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rddtools: Regression Discontinuity in R

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Abstract

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Keywords: Regression Discontinuity Design, R.

1. About package rddtools in R

The special JSS style commands related to software and mathematical formulas are written as follows in LyX: R or R for the names of programming languages, **rddtools** or **rddtools** for software packages, and `some code` or **`some code`** for code; E for expectations, VAR for variances, COV for covariances, and P for probabilities.

Writing several lines of code:

```
library(rddtools)

## Loading required package:  AER
## Loading required package:  car
## Loading required package:  lmtest
## Loading required package:  zoo
##
## Attaching package:  'zoo'
## The following objects are masked from 'package:base':
```

```
##
##     as.Date, as.Date.numeric
## Loading required package:  sandwich
## Loading required package:  survival
## Loading required package:  np
## Nonparametric Kernel Methods for Mixed Datatypes (version 0.60-2)
## [vignette("np_faq",package="np") provides answers to frequently asked questions]
```

These are all the exported functions:

```
ls("package:rddtools")

##  [1] "as.lm"          "as.npreg"        "as.npregbw"
##  [4] "clusterInf"     "computePlacebo"  "covarTest_dis"
##  [7] "covarTest_mean" "dens_test"       "gen_mc_ik"
## [10] "plotPlacebo"    "plotPlaceboDens" "plotSensi"
## [13] "rdd_bw_ik"      "rdd_bw_rsw"      "rdd_coef"
## [16] "rdd_data"       "rdd_gen_reg"     "rdd_pred"
## [19] "rdd_reg_lm"     "rdd_reg_np"      "rot_bw"
## [22] "vcovCluster"    "vcovCluster2"
```

and now including the non-exported:

```
ls(getNamespace("rddtools"), all.names=TRUE)

##    [1] ".__NAMESPACE__."              ".__S3MethodsTable__."
##    [3] ".__global__"                  ".packageName"
##    [5] "Kernel_tri"                   "Kernel_uni"
##    [7] "[.rdd_data"                   "all_var"
##    [9] "all_var.rdd_reg.np"           "all_var_low"
##   [11] "as.data.frame.rdd_data"       "as.lm"
##   [13] "as.lm.rdd_reg"                "as.lm.rdd_reg_np"
##   [15] "as.lm_RDD"                    "as.npreg"
##   [17] "as.npregbw"                   "as.npregbw_low"
##   [19] "bread.rdd_reg_np"             "checkIsAnyRDD"
##   [21] "checkIsRDD"                   "clusterInf"
##   [23] "computePlacebo"               "covarTest_dis"
##   [25] "covarTest_dis.rdd_data"       "covarTest_dis.rdd_reg"
##   [27] "covarTest_dis_low"            "covarTest_mean"
##   [29] "covarTest_mean.rdd_data"      "covarTest_mean.rdd_reg"
##   [31] "covarTest_mean_low"           "dens_estim"
##   [33] "dens_estim2"                  "dens_test"
##   [35] "estfun.rdd_reg_np"            "format.perc"
##   [37] "gen_MC_simple"                "gen_mc_ik"
##  [39] "gen_mc_ik_1"                 "gen_mc_ik_2"
##  [41] "gen_mc_ik_3"                 "gen_mc_ik_4"
##  [43] "getBW"                       "getCall.rdd_reg"
##  [45] "getCovar"                    "getCovarNames"
##  [47] "getCutpoint"                 "getModelRank"
##  [49] "getModelRank.default"        "getModelRank.rdd_reg_np"
##  [51] "getOrder"                    "getOriginalData"
##  [53] "getOriginalData.rdd_reg"     "getOriginalX"
##  [55] "getOriginalX.rdd_data"       "getOriginalX.rdd_reg"
##  [57] "getSlope"                    "getType"
##  [59] "gplot"                       "hasCovar"
##  [61] "hasCovar.rdd_data"           "hasCovar.rdd_reg"
##  [63] "ik_amse"                     "ik_bias"
##  [65] "ik_var"                      "infType"
##  [67] "isFuzzy"                     "is_even"
##  [69] "model.frame.rdd_reg_np"      "model.matrix.rdd_data"
##  [71] "plot.rdd_data"               "plot.rdd_reg_lm"
##  [73] "plot.rdd_reg_np"             "plotBin"
##  [75] "plotPlacebo"                 "plotPlacebo.PlaceboVals"
##  [77] "plotPlacebo.rdd_reg"         "plotPlaceboDens"
##  [79] "plotPlaceboDens.PlaceboVals" "plotPlaceboDens.rdd_reg"
##  [81] "plotPlaceboDens_low"         "plotPlacebo_low"
##  [83] "plotSensi"                   "plotSensi.rdd_reg_lm"
##  [85] "plotSensi.rdd_reg_np"        "print.rdd_reg_lm"
##  [87] "print.rdd_reg_np"            "print.summary.rdd_reg_np"
##  [89] "rdd_bw_ik"                   "rdd_bw_ik_low"
##  [91] "rdd_bw_rsw"                  "rdd_coef"
##  [93] "rdd_coef.default"            "rdd_coef.rdd_reg_np"
##  [95] "rdd_coef.rdd_reg_npreg"      "rdd_data"
##  [97] "rdd_gen_reg"                 "rdd_gen_reg_old"
##  [99] "rdd_pred"                    "rdd_reg_lm"
## [101] "rdd_reg_np"                  "rot_bw"
## [103] "subset.rdd_data"             "summary.rdd_data"
## [105] "summary.rdd_reg_np"          "uniK"
## [107] "var_estim"                   "var_estim2"
## [109] "vcov.rdd_reg_np"             "vcovCluster"
## [111] "vcovCluster2"                "waldci"
## [113] "waldci.default"              "waldci.glm"
## [115] "waldci.mlm"                  "waldci.rdd_reg_np"
## [117] "waldci.survreg"
```

