Package ‘RobAStBase’

April 5, 2019

Version 1.2.0
Date 2019-04-05
Title Robust Asymptotic Statistics
Description Base S4-classes and functions for robust asymptotic statistics.
Depends R(>= 3.4), methods, rrcov, distr(>= 2.8.0), distrEx(>= 2.8.0), distrMod(>= 2.8.0), RandVar(>= 1.2.0)
Suggests ROptEst(>= 1.2.0), RUnit(>= 0.4.26)
Imports startupmsg, graphics, grDevices, stats
ByteCompile yes
License LGPL-3
Encoding latin1

URL http://robast.r-forge.r-project.org/

LastChangedDate {$LastChangedDate: 2019-04-05 07:33:12 +0200 (Fr, 05. Apr 2019) $}
LastChangedRevision {$LastChangedRevision: 1216 $}
VCS/SVNRevision 1205

NeedsCompilation no

Author Matthias Kohl [cre, cph, aut],
Peter Ruckdeschel [aut, cph],
Mykhailo Pupashenko [ctb] (contributed wrapper functions for diagnostic plots),
Gerald Kroisandt [ctb] (contributed testing routines),
R Core Team [ctb, cph] (for source file 'format.perc')

Maintainer Matthias Kohl <Matthias.Kohl@stamats.de>

Repository CRAN

Date/Publication 2019-04-05 09:42:47 UTC
### R topics documented:

RobAStBase-package ................................................. 3
ALEEstimate-class .................................................. 4
BdStWeight-class .................................................... 7
biastype-methods .................................................... 8
BoundedWeight-class ................................................ 8
checkIC ................................................................. 9
ComparePlot .......................................................... 11
comparePlot-methods ............................................... 12
ContIC ................................................................. 18
ContIC-class .......................................................... 20
ContNeighborhood .................................................... 22
ContNeighborhood-class ........................................... 23
cutoff ................................................................. 24
cutoff-class .......................................................... 25
ddPlot-methods ....................................................... 26
evalIC ................................................................. 30
FixRobModel .......................................................... 31
FixRobModel-class ................................................... 32
generateIC ............................................................ 33
generateIC.fct-methods ............................................. 34
getBiasIC .............................................................. 35
getBoundedIC ........................................................ 36
getFiRisk .............................................................. 37
getRiskFctBV-methods .............................................. 38
getRiskIC .............................................................. 39
getweight-methods .................................................. 42
HampelWeight-class .................................................. 44
HampIC-class ........................................................ 45
IC ................................................................. 46
IC-class .............................................................. 48
InfluenceCurve ....................................................... 49
InfluenceCurve-class ............................................... 50
InfoPlot ............................................................... 52
infoPlot ............................................................. 53
InfRobModel .......................................................... 59
InfRobModel-class ................................................... 60
interpolRisk-class .................................................... 61
kStepEstimate-class .................................................. 62
kStepEstimator ....................................................... 64
kStepEstimator.start-methods .................................... 67
locMEstimator ....................................................... 68
makeIC ............................................................... 69
masked-methods ..................................................... 72
MEstimate-class ...................................................... 73
movToRef-methods ................................................... 74
Neighborhood-class ................................................. 76
RobAStBase-package

Description

Base S4-classes and functions for robust asymptotic statistics.

Details

Package: RobAStBase
Version: 1.2.0
Date: 2019-04-05
Depends: R(>= 3.4), methods, rrcov, distr(>= 2.8.0), distrEx(>= 2.8.0), distrMod(>= 2.8.0), RandVar(>= 1.2.0)
Suggests: ROptEst(>= 1.2.0), RUnit(>= 0.4.26)
Imports: startupmsg, graphics, grDevices, stats
ByteCompile: yes
Encoding: latin1
License: LGPL-3
URL: http://robast.r-forge.r-project.org/
VCS/SVNRevision: 1205

Robust Asymptotic Statistics
Package versions

Note: The first two numbers of package versions do not necessarily reflect package-individual development, but rather are chosen for the RobASiXXX family as a whole in order to ease updating "depends" information.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>, Matthias Kohl <Matthias.Kohl@stamats.de>
Maintainer: Matthias Kohl <matthias.kohl@stamats.de>

References


See Also

distr-package, distrEx-package, distrMod-package

Examples

library(RobASTBase)

## some L2 differentiable parametric family from package distrMod, e.g.
B <- BinomFamily(size = 25, prob = 0.25)

## classical optimal IC
IC0 <- optIC(model = B, risk = asCov())
plot(IC0) # plot IC
checkIC(IC0, B)

Description

Class of asymptotically linear estimates.

Details

The (return value) class of an estimator is of class ALE, if it is asymptotically linear; then it has an influence function (implemented in slot piC) and so all the diagnostics for influence functions are available; in addition it is asymptotically normal, so we can (easily) deduce asymptotic covariances, hence may use these in confidence intervals; in particular, the return values of kStepEstimator oneStepEstimator (and roptest, robtest, RMXEstimator, MBEstimator, OBREstimator, OMSEstimator in package 'ROptEst') are objects of (subclasses of) this class.
As the return value of `cvMMDestimator` (or `MDEstimator` with `CvMDist` or `CvMDist2` as distance) is asymptotically linear, there is class `MCALEstimate` extending `MCEstimate` by extra slots `pIC` and `asbias` (only filled optionally with non-NULL values). Again all the diagnostics for influence functions are then available. Classes `ML.ALEstimate` and class `CvMMD.ALEstimate` are nominal subclasses of class `MCALEstimate`, nominal in the sense that they have no extra slots, but they might have particular methods later on.

Helper method `getPIC` by means of the estimator class, and, in case of estimators of class `CvMMDEstimate`, also the name (in slot `name`) produces the (partial) influence function: calling `.CvMMDCovariance` - either directly or through wrapper `.CvMMDCovarianceWithMux`. This is used in the corresponding `.checkEstClassForParamFamily` method, which coerces object from class "`MCEstimate`" to "`MCALEstimate`".

**Objects from the Class**

Objects can be created by calls of the form `new("ALEstimate", ...)`.  

**Slots**

- `name`: Object of class "character": name of the estimator.  
- `estimate`: Object of class "ANY": estimate.  
- `estimate.call`: Object of class "call": call by which estimate was produced.  
- `samplesize`: object of class "numeric" — the samplesize (only complete cases are counted) at which the estimate was evaluated.  
- `completecases`: object of class "logical" — complete cases at which the estimate was evaluated.  
- `asvar`: object of class "OptionalNumericOrMatrix" which may contain the asymptotic (co)variance of the estimator.  
- `asbias`: Optional object of class "numeric": asymptotic bias.  
- `pIC`: Optional object of class `InfluenceCurve`: influence curve.  
- `nuis.idx`: object of class "OptionalNumeric": indices of estimate belonging to the nuisance part.  
- `fixed`: object of class "OptionalNumeric": the fixed and known part of the parameter.  
- `Infos`: object of class "matrix" with two columns named `method` and `message`: additional informations.  
- `trafo`: object of class "list": a list with components `fct` and `mat` (see below).  
- `untransformed.estimate`: Object of class "ANY": untransformed estimate.  
- `untransformed.asvar`: object of class "OptionalNumericOrMatrix" which may contain the asymptotic (co)variance of the untransformed estimator.

**Extends**

Class `ALEstimate` extends class "`Estimate`", directly. Class `MCALEstimate` extends classes "`ALEstimate`", and "`MCEstimate`" directly. Class `ML.ALEstimate` extends classes "`ALEstimate`", and "`MLEstimate`" directly. Class `CvM.ALEstimate` extends classes "`ALEstimate`", and "`CvMMDEstimate`" directly. The last two classes are to be used for method dispatch, later; they have an identical slot structure to class `MCALEstimate`.  

Objects can be created by calls of the form `new("ALEstimate", ...)`.  

