

Package ‘rqmcm2’

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Title Markov Chain Marginal Bootstrap for Quantile Regression

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Depends quantreg

Description Markov Chain Marginal Bootstrap for Quantile Regression. A resampling method for inference in quantile regression. Suitable for modest to large data sets.

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| | |
|---------|----------------------------------|
| plotDim | <i>Determine the Plot Layout</i> |
|---------|----------------------------------|

Description

Determine the "optimal" layout for the plots of MCMB sequences based on the number of parameters.

Usage

```
plotDim(p)
```

Arguments

p the number of parameters

Value

Dimensions for plot layout.

| | |
|-------|--|
| rqmcb | <i>Markov Chain Marginal Bootstrap for Quantile Regression</i> |
|-------|--|

Description

MCMB for Quantile Regression (also see quantreg package by Roger Koenker)

Usage

```
rqmcb(x=x, y=y, tau=0.5, K=100, int=TRUE,
      plotTheta=FALSE)
```

Arguments

x a data matrix (n by p) for the design variables whose rows correspond to cases

y a response vector of length n

tau a percentile level between 0 and 1. Default at 0.5 for the median

K length of the MCMB sequence. Default is 100

plotTheta TRUE or FALSE for plotting the MCMB sequence. Default to FALSE

int should be set to TRUE if the intercept is to be included in the model, and to FALSE if no intercept is desired. Default is TRUE.

Value

A list with the following components:

| | |
|---------|--|
| coef | the parameter estimate from rq() |
| theta | a matrix containing the MCMB sequence. The first row is the initial parameter estimate from rq() |
| success | returns 1 if MCMB is successful. A value of 0 indicates that the program fails to return a desired MCMB sequence |
| cn | condition number of the $X'X$ matrix. |

WARNING

The MCMB may not be suitable for problems of small sample sizes. Severe collinearity in the x matrix could also be harmful.

Author(s)

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References

- Kocherginsky, M., He, X. Extensions of the Markov Chain Marginal Bootstrap. *Statistics & Probability Letters*, in press.
- Kocherginsky M, He X, Mu Y. (2005). Practical confidence intervals for regression quantiles. *Journal of Computational and Graphical Statistics* 14:41-55, 2005.
- Kocherginsky, M. (2003). Extensions of the Markov Chain Marginal Bootstrap. Ph.D Thesis, University of Illinois Urbana-Champaign.
- He, X. and Hu, F. (2002). Markov Chain Marginal Bootstrap. *Journal of the American Statistical Association*, Vol. 97, no. 459, 783-795.

See Also

[rq](#)

Examples

```
library(quantreg)

x <- cbind(rnorm(100), runif(100))
y <- rnorm(100)

#generate the MCMB sequence:
mcmb <- rqmcb(x, y, tau=.5, plotTheta=FALSE)

#get MCMB estimates of mean, SD, and CI:
rqmcb.ci(mcmb)

#plot the MCMB sequences:
rqmcb.plot(mcmb)
```

rqmcmf.ci

Summary of RQMCMB sequences

Description

Provide mean, standard error and confidence intervals using RQMCMB sequences. The confidence intervals are based on standard normal quantiles.

Usage

```
rqmcmf.ci(obj, alpha=0.1)
```

Arguments

| | |
|-------|--|
| obj | The output object from rqmcmf() |
| alpha | Significance level, default alpha=0.10 |

rqmcmf.plot

Plot the MCMB Sequences

Description

Plots the MCMB sequences. The dotted line is the initial estimate of the parameter vector from rq. The two solid lines are the CI limits of size alpha centered at the MCMB parameter estimates

Usage

```
rqmcmf.plot(obj, alpha=.10)
```

Arguments

| | |
|-------|---------------------------------|
| obj | The output of rqmcmf() function |
| alpha | Confidence level |

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