2. Internals

We can show the code of a function as such (note that we can just remove them and add their definitions to the example code):

```
rdd_data

## function(y, x, covar, cutpoint, z, labels, data) {
##
##
##     ## check args
##     type <- ifelse(missing(z), "Sharp", "Fuzzy")
##     hasCovar <- !missing(covar)
##     if (missing(cutpoint))
##         stop("Please provide cutpoint")
##     covar_nam <- deparse(substitute(covar))
##
##     ## Use data in case:
##     if (!missing(data)) {
##         pf <- parent.frame()
##         x <- eval(substitute(x), data, enclos = pf)  # copy from with.default
##         y <- eval(substitute(y), data, enclos = pf)  # copy from with.default
##         if (hasCovar)
##             covar <- eval(substitute(covar), data, enclos = pf)  # idem
##     }
##
##     ### Check y, x univariate
##     k_y <- NCOL(y)
##     k_x <- NCOL(x)
##
##     if (any(!c(k_y, k_x) == 1))
##         stop("y or x should be univariate")
##
##     ### Check y, x, z same size
##     n_y <- NROW(y)
##     n_x <- NROW(x)
##     n_covar <- if (hasCovar)
##         NROW(x) else NULL
##
##     if (any(c(n_y, n_x) != n_covar))
##         stop("y or x should be univariate")
##
##     ### Check cutpoint
##     range_x <- range(x, na.rm = TRUE)
##     if (cutpoint < range_x[1] | cutpoint > range_x[2])
##         stop("Cutpoint outside range of x")
##
##     ## Check labels
##     if (!missing(labels)) {
##         if (!is.list(labels))
##             stop("labels should be a list.")
##         if (is.null(names(labels)) || !all(names(labels) %in% c("x", "y", "covar")))
##             stop("labels should be a list with components x, and/or y, and/or covar")
##         if (hasCovar) {
##             if ("covar" %in% names(labels) && length(labels$covar) != NCOL(covar))
##                 stop("There should be ", NCOL(covar), " values (dim of covar) for compo
##         }
##     } else {
##         labels <- list()
##     }
##
##     # if(is.null(labels$x)) labels$x <- deparse(substitute(x)) if(is.null(labels$y)) la
##     # if(hasCova && is.null(labels$covar)) labels$covar <- if(NCOL(covar)==1) names(dep
##
##     ## Assemble data
##     rdd_dat <- data.frame(x = x, y = y)
##     if (hasCovar) {
##         rdd_dat <- cbind(rdd_dat, covar)
##         if (NCOL(covar) == 1 && is.null(colnames(covar)))
##             colnames(rdd_dat)[3] <- covar_nam
##     }
##
##     if (type == "Fuzzy") {
##         rdd_dat <- cbind(rdd_dat, z)
##     }
##
##     ## return
##     class(rdd_dat) <- c("rdd_data", "data.frame")
##     attr(rdd_dat, "hasCovar") <- hasCovar
##     attr(rdd_dat, "labels") <- labels
##     attr(rdd_dat, "cutpoint") <- cutpoint
##     attr(rdd_dat, "type") <- type
##
##     rdd_dat
## }
## <environment: namespace:rddtools>
```

Acknowledgments

We gratefully acknowledge support from ...

A. This is the first appendix section

A.1. A subsection

A subsubsection

some text

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