**Slots**

- `name`: Object of class "character": name of the estimator.  
- `estimate`: Object of class "ANY": estimate.  
- `estimate.call`: Object of class "call": call by which estimate was produced.  
- `samplesize`: object of class "numeric" — the samplesize (only complete cases are counted) at which the estimate was evaluated.  
- `completecases`: object of class "logical" — complete cases at which the estimate was evaluated.  
- `asvar`: object of class "OptionalNumericOrMatrix" which may contain the asymptotic (co)variance of the estimator.  
- `asbias`: Optional object of class "numeric": asymptotic bias.  
- `pIC`: Optional object of class `InfluenceCurve`: influence curve.  
- `nuis.idx`: object of class "OptionalNumeric": indices of estimate belonging to the nuisance part.  
- `fixed`: object of class "OptionalNumeric": the fixed and known part of the parameter.  
- `Infos`: object of class "matrix" with two columns named `method` and `message`: additional informations.  
- `trafo`: object of class "list": a list with components `fct` and `mat` (see below).  
- `untransformed.estimate`: Object of class "ANY": untransformed estimate.  
- `untransformed.asvar`: object of class "OptionalNumericOrMatrix" which may contain the asymptotic (co)variance of the untransformed estimator.

**Extends**

Class `ALEstimate` extends class "`Estimate`", directly. Class `MCALEstimate` extends classes "`ALEstimate`", and "`MCEstimate`" directly. Class `ML.ALEstimate` extends classes "`ALEstimate`", and "`MLEstimate`" directly. Class `CvM.ALEstimate` extends classes "`ALEstimate`", and "`CvMMDEstimate`" directly. The last two classes are to be used for method dispatch, later; they have an identical slot structure to class `MCALEstimate`.  

Objects can be created by calls of the form `new("ALEstimate", ...)`.  

**Slots**

- `name`: Object of class "character": name of the estimator.  
- `estimate`: Object of class "ANY": estimate.  
- `estimate.call`: Object of class "call": call by which estimate was produced.  
- `samplesize`: object of class "numeric" — the samplesize (only complete cases are counted) at which the estimate was evaluated.  
- `completecases`: object of class "logical" — complete cases at which the estimate was evaluated.  
- `asvar`: object of class "OptionalNumericOrMatrix" which may contain the asymptotic (co)variance of the estimator.  
- `asbias`: Optional object of class "numeric": asymptotic bias.  
- `pIC`: Optional object of class `InfluenceCurve`: influence curve.  
- `nuis.idx`: object of class "OptionalNumeric": indices of estimate belonging to the nuisance part.  
- `fixed`: object of class "OptionalNumeric": the fixed and known part of the parameter.  
- `Infos`: object of class "matrix" with two columns named `method` and `message`: additional informations.  
- `trafo`: object of class "list": a list with components `fct` and `mat` (see below).  
- `untransformed.estimate`: Object of class "ANY": untransformed estimate.  
- `untransformed.asvar`: object of class "OptionalNumericOrMatrix" which may contain the asymptotic (co)variance of the untransformed estimator.

**Extends**

Class `ALEstimate` extends class "`Estimate`", directly. Class `MCALEstimate` extends classes "`ALEstimate`", and "`MCEstimate`" directly. Class `ML.ALEstimate` extends classes "`ALEstimate`", and "`MLEstimate`" directly. Class `CvM.ALEstimate` extends classes "`ALEstimate`", and "`CvMMDEstimate`" directly. The last two classes are to be used for method dispatch, later; they have an identical slot structure to class `MCALEstimate`.  

Objects can be created by calls of the form `new("ALEstimate", ...)`.  

**Slots**

- `name`: Object of class "character": name of the estimator.  
- `estimate`: Object of class "ANY": estimate.  
- `estimate.call`: Object of class "call": call by which estimate was produced.  
- `samplesize`: object of class "numeric" — the samplesize (only complete cases are counted) at which the estimate was evaluated.  
- `completecases`: object of class "logical" — complete cases at which the estimate was evaluated.  
- `asvar`: object of class "OptionalNumericOrMatrix" which may contain the asymptotic (co)variance of the estimator.  
- `asbias`: Optional object of class "numeric": asymptotic bias.  
- `pIC`: Optional object of class `InfluenceCurve`: influence curve.  
- `nuis.idx`: object of class "OptionalNumeric": indices of estimate belonging to the nuisance part.  
- `fixed`: object of class "OptionalNumeric": the fixed and known part of the parameter.  
- `Infos`: object of class "matrix" with two columns named `method` and `message`: additional informations.  
- `trafo`: object of class "list": a list with components `fct` and `mat` (see below).  
- `untransformed.estimate`: Object of class "ANY": untransformed estimate.  
- `untransformed.asvar`: object of class "OptionalNumericOrMatrix" which may contain the asymptotic (co)variance of the untransformed estimator.
Methods

pIC signature(object = "ALEstimate"): accessor function for slot pIC.
show signature(object = "ALEstimate")
confint signature(object = "ALEstimate", method = "missing"): compute asymptotic (LAN-based) confidence interval neglecting any bias.
confint signature(object = "ALEstimate", method = "symmetricBias"): compute asymptotic (LAN-based) confidence interval incorporating bias symmetrically.
confint signature(object = "ALEstimate", method = "onesidedBias"): compute asymptotic (LAN-based) confidence interval incorporating bias one-sided; i.e., positive or negative, respectively.
confint signature(object = "ALEstimate", method = "asymmetricBias"): compute asymptotic (LAN-based) confidence interval incorporating bias asymmetrically.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de> and Peter Ruckdeschel <Peter.Ruckdeschel@uni-oldenburg.de>

See Also

Estimate-class

Examples

## prototype
new("ALEstimate")

## data example
set.seed(123)
x <- rgamma(50, scale = 0.5, shape = 3)

## parametric family of probability measures
G <- GammaFamily(scale = 1, shape = 2)
mle <- MLEstimator(x, G)
(picM <- pIC(mle))

## Kolmogorov(-Smirnov) minimum distance estimator
ke <- KolmogorovMDEstimator(x = x, ParamFamily = G)
pIC(ke) ## gives NULL

## von Mises minimum distance estimator with default mu

## to save time for CRAN
system.time(me <- CvMMEstimator(x = x, ParamFamily = G))
str(me@pIC) ## a call
system.time(pICO <- pIC(me))
str(me@pIC) ## now filled
Description

Classes for bounded, robust, standardized weights.

Objects from the Class

Objects can be created by calls of the form `new("BdStWeight", ...)`. to fill slot weight, you will use the generating functions `getweight` and `minbiasweight`.

Slots

- `name`: Object of class "character"; inherited from class `RobWeight`.
- `weight`: Object of class "function" — the weight function; inherited from class `RobWeight`.
- `clip`: Object of class "numeric" — clipping bound(s); inherited from class `BoundedWeight`.
- `stand`: Object of class "matrix" — standardization.

Extends

Class "RobWeight", via class "BoundedWeight". Class "BoundedWeight", directly.

Methods

- `stand`: signature(object = "BdStWeight"): accessor function for slot `stand`.
- `stand<-`: signature(object = "BdStWeight", value = "matrix"): replacement function for slot `stand`. This replacement method should be used with great care, as the slot `weight` is not simultaneously updated and hence, this may lead to inconsistent objects.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References


See Also

`BoundedWeight-class, RobWeight-class, IC, InfluenceCurve-class`
Examples

```r
## prototype
new("BdStWeight")
```

Methods

```r
biastype-methods
signature(object = "interpolrisk")
```

Examples

```r
myrisk <- MBRRisk(samplesize=100)
biastype(myrisk)
```

Description

Classes for bounded, robust weights.

Objects from the Class

Objects can be created by calls of the form `new("BoundedWeight", ...)`. 

Slots

- `name` Object of class "character"; inherited from class RobWeight.
- `weight` Object of class "function" — the weight function; inherited from class RobWeight.
- `clip` Object of class "numeric" — clipping bound(s).

Extends

Class "RobWeight", directly.
**Methods**

`clip` signature(x1 = "BoundedWeight"): accessor function for slot `clip`.

`clip<-` signature(object = "BoundedWeight", value = "numeric"): replacement function for slot `clip`. This replacement method should be used with great care, as the slot `weight` is not simultaneously updated and hence, this may lead to inconsistent objects.

**Author(s)**

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

**References**


**See Also**

`RobWeight-class, IC, InfluenceCurve-class`

**Examples**

```r
## prototype
nenew("BoundedWeight")
```

---

**Description**

Generic function for checking centering and Fisher consistency of ICs.

**Usage**

```r
checkIC(IC, L2Fam, ...)
## S4 method for signature 'IC,missing'
checkIC(IC, out = TRUE, ..., diagnostic = FALSE)
## S4 method for signature 'IC,L2ParamFamily'
checkIC(IC, L2Fam, out = TRUE, ..., diagnostic = FALSE)
```
Arguments

IC object of class "IC"
L2Fam L2-differentiable family of probability measures.
out logical: Should the values of the checks be printed out?
... additional parameters
diagnostic logical; if TRUE and out==TRUE, diagnostic information on the integration is printed; independent of out, if diagnostic==TRUE, this information is returned as attribute diagnostic of the return value.

Details

The precisions of the centering and the Fisher consistency are computed.

Diagnostics on the involved integrations are available if argument diagnostic is TRUE. Then there is attribute diagnostic attached to the return value, which may be inspected and accessed through showDiagnostic and getDiagnostic.

Value

The maximum deviation from the IC properties is returned.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References


See Also

L2ParamFamily-class, IC-class

Examples

IC1 <- new("IC")
checkIC(IC1)
Description

The wrapper ComparePlot (capital C!) takes most of arguments to function comparePlot (lower case c!) by default and gives a user possibility to run the function with low number of arguments.

Usage

```r
ComparePlot(IC1, IC2, y, ..., IC3 = NULL, IC4 = NULL,
  alpha.trsp = 100, with.legend = TRUE, rescale = FALSE,
  withCall = TRUE)
```

Arguments

- **IC1**: object of class IC
- **IC2**: object of class IC
- **IC3**: object of class IC
- **IC4**: object of class IC
- **y**: optional data argument — for plotting observations into the plot
- **...**: additional parameters (in particular to be passed on to `plot`)
- **alpha.trsp**: the transparency argument (0 to 100) for plotting the data
- **with.legend**: the flag for showing the legend of the plot
- **rescale**: the flag for rescaling the axes for better view of the plot
- **withCall**: the flag for the call output

Value

`invisible(retV)` where `retV` is the return value of the respective call to the full-fledged function `comparePlot` with the additional item `wrapcall` with the call to the wrapper `ComparePlot` and `wrappedcall` the call to to the full-fledged function `comparePlot`.

Details

Calls `comparePlot` with suitably chosen defaults; if `withCall` == `TRUE`, the call to `comparePlot`, i.e., item `wrappedcall` of the (hidden) return value, is printed.

Examples

```r
# Gamma
fam <- GammaFamily()
rfam <- InfRobModel(fam, ContNeighborhood(0.5))
IC1 <- optIC(model = fam, risk = asCov())
IC2 <- makeIC(list(function(x)sin(x),function(x)x^2), L2Fam = fam)
```
Y <- distribution(fam)
y <- r(Y)(100)
ComparePlot(IC1, IC2, y, withCall = TRUE)

comparePlot-methods  Compare - Plots

Description
Plots 2-4 influence curves to the same model.

Usage
comparePlot(obj1, obj2, ...)
## S4 method for signature 'IC,IC'
comparePlot(obj1, obj2, obj3 = NULL, obj4 = NULL, data = NULL, ...
    , withSweave = getdistrOption("withSweave"),
    forceSameModel = FALSE, main = FALSE, inner = TRUE,
    sub = FALSE, col = par("col"), lwd = par("lwd"), lty,
    col.inner = par("col.main"), cex.inner = 0.8,
    bmar = par("mar")[1], tmar = par("mar")[3],
    with.automatic.grid = TRUE, with.legend = FALSE,
    legend = NULL, legend.bg = "white",
    legend.location = "bottomright", legend.cex = 0.8,
    withMBR = FALSE, MBRB = NA, MBR.fac = 2, col.MBR = par("col"),
    lty.MBR = "dashed", lwd.MBR = 0.8, x.vec = NULL,
    scaleX = FALSE, scaleX.fct, scaleX.inv, scaleY = FALSE,
    scaleY.fct = pnorm, scaleY.inv = qnorm, scaleN = 9,
    x.ticks = NULL, y.ticks = NULL, mfColRow = TRUE,
    to.draw.arg = NULL,
    cex pts = 1, cex pts.fun = NULL, col pts = par("col"),
    pch pts = 19, cex npts = 1, cex npts.fun = NULL,
    col.npts = par("col"), pch.npts = 20, jitter.fac = 1,
    with.lab = FALSE, cex.labs = 1, adj.labs = c(0, 0),
    col.labs = col.pnts, lab.pnts = NULL, lab.font = NULL,
    alpha.trsp = NA, which.lbs = NULL, which.Order = NULL,
    which.nonlbs = NULL, attr.pre = FALSE, return.Order = FALSE,
    withSubst = TRUE)

Arguments
obj1  object of class "InfluenceCurve"
obj2  object of class "InfluenceCurve" to be compared with obj1
obj3  optional: object of class "InfluenceCurve" to be compared with obj1
obj4  optional: object of class "InfluenceCurve" to be compared with obj1
data  optional data argument — for plotting observations into the plot;
withSweave logical: if TRUE (for working with Sweave) no extra device is opened
forceSameModel logical: shall we check/enforce that the model of the ICs obj1, obj2, obj3, and obj4 be the same?
main logical: is a main title to be used? or just as argument main in plot.default.
col color[s] of ICs in arguments obj1 [.., obj4].
lwd linewidth[s] of ICs in arguments obj1 [.., obj4].
lty line-type[s] of ICs in arguments obj1 [.., obj4].
inner logical: do panels have their own titles? or character vector of / cast to length 'number of plotted dimensions'; if argument to.draw.arg is used, this refers to a vector of length length(to.draw.arg), the actually plotted dimensions. For further information, see also description of argument main in plot.default.
sub logical: is a sub-title to be used? or just as argument sub in plot.default.
tmar top margin – useful for non-standard main title sizes
bmar bottom margin – useful for non-standard sub title sizes
cex.inner magnification to be used for inner titles relative to the current setting of cex; as in par
col.inner character or integer code; color for the inner title
with-automatic.grid logical: should a grid be plotted alongside with the ticks of the axes, automatically? If TRUE a respective call to grid in argument panel.first is ignored.
with.legend logical; shall a legend be plotted?
legend either NULL or a list of length (number of plotted panels) of items which can be used as argument legend in command legend.
legend.location a valid argument x for legend — the place where to put the legend on the last issued plot
legend.bg background color for the legend
legend.cex magnification factor for the legend
withMBR logical; shall horizontal lines with min and max of MBRE be plotted for comparison?
MBRB matrix (or NA); coerced by usual recycling rules to a matrix with as many rows as plotted panels and with first column the lower bounds and the second column the upper bounds for the respective coordinates (ideally given by the MBR-IC).
MBR.fac positive factor; scales the bounds given by argument MBRB
col.MBR color for the MBR lines; as usual col-argument;
lty.MBR line type for the MBR lines; as usual lty-argument;
lwd.MBR line width for the MBR lines; as usual lwd-argument;
x.vec a numeric vector of grid points to evaluate the influence curve; by default, x.vec is NULL; then the grid is produced automatically according to the distribution of the IC. x.vec can be useful for usage with a rescaling of the x-axis to avoid that the evaluation points be selected too unevenly (i.e. on an equally spaced grid in the original scale, but then, after rescaling non-equally). The grid has to be specified in original scale; i.e.; when used with rescaling, it should be chosen non-equally spaced.

scaleX logical; shall X-axis be rescaled (by default according to the cdf of the underlying distribution)?

scaleY logical; shall Y-axis be rescaled (by default according to a probit scale)?

scaleX.fct an isotone, vectorized function mapping the domain of the IC to [0,1]; if scaleX is TRUE and scaleX.fct is missing, the cdf of the underlying observation distribution.

scaleX.inv the inverse function to scale.fct, i.e., an isotone, vectorized function mapping [0,1] to the domain of the IC such that for any x in the domain, scaleX.inv(scaleX.fct(x))==x; if scaleX is TRUE and scaleX.inv is missing, the quantile function of the underlying observation distribution.

scaleY.fct an isotone, vectorized function mapping for each coordinate the range of the respective coordinate of the IC to [0,1]; defaulting to the cdf of $\mathcal{N}(0,1)$; can also be a list of functions with one list element for each of the panels to be plot.

scaleY.inv an isotone, vectorized function mapping for each coordinate the range [0,1] into the range of the respective coordinate of the IC; defaulting to the quantile function of $\mathcal{N}(0,1)$; can also be a list of functions with one list element for each of the panels to be plot.

scaleN integer; defaults to 9; on rescaled axes, number of x and y ticks if drawn automatically;

x.ticks numeric; defaults to NULL; (then ticks are chosen automatically); if non-NULL, user-given x-ticks (on original scale);

y.ticks numeric; defaults to NULL; (then ticks are chosen automatically); if non-NULL, user-given y-ticks (on original scale); can be a list with one (numeric or NULL) item per panel

mfColRow shall default partition in panels be used — defaults to TRUE

to.draw.arg Either NULL (default; everything is plotted) or a vector of either integers (the indices of the subplots to be drawn) or characters — the names of the subplots to be drawn: these names are to be chosen either among the row names of the trafo matrix rownames(trafo(eval(obj1@Ca1L2Fam@param))) or if the last expression is NULL a vector "dim<dimnr>", dimnr running through the number of rows of the trafo matrix.

withSubst logical; if TRUE (default) pattern substitution for titles and labels is used; otherwise no substitution is used.

col.pts color of the points of the data argument plotted; can be a vector or a matrix. More specifically, if argument attr.pre is TRUE, it is recycled to fill a matrix of dimension n by nIC (n the number of observations prior to any selection and nIC the number of ICs plotted) where filling is done in order column first. The columns are used for possibly different colors for the different ICs from
arguments obj1, obj2, and, possibly obj3 and obj4. The selection done via which.lbs and which.Order is then done afterwards and on this matrix; in this case, argument col.npts is ignored. If attr.pre is FALSE, col.pnts is recycled to fill a matrix of dimension n.s by nIC where n.s is the number of observations selected for labelling and refers to the index ordering after the selection. Then argument col.npts determines the colors of the shown but non-labelled observations as given in argument which.nonlbs.

pch.pnts symbol of the points of the data argument plotted (may be a vector of length nIC or a matrix, see col.pnts).

cex.pnts size of the points of the data argument plotted (may be a vector of length nIC or a matrix, see col.pnts).

cex.pnts.fun rescaling function for the size of the points to be plotted; either NULL (default), then log(1+abs(x)) is used for each of the rescalings, or a function which is then used for each of the rescalings, or a list of functions; if it is a function or a list of functions, if necessary it is recycled to length nIC * dim where dim is the number of dimensions of the pICs to be plotted; in the index of this list, nIC is incremented first; then dim.

col.npts color of the non-labelled points of the data argument plotted; (may be a vector of length nIC the number of plotted pICs, i.e., one value for each pIC in arguments obj1, obj2, and, if available, obj3 and obj4, or it can be a matrix nnlb <- sum(which.nonlbs) by nIC, nnlb the number of non-labelled observations.

pch.npts symbol of the non-labelled points of the data argument plotted (may be a vector of length nIC or a matrix, see col.npts).

cex.npts size of the non-labelled points of the data argument plotted (may be a vector of length nIC or a matrix, see col.npts).

cex.npts.fun rescaling function for the size of the non-labelled points to be plotted; either NULL (default), then log(1+abs(x)) is used for each of the rescalings, or a function which is then used for each of the rescalings, or a list of functions; if it is a function or a list of functions, if necessary it is recycled to length nIC * dim where dim is the number of dimensions of the pICs to be plotted; in the index of this list, nIC is incremented first; then dim.

lab.pnts character or NULL; labels to be plotted to the observations; can be a vector of length n, n the number of all observations prior to any selection with which.lbs, which.Order; if lab.pnts is NULL, observation indices are used.

with.lab logical; shall labels be plotted to the observations? (May be a vector of length nIC, see col.pnts - but not a matrix).

cex.lbs size of the labels; can be vectorized to an array of dim nlbs x nIC x npnl where npnl is the number of plotted panels and nlbs the number of plotted labels; if it is a vector, it is recycled in order labels then plotted ICs then panels.

col.lbs color of the labels; can be vectorized to a matrix of dim nlbs x nIC as col.pnts.

adj.lbs adjustment of the labels; can be vectorized to an array of dim 2 x nIC x npnl, npnl the number of plotted panels; if it is a vector, it is recycled in order (x,y)-coords then ICs then panels.

lab.font font to be used for labels (may be a vector of length nIC, see with.lab).
alpha.trsp  alpha transparency to be added ex post to colors col.pch and col.lbl; if one-
dim and NA all colors are left unchanged. Otherwise, with usual recycling rules
alpha.trsp gets shorted/prolongated to length the data-symbols to be plotted.
Coordinates of this vector alpha.trsp with NA are left unchanged, while for
the remaining ones, the alpha channel in rgb space is set to the respective coor-
dinate value of alpha.trsp. The non-NA entries must be integers in \([0,255]\) (0
invisible, 255 opaque).

tCCf  jittering factor used in case of a DiscreteDistribution for plotting points
of the data argument in a jittered fashion (may be a vector of length 2, see
with.lab).

attr.pre  logical; do graphical attributes for plotted data refer to indices prior (TRUE) or
posterior to selection via arguments which.lbs, which.Order, which.nonlbs
(FALSE)?

which.lbs  either an integer vector with the indices of the observations to be plotted into
graph or NULL — then no observation is excluded.

which.Order  for each of the given ICs, we order the observations (descending) according to
the norm given by the corresponding normtype(object); then which.Order
either is an integer vector with the indices of the ordered observations (remain-
ing after a possible reduction by argument which.lbs) to be plotted into graph
or NULL — then no (further) observation is excluded.

which.nonlbs  indices of the observations which should be plotted but not labelled; either an
integer vector with the indices of the observations to be plotted into graph or
NULL — then all non-labelled observations are plotted.

return.Order  logical; if TRUE, a list of length maximally four with order vectors is returned —
one for the ordering w.r.t. each of the given ICs; more specifically, the order of
the (remaining) observations given by their original index is returned (remaining
means: after a possible reduction by argument which.lbs, and ordering
is according to the norm given by normtype(object)); otherwise we return
invisible() as usual.

...  further arguments to be passed to plot

details

Any parameters of plot.default may be passed on to this particular plot method.

For main-, inner, and subtitles given as arguments main, inner, and sub, top and bottom margins
are enlarged to 5 resp. 6 by default but may also be specified by tmar / bmar arguments. If main /
inner / sub are logical then if the respective argument is FALSE nothing is done/plotted, but if it is
TRUE, we use a default main title taking up the calling arguments in case of main, default inner titles
taking up the class and (named) parameter slots of arguments in case of inner, and a "generated
on <data>"-tag in case of sub. Of course, if main / inner / sub are character, this is used for the
title; in case of inner it is then checked whether it has correct length. If argument withSubst is
TRUE, in all title and axis lable arguments, the following patterns are substituted:

"%C1","%C2","%C3","%C4"] class of argument obj<i>, i=1...4

"%A1","%A2","%A3","%A4"] deparsed argument obj<i>, i=1...4

"%D" time/date-string when the plot was generated
If argument ... contains argument ylim, this may either be as in plot.default (i.e. a vector of length 2) or a vector of length 2*(number of plotted dimensions); in the case of longer length, these are the values for ylim for the plotted dimensions of the IC, one pair for each dimension.

In addition, argument ... may contain arguments panel.first, panel.last, i.e., hook expressions to be evaluated at the very beginning and at the very end of each panel (within the then valid coordinates). To be able to use these hooks for each panel individually, they may also be lists of expressions (of the same length as the number of panels and run through in the same order as the panels).

**Value**

An S3 object of class c("plotInfo","DiagnInfo"), i.e., a list containing the information needed to produce the respective plot, which at a later stage could be used by different graphic engines (like, e.g. ggplot) to produce the plot in a different framework. A more detailed description will follow in a subsequent version.

**Author(s)**

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

**References**


**See Also**

L2ParamFamily-class, IC-class, plot

**Examples**

```r
if(require(ROptEst)){
  N0 <- NormLocationScaleFamily(mean=0, sd=1)
  N0.Rob1 <- InfRobModel(center = N0, neighbor = ContNeighborhood(radius = 0.5))

  IC1 <- optIC(model = N0, risk = asCov())
  IC2 <- optIC(model = N0.Rob1, risk = asMSE())

  comparePlot(IC1,IC2)

  set.seed(12); data <- r(N0)(20)
  comparePlot(IC1, IC2, data=data, with.lab = TRUE,
              which.lbs = c(1:4,15:20),
              which.Order = 1:6,
              return.Order = TRUE)

  ## don't test to reduce check time on CRAN
  ## selection of subpanels for plotting
```
par(mfrow=c(1,1))
comparePlot(IC1, IC2, mfColRow = FALSE, to.draw.arg=c("mean"),
panel.first=grid(), ylim=c(-4,4), xlim=c(-6,6))

## matrix-valued ylim
comparePlot(IC1, IC2, panel.first=grid(), ylim=c(-4,4,0,4), xlim=c(-6,6))

x <- c(data,-12,10)
comparePlot(IC1, IC2, data=x, which.Order=10,
panel.first=grid(), ylim=c(-4,4,0,4), xlim=c(-6,6))

Y <- Chisq(df=1) * DiscreteDistribution(c(-1,1))
comparePlot(IC1, IC2, data=x, which.Order=10,
scaleX = TRUE, scaleX.fct=pnorm, scaleX.inv=qnorm,
scaleY = TRUE, scaleY.fct=pY, scaleY.inv=q1(Y),
panel.first=grid(), ylim=c(-4,4,0,4), xlim=c(-6,6))

## with use of trafo-matrix:
G <- GammaFamily(scale = 1, shape = 2)
## explicitly transforming to
## MASS parametrization:
mtrafo <- function(x){
  nms0 <- names(c(main(param(G)), nuisance(param(G))))
  nms <- c("shape","rate")
  fval0 <- c(x[2], 1/x[1])
  names(fval0) <- nms
  mat0 <- matrix(c(0, -1/x[1]^2, 1, 0), nrow = 2, ncol = 2,
  dimnames = list(nms,nms0))
  list(fval = fval0, mat = mat0))
G2 <- G
trafo(G2) <- mtrafo
G2
G2.Rob1 <- InfRobModel(center = G2, neighbor = ContNeighborhood(radius = 0.5))
system.time(IC1 <- optIC(model = G2, risk = asCov()))
system.time(IC2 <- optIC(model = G2.Rob1, risk = asMSE()))
system.time(IC2.i <- optIC(model = G2.Rob1, risk = asMSE(normtype=InfoNorm())))
system.time(IC2.s <- optIC(model = G2.Rob1, risk = asMSE(normtype=SelfNorm())))

comparePlot(IC1, IC2, IC2.i, IC2.s)

}
Description

Generates an object of class "ContIC": i.e., an influence curves \( \eta \) of the form

\[
\eta = (A\Lambda - a) \min(1, b/|A\Lambda - a|)
\]

with clipping bound \( b \), centering constant \( a \) and standardizing matrix \( A \). \( \Lambda \) stands for the L2 derivative of the corresponding L2 differentiable parametric family which can be created via CallL2Fam.

Usage

```r
ContIC(name, CallL2Fam = call("L2ParamFamily"),
       Curve = EuclRandVarList(RealRandVariable(Map = c(function(x){x}),
                                  Domain = Reals())),
       Risks, Infos, clip = Inf, cent = 0, stand = as.matrix(1),
       lowerCase = NULL, neighborRadius = 0, w = new("HampelWeight"),
       normtype = NormType(), biastype = symmetricBias(),
       modifyIC = NULL)
```

Arguments

- `name`: object of class "character".
- `CallL2Fam`: object of class "call": creates an object of the underlying L2-differentiable parametric family.
- `Curve`: object of class "EuclRandVarList".
- `Risks`: object of class "list": list of risks; cf. RiskType-class.
- `Infos`: matrix of characters with two columns named method and message: additional informations.
- `clip`: positive real: clipping bound.
- `cent`: real: centering constant
- `stand`: matrix: standardizing matrix
- `w`: HampelWeight: weight object
- `lowerCase`: optional constant for lower case solution.
- `neighborRadius`: radius of the corresponding (unconditional) contamination neighborhood.
- `biastype`: BiasType: type of the bias
- `normtype`: NormType: type of the norm
- `modifyIC`: object of class "OptionalFunction": function of four arguments: (1) L2Fam an L2 parametric family (2) IC an optional influence curve, (3) withMakeIC a logical argument whether to enforce the IC side conditions by makeIC, and (4) ... for arguments to be passed to calls to E in makeIC. Returns an object of class "IC". This function is mainly used for internal computations!

Value

Object of class "ContIC"
Author(s)
Matthias Kohl <Matthias.Kohl@stamats.de>

References

See Also
IC-class, ContIC, HampIC-class

Examples
```r
IC1 <- ContIC()
plot(IC1)
```

---

### Description

Class of (partial) influence curves of contamination type; i.e., influence curves $\eta$ of the form

$$
\eta = (A\Lambda - a) \min(1, b/|A\Lambda - a|)
$$

with clipping bound $b$, centering constant $a$ and standardizing matrix $A$. $\Lambda$ stands for the L2 derivative of the corresponding L2 differentiable parametric family created via the call in the slot callL2Fam.

### Objects from the Class

Objects can be created by calls of the form `new("ContIC", ...)`. More frequently they are created via the generating function `ContIC`, respectively via the method `generateIC`.

### Slots

- **callL2Fam**: object of class "call"; creates an object of the underlying L2-differentiable parametric family.
- **name**: object of class "character"
- **Curve**: object of class "EuclRandVarList"
- **modifyIC**: object of class "OptionalFunction"; function of four arguments: (1) L2Fam an L2 parametric family (2) IC an optional influence curve, (3) withMakeIC a logical argument whether to enforce the IC side conditions by `makeIC`, and (4) ... for arguments to be passed to calls to `makeIC`. Returns an object of class "IC". This function is mainly used for internal computations!
Risks: object of class "list": list of risks; cf. RiskType-class.
Infos: object of class "matrix" with two columns named method and message: additional informations.
clip: object of class "numeric": clipping bound.
cent: object of class "numeric": centering constant.
stand: object of class "matrix": standardizing matrix.
weight: object of class "HampelWeight": weight function
biastype: object of class "BiasType": bias type (symmetric/onsided/asymmetric)
normtype: object of class "NormType": norm type (Euclidean, information/self-standardized)
lowerCase: object of class "OptionalNumeric": optional constant for lower case solution.
neighborRadius: object of class "numeric": radius of the corresponding (unconditional) contamination neighborhood.

Extends
Class "HampIC", directly.
Class "IC", by class "HampIC".
Class "InfluenceCurve", by class "IC".

Methods

CallL2Fam<- signature(object = "ContIC"): replacement function for slot CallL2Fam.
cent signature(object = "ContIC"): accessor function for slot cent.
cent<- signature(object = "ContIC"): replacement function for slot cent.
clip signature(x1 = "ContIC"): accessor function for slot clip.
clip<- signature(object = "ContIC"): replacement function for slot clip.
stand<- signature(object = "ContIC"): replacement function for slot stand.
lowerCase<- signature(object = "ContIC"): replacement function for slot lowerCase.
neighbor signature(object = "ContIC"): generates an object of class "ContNeighborhood" with radius given in slot neighborRadius.
generateIC signature(neighbor = "ContNeighborhood", L2Fam = "L2ParamFamily"): generate an object of class "ContIC”. Rarely called directly.
show signature(object = "ContIC")

Author(s)
Matthias Kohl <Matthias.Kohl@stamats.de>

References
ContNeighborhood

Description

Generates an object of class "ContNeighborhood".

Usage

ContNeighborhood(radius = 0)

Arguments

radius non-negative real: neighborhood radius.

Value

Object of class "ContNeighborhood"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

sertation.

See Also

ContNeighborhood-class

Examples

ContNeighborhood()

## The function is currently defined as
function(radius = 0){
    new("ContNeighborhood", radius = radius)
}
ContNeighborhood-class

Contamination Neighborhood

Description

Class of (unconditional) contamination neighborhoods.

Objects from the Class

Objects can be created by calls of the form `new("ContNeighborhood", ...)`. More frequently they are created via the generating function `ContNeighborhood`.

Slots

- `type` Object of class "character": “(uncond.) convex contamination neighborhood”.
- `radius` Object of class "numeric": neighborhood radius.

Extends

Class "UncondNeighborhood", directly.
Class "Neighborhood", by class "UncondNeighborhood".

Methods

No methods defined with class "ContNeighborhood" in the signature.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References


See Also

ContNeighborhood, UncondNeighborhood-class

Examples

`new("ContNeighborhood")`
Generating function(s) for class 'cutoff'

Description

Generating function(s) for class cutoff.

Usage

cutoff(name = "empirical", body.fct0,
  cutoff.quantile = 0.95,
  norm = NormType(), QF, nsim = 100000)
cutoff.sememp(cutoff.quantile = 0.95)
cutoff.chisq(cutoff.quantile = 0.95)
cutoff.quant(qfct)

Arguments

  name           argument for name slot of cutoff object
  body.fct0      a call generated by code wrapped to substitute resp. quote; the body of the
data slot of the cutoff object
  cutoff.quantile numeric (in [0,1]); the corresponding slot value for the cutoff object
  norm           an object of class NormType – the norm/distance by which to produce the cutoff
                  value.
  nsim           integer: the sample size used for determining the quantiles of (x^T Q x)^(1/2) for x
                  a corresponding quadratic form
  QF             a quadratic (positive semidefinite, symmetric) matrix used as quadratic form
  qfct           a (nominal) quantile function

Details

cutoff generates a valid object of class "cutoff". As function slot fct may only have a formal argument data, the other arguments to determine the cutoff value, i.e. norm, QF, nsim, cutoff.quantile, nsim have to enter the scope of this function by lexical scoping; now cutoff.quantile, norm, QF are to be taken from the calling environment (not from the defining one), so we have delay evaluation of the function body, which is why we assume it to be given wrapped into substitute resp. quote. body.fct0 is by default (i.e. if argument body.fct0 is missing) set to quote(quantile(slot(norm,"fct")(data), cutoff.quantile)), internally, i.e.; to an empirical quantile of the corresponding norms.

cutoff.sememp() is a helper function generating the theoretical (asymptotic) quantile of (the square root of) a corresponding quadratic form, assuming multivariate normality; to determine this quantile nsim simulations are used.
cutoff-class

cutoff.chisq() is a helper function generating the theoretical (asymptotic) quantile of (the square root of) a (self-standardized) quadratic form, assuming multivariate normality; i.e.; a corresponding quantile of a Chi-Square distribution.

cutoff.quant() is a helper function generating the theoretical quantile corresponding to the quantile function qfct: if qfct is missing, it searches the caller environment for an object .ICloc, and if this exists it uses the respective model quantile function; the fallback is qnorm. At any rate, if there is an object ..trf in the scope of the function it is used to transfer the quantile (after its evaluation).

Value

Object of class "cutoff".

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

See Also

cutoff-class, ddPlot

Examples

cutoff()
cutoff.sememp()
cutoff.chisq()
cutoff.quantile: Object of class "numeric": a probability (in [0,1]) to determine the respective quantile (empirical or theoretical) to plot the cutoff line; defaults to 0.95 in prototype.

Methods

cutoff.quantile signature(object = "cutoff"): accessor function for slot cutoff.quantile.
cutoff.quantile<- signature(object = "cutoff"): replacement function for slot cutoff.quantile.
fct signature(object = "cutoff"): accessor function for slot fct.
name signature(object = "cutoff"): accessor function for slot name.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

See Also
ddPlot, outlyingPlotIC cutoff

Examples
cutoff()

ddPlot-methods

Methods for Function ddPlot in Package 'RobAStBase'

Description
ddPlot-methods

Usage
ddPlot(data, dist.x, dist.y, cutoff.x, cutoff.y, ...)## S4 method for signature 'matrix'
ddPlot(data, dist.x = NormType(), dist.y = NormType(),
cutoff.x, cutoff.y, ...,
cutoff.quantile.x = 0.95, cutoff.quantile.y = cutoff.quantile.x,
transform.x, transform.y = transform.x,
id.n, cex.pts = 1,lab.pts = 0, alpha.trsp = NA, adj =0, cex.idn,
col.idn, lty.cutoff, lwd.cutoff, col.cutoff, text.abline = TRUE,
text.abline.x = NULL, text.abline.y = NULL,
cex.abline = par("cex"), col.abline = col.cutoff,
font.abline = par("font"), adj.abline = c(0,0),
text.abline.x.x = NULL, text.abline.x.y = NULL,
text.abline.y.x = NULL, text.abline.y.y = NULL,
text.abline.x.fmt.cx = "%7.2f", text.abline.x.fmt.qx = "%4.2f%%",
text.abline.y.fmt.cy = "%7.2f", text.abline.y.fmt.qy = "%4.2f%%",
jitter.fac, jitter.tol = .Machine$double.eps,doplot = TRUE)
## S4 method for signature 'numeric'

```
ddPlot(data, dist.x = NormType(), dist.y = NormType(),
       cutoff.x, cutoff.y, ...,
       cutoff.quantile.x = 0.95, cutoff.quantile.y = cutoff.quantile.x,
       transform.x, transform.y = transform.x,
       id.n, cex.eps, cex.idn, lty.cutoff, lwd.cutoff, col.cutoff, text.abline = TRUE,
       text.abline.x = NULL, text.abline.y = NULL,
       cex.abline = par("cex"), col.abline = col.cutoff,
       font.abline = par("font"), adj.abline = c(0,0),
       text.abline.x.x = NULL, text.abline.x.y = NULL,
       text.abline.y.x = NULL, text.abline.y.y = NULL,
       text.abline.x.fmt.cx = "%7.2f", text.abline.x.fmt.qx = "%4.2f%%",
       text.abline.y.fmt.cy = "%7.2f", text.abline.y.fmt.qy = "%4.2f%%",
       jitter.fac, jitter.tol.=.Machine$double.eps, doplot = TRUE)
```

## S4 method for signature 'data.frame'

```
ddPlot(data, dist.x = NormType(), dist.y = NormType(),
       cutoff.x, cutoff.y, ...,
       cutoff.quantile.x = 0.95, cutoff.quantile.y = cutoff.quantile.x,
       transform.x, transform.y = transform.x,
       id.n, cex.eps, cex.idn, lty.cutoff, lwd.cutoff, col.cutoff, text.abline = TRUE,
       text.abline.x = NULL, text.abline.y = NULL,
       cex.abline = par("cex"), col.abline = col.cutoff,
       font.abline = par("font"), adj.abline = c(0,0),
       text.abline.x.x = NULL, text.abline.x.y = NULL,
       text.abline.y.x = NULL, text.abline.y.y = NULL,
       text.abline.x.fmt.cx = "%7.2f", text.abline.x.fmt.qx = "%4.2f%%",
       text.abline.y.fmt.cy = "%7.2f", text.abline.y.fmt.qy = "%4.2f%%",
       jitter.fac, jitter.tol.=.Machine$double.eps, doplot = TRUE)
```

### Arguments

- **data**
  - data coercable to matrix; the data at which to produce the `ddPlot`.

- **...**
  - further arguments to be passed to `plot.default`, `text`, and `abline`

- **dist.x**
  - object of class `NormType`; the distance for the x axis.

- **dist.y**
  - object of class `NormType`; the distance for the y axis.

- **cutoff.x**
  - object of class `cutoff`; the cutoff information for the x axis (the vertical line discriminating 'good' and 'bad' points).

- **cutoff.y**
  - object of class `cutoff`; the cutoff information for the y axis (the horizontal line discriminating 'good' and 'bad' points).

- **cutoff.quantile.x**
  - numeric; the cutoff quantile for the x axis.

- **cutoff.quantile.y**
  - numeric; the cutoff quantile for the y axis.

- **transform.x**
  - function; a transformation to be performed before determining the distances of the x axis.
transform.y function; a transformation to be performed before determining the distances of the y axis.

id.n a set of indices (or a corresponding logical vector); to select a subset of the data in argument data.

cex.pnts the corresponding cex argument for plotted points.

lab.pnts a vector of labels for the (unsubsetted) data.

jitter.pnts the corresponding jitter argument for plotted points; may be a vector of length 2 – for separate factors for x- and y-coordinate.

alpha.trsp alpha transparency to be added ex post to colors col.pch and col.lbl; if one-dim and NA all colors are left unchanged. Otherwise, with usual recycling rules alpha.trsp gets shorted/prolongated to length the data-symbols to be plotted. Coordinates of this vector alpha.trsp with NA are left unchanged, while for the remaining ones, the alpha channel in rgb space is set to the respective coordinate value of alpha.trsp. The non-NA entries must be integers in [0,255] (0 invisible, 255 opaque).

adj the corresponding argument for text for labelling the outliers.

cex.idn the corresponding cex argument for text for labelling the outliers.

col.idn the corresponding col argument for text for labelling the outliers.

lty.cutoff the corresponding lty argument for abline for drawing the cutoff lines; either one lty-value (one value or vector) or a list of length 2 of lty-values.

lwd.cutoff (vector cast to length 2): the corresponding lwd argument for abline for drawing the cutoff lines.

col.cutoff (vector cast to length 2): the corresponding col argument for abline for drawing the cutoff lines.

text.abline vector of logicals (cast to length 2): shall text be added to cutoff lines.

text.abline.x text to be added to cutoff lines in x direction; if NULL (default) we use “[[pp]\%]-cutoff = [ff]” where [pp] is the percentage up to 2 digits and [ff] is the cutoff value up to 2 digits.

text.abline.y text to be added to cutoff lines in y direction; if NULL (default) we use “[[pp]\%]-cutoff = [ff]” where [pp] is the percentage up to 2 digits and [ff] is the cutoff value up to 2 digits.

cex.abline vector of numerics (cast to length 2): cex-value for added cutoff text.

col.abline vector of length 2: color for added cutoff text.

font.abline vector of length 2: font for added cutoff text.

adj.abline cast to 2 x 2 matrix (by recycling rules): adjustment values for added cutoff text.

text.abline.x.y y-coordinate of text to be added to cutoff lines in x direction; if NULL (default) set to mid of mean(par("usr")[c(3,4)])

text.abline.y.x x-coordinate of text to be added to cutoff lines in y direction; if NULL (default) set to mid of mean(par("usr")[c(1,2)])
text.abline.x.x
x-coordinate of text to be added to cutoff lines in x direction; if NULL (default) set to 1.05 times the cutoff value.

text.abline.y.y
y-coordinate of text to be added to cutoff lines in y direction; if NULL (default) set to 1.05 times the cutoff value.

text.abline.x.fmt.cx
format string (see `gettextf`) to format the cutoff value in label in x direction.

text.abline.x.fmt.qx
format string to format cutoff probability in label in x direction.

text.abline.y.fmt.cy
format string to format the cutoff value in label in y direction.

text.abline.y.fmt.qy
format string to format cutoff probability in label in y direction.

jitter.fac
factor for jittering, see `jitter`;

jitter.tol
threshold for jittering: if distance between points is smaller than `jitter.tol`, points are considered replicates.

doplot
logical; shall a plot be produced? if FALSE only the return values are produced.

Details
The matrix-method calls `.ddPlot.MatNtNtCoCo`, the numeric- and data.frame-methods coerce argument `data` to `matrix` — the numeric-method by a call to `matrix(data, nrow=1)`, in the data.frame-methods by a call to `t(as.matrix(data))`.

In arguments `text.abline.x` and `text.abline.y` the following patterns are substituted:

"%qx" cutoff-quantile in x-direction
"%qy" cutoff-quantile in y-direction
"%cx" cutoff-value in x-direction
"%cy" cutoff-value in y-direction

Value
If argument `doplot` is FALSE: A list (returned as `invisible()`) with items

id.x the indices of (possibly transformed) data (within subset `id.n`) beyond the x-cutoff
id.y the indices of (possibly transformed) data (within subset `id.n`) beyond the y-cutoff
id.xy the indices of (possibly transformed) data (within subset `id.n`) beyond the x-cutoff and the y-cutoff
qtx the quantiles of the distances of the (possibly transformed) data in x direction
qty the quantiles of the distances of the (possibly transformed) data in y direction
cutoff.x.v the cutoff value in x direction
cutoff.y.v the cutoff value in y direction
If argument doplot is TRUE: An S3 object of class c("plotInfo","DiagnInfo"), i.e., a list containing the information needed to produce the respective plot, which at a later stage could be used by different graphic engines (like, e.g., ggplot) to produce the plot in a different framework. A more detailed description will follow in a subsequent version. One item is retV which is the return value in case doplot is FALSE.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

Examples

```r
MX <- matrix(rnorm(1500), nrow=6)
QM <- matrix(rnorm(36), nrow=6); QM <- QM %*% t(QM)
ddPlot(data=MX, dist.y=QFNorm(QuadF=PosSemDefSymmMatrix(QM))
```

---

evalIC

Generic function for evaluating ICs

Description

Generic function for evaluating ICs.

Usage

```r
evalIC(IC, x)
```

Arguments

- `IC` object of class "IC"
- `x` numeric vector or matrix

Details

The list of random variables contained in the slot Curve is evaluated at `x`.

Value

In case `x` is numeric a vector and in case `x` is matrix a matrix is returned.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

FixRobModel

See Also

IC-class

FixRobModel Generating function for FixRobModel-class

Description

Generates an object of class "FixRobModel".

Usage

FixRobModel(center = ParamFamily(modifyParam =
    function(theta) Norm(mean = theta)), neighbor = ContNeighborhood())

Arguments

center object of class "ProbFamily"
neighbor object of class "UncondNeighborhood"

Value

Object of class "FixRobModel"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References


See Also

FixRobModel-class

Examples

(M1 <- FixRobModel())

## The function is currently defined as
function(center = ParamFamily(), neighbor = ContNeighborhood()){
    new("FixRobModel", center = center, neighbor = neighbor)
}
FixRobModel-class

Robust model with fixed (unconditional) neighborhood

Description

Class of robust models with fixed (unconditional) neighborhoods.

Objects from the Class

Objects can be created by calls of the form new("FixRobModel", ...). More frequently they are created via the generating function FixRobModel.

Slots

center Object of class "ProbFamily".
neighbor Object of class "UncondNeighborhood".

Extends

Class "RobModel", directly.

Methods

neighbor<- signature(object = "FixRobModel"): replacement function for slot neighbor<- show signature(object = "FixRobModel")

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References


See Also

ProbFamily-class, UncondNeighborhood-class, FixRobModel

Examples

new("FixRobModel")
generateIC

Generic function for the generation of influence curves

Description

This function is rarely called directly. It is used by other functions to create objects of class "IC".

Usage

generateIC(neighbor, L2Fam, ...)

Arguments

neighbor Object of class "Neighborhood".
L2Fam L2-differentiable family of probability measures.
... additional parameters

Value

Object of class "IC"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References


See Also

IC-class, ContIC-class, TotalVarIC-class
Generic Function for making ICs consistent at a possibly different model

Description

Generic function for providing centering and Fisher consistency of ICs.

Usage

\texttt{generateIC.fct(neighbor, L2Fam, \ldots)}

Arguments

- \texttt{neighbor}: object of class "UncondNeighborhood"
- \texttt{L2Fam}: L2-differentiable family of probability measures; may be missing.
- \texttt{\ldots}: additional parameters

Value

An IC at the model.

Methods

\texttt{generateIC.fct signature(IC = "UncondNeighborhood", L2Fam = "L2ParamFamily"; \ldots)}

Author(s)

Peter Ruckdeschel \textless{}peter.ruckdeschel@uni-oldenburg.de\textgreater{}

References


See Also

\texttt{L2ParamFamily-class, IC-class}
getBiasIC

Generic function for the computation of the asymptotic bias for an IC

Description

Generic function for the computation of the asymptotic bias for an IC.

Usage

getBiasIC(IC, neighbor, ...)

getBiasIC(IC, neighbor, L2Fam, biastype = symmetricBias(), normtype = NormType(),
tol = .Machine$double.eps$0.25, numbeval = 1e5, withCheck = TRUE, ...)

Arguments

IC object of class "InfluenceCurve"
neighbor object of class "Neighbor".
L2Fam object of class "L2ParamFamily".
biastype object of class "BiasType"
normtype object of class "NormType"
tol the desired accuracy (convergence tolerance).
numbeval number of evaluation points.
withCheck logical: should a call to checkIC be done to check accuracy (defaults to TRUE).
... additional parameters to be passed to expectation E

Value

The bias of the IC is computed.

Methods

IC = "IC", neighbor = "UncondNeighborhood" determines the as. bias by random evaluation of the IC; this random evaluation is done by the internal S4-method .evalBiasIC; this latter dispatches according to the signature IC, neighbor, biastype. For signature IC = "IC", neighbor = "ContNeighborhood", biastype = "BiasType", also an argument normtype is used to be able to use self- or information standardizing norms; besides this the signatures IC = "IC", neighbor = "TotalVarNeighborhood", biastype = "BiasType", IC = "IC", neighbor = "ContNeighborhood", biastype = "onessidedBias", and IC = "IC", neighbor = "ContNeighborhood", biastype = "asymmetricBias" are implemented.
Note

This generic function is still under construction.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References


See Also

getRiskIC-methods,InfRobModel-class

getBoundedIC

getBoundedIC

description

Generates a bounded influence curve.

Usage

getBoundedIC(L2Fam, D=trafo(L2Fam@param), ..., diagnostic = FALSE)

Arguments

L2Fam: object of class "L2ParamFamily"
D: matrix with as many columns as length(L2Fam@param)
...: further arguments to be passed to E
diagnostic: logical; if TRUE, the return value obtains an attribute "diagnostic" with diagnostic information on the integration.

Value

(a bounded) pIC (to matrix D) given as object of class "EuclRandVariable"
getFiRisk

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References


---

**getFiRisk**

*Generic Function for Computation of Finite-Sample Risks*

**Description**

Generic function for the computation of finite-sample risks. This function is rarely called directly. It is used by other functions.

**Usage**

getFiRisk(risk, Distr, neighbor, ...)  

## S4 method for signature 'fiUnOvShoot,Norm,ContNeighborhood'
getFiRisk(risk, Distr,  
neighbor, clip, stand, sampleSize, Algo, cont)  

## S4 method for signature 'fiUnOvShoot,Norm,TotalVarNeighborhood'
getFiRisk(risk, Distr,  
neighbor, clip, stand, sampleSize, Algo, cont)

**Arguments**

- **risk**: object of class "RiskType".
- **Distr**: object of class "Distribution".
- **neighbor**: object of class "Neighborhood".
- **...**: additional parameters.
- **clip**: positive real: clipping bound
- **stand**: standardizing constant/matrix.
- **sampleSize**: integer: sample size.
- **Algo**: "A" or "B".
- **cont**: "left" or "right".

**Details**

The computation of the finite-sample under-/overshoot risk is based on FFT. For more details we refer to Section 11.3 of Kohl (2005).
**Value**

The finite-sample risk is computed.

**Methods**


**Author(s)**

Matthias Kohl <Matthias.Kohl@stamats.de>

**References**


**See Also**

- `fiRisk-class`

---

**Description**

`getRiskFctBV` for a given object of S4 class `asGRisk` returns a function in bias and variance to compute the asymptotic risk.

**Methods**

- `getRiskFctBV signature(risk = "asGRisk", biastype = "ANY")`: returns an error that the respective method is not yet implemented.
- `getRiskFctBV signature(risk = "asMSE", biastype = "ANY")`: returns a function with arguments `bias` and `variance` to compute the asymptotic MSE for a given ALE at a situation where it has bias `bias` (including the radius!) and variance `variance`.
- `getRiskFctBV signature(risk = "asSemivar", biastype = "onesidedBias")`: returns a function with arguments `bias` and `variance` to compute the asymptotic semivariance error, i.e. $E[(S_n - \theta)^2]$ resp. $E[(S_n - \theta)^2 - \theta^2]$, for a given ALE $S_n$ at a situation where it has one-sided bias `bias` (including the radius!) and variance `variance`.
getRiskIC  Generic function for the computation of a risk for an IC

Description

Generic function for the computation of a risk for an IC.

Usage

getRiskIC(IC, risk, neighbor, L2Fam, ...)

## S4 method for signature 'IC,asCov,missing,missing'
getRiskIC(IC, risk,
   tol = .Machine$double.eps^0.25, withCheck = TRUE, ...)

## S4 method for signature 'IC,asCov,missing,L2ParamFamily'
getRiskIC(IC, risk, L2Fam,
   tol = .Machine$double.eps^0.25, withCheck = TRUE, ...)

## S4 method for signature 'IC,trAsCov,missing,missing'
getRiskIC(IC, risk,
   tol = .Machine$double.eps^0.25, withCheck = TRUE, ...)

## S4 method for signature 'IC,trAsCov,missing,L2ParamFamily'
getRiskIC(IC, risk, L2Fam,
   tol = .Machine$double.eps^0.25, withCheck = TRUE, ...)

## S4 method for signature 'IC,asBias,UncondNeighborhood,missing'
getRiskIC(IC, risk, neighbor,
   tol = .Machine$double.eps^0.25, withCheck = TRUE, ...)

## S4 method for signature 'IC,asBias,UncondNeighborhood,L2ParamFamily'
getRiskIC(IC, risk, neighbor, L2Fam,
   tol = .Machine$double.eps^0.25, withCheck = TRUE, ...)

## S4 method for signature 'IC,asMSE,UncondNeighborhood,missing'
getRiskIC(IC, risk, neighbor,
getRiskIC

```r
tol = .Machine$double.eps^0.25, withCheck = TRUE, ...)
```

## S4 method for signature 'IC,asMSE,UncondNeighborhood,L2ParamFamily'
```r
getRiskIC(IC, risk, neighbor, L2Fam,
  tol = .Machine$double.eps^0.25, withCheck = TRUE, ...)
```

## S4 method for signature 'TotalVarIC,asUnOvShoot,UncondNeighborhood,missing'
```r
getRiskIC(IC, risk, neighbor)
```

## S4 method for signature 'IC,fiUnOