qrMNAR

R package "qrMNAR" for estimation of quantile regression coefficients with nonignorable missing data. Provide an algorithm to implement the proposed method to estimate quantile regression coefficients with nonignorable missing data. It also provides a bootstrap method to estimate the standard error of the proposed estimation.

Installation

Requirements

- Rtools

Package Install

```
# install.packages("quantreg")
# install.packages("Rcpp")
# install.packages("foreach")
# install.packages("snow")
# install.packages("doSNOW")

## download "qrMNAR_0.1.0.tar.gz", then use the following code to install this R package
install.packages("path/to/qrMNAR_0.1.0.tar.gz", repos = NULL, type = "source")
```

Example

```
library(qrMNAR)

#### This package has two main functions "msIpwQr" and "estimate_sd.boot". "msIpwQr" is used to
estimate quantile regression coefficients; "estimate_sd.boot" is used to estimate standard
errors of the proposed estimates via weighted bootstrapping and function "estimate_sd.boot" can
using parallel computing for bootstrapping. More detailed information about these two functions
can be obtained through

help("msIpwQr")
help("estimate_sd.boot")

#### Example 1: Call function "msIpwQr" to estimate quantile regression coefficients
## generate sim_data for example

nsize <- 1000
```

```
beta <- c(1,-2,2,0.5) ; gam <- c(0.5, 0.5, 0.2, 0); theta <- c(-2, 0.5,0.5,0.5)
x1 <- rbinom(nsize, 1, 0.5); x2 <- rnorm(nsize, mean = 2, sd = 0.5);
x3 <- runif(nsize, min = 0, max = 2); xx <- cbind(1, x1, x2, x3);
err <- xx%*%gam*rnorm( nsize, mean = 0, sd = 0.5); yy <- xx %*% beta + err
xy <- cbind(1, x1, x2, yy); prob.m <- 1/(1+ exp(- xy %*% theta))
delta.ind <- sapply(prob.m, function(p){rbinom(n=1, size=1, prob=p)})
yy[delta.ind==0] <- NA
set.seed(100)
sim_data <- data.frame(x1, x2, x3, yy)
p1<- 1; p2<- 1; q1<- 0; q2 <- 1

## set the initial value related to the algorithm
thresh = 1e-04; max_iter.ms <- 50;  m <- 10
tau_seq.ms  <- seq(1/50, 49/50, by = 1/50); tau_seq.out <- seq(0.25, 0.75, by = 0.25)

## using sim_data to estimate quantile regression coefficients
out <- msIpwQr(sim_data, p1, p2, q1, q2, thresh, max_iter.ms, tau_seq.out, tau_seq.ms, m )
# true value of quantile regression coefficients
beta_tau_true <- beta + gam %*% t(qnorm( tau_seq.out, mean = 0, sd = 0.5))
# quantile regression coefficients estimates
out[[3]]
# summary of quantile regression model
out[[7]]


####  Example 2: Call function "estimate_sd.boot" to get a bootstrap estimate of the standard
errors of resulting estimators; this function implement bootstrap through parallel computing
## set the initial value related to the algorithm
library(parallel)
num_cores <- detectCores()
B = 100

## to obtain standard errors of quantile regression coefficients estimates via bootstrapping by
parallel computing
out_sd <- estimate_sd.boot(sim_data, p1, p2, q1, q2, thresh, max_iter.ms,
                           tau_seq.out,  tau_seq.ms, m, B, num_cores)
# standard errors of quantile regression coefficients estimates via bootstrapping
out_sd[[3]]
```