expectile, any number between zero and infinite is M-quantile.

Value

alpha Numeric vector, intercepts' coefficients.

beta Numeric vector, exploratory variables' coefficients.

lambda Numeric, estimated lambda.

res Numeric vector, percentile residuals.

tau Numeric scalar, the percentile.

penalty Numeric scalar, indicate the chosen effect.

c Numeric scalar, indicate the chosen c.

sig2_alpha Numeric vector, intercepts' standard errors.

sig2_beta Numeric vector, exploratory variables' standard errors.

Tab_alpha Data.frame, intercepts' summary.

Tab_beta Data.frame, exploratory variables' summary.

Mat_alpha Numeric matrix, intercepts' summary.

Mat_beta Numeric matrix, exploratory variables' summary.

References

Danilevicz, I.M., Bondon, P., Reisen, V.A. (2022), "Alternative methods to quantile regression for panel data". Journal, vol number pages.

Koenker, R. (2004), "Quantile regression for longitudinal data", J. Multivar. Anal., 91(1): 74-89.

Examples

```
n = 10
m = 5
d = 4
N = n*m
x = matrix(rnorm(d*N), ncol=d, nrow=N)
subj = rep(1:n, each=m)
alpha = rnorm(n)
beta = rnorm(d)
eps = rnorm(N)
y = as.vector(x %*% beta + rep(alpha, each=m) + eps)
m1 = pqr(x=x, y=y, subj=subj, tau=0.75, effect="lasso", c = 0)
m1$Tab_beta
```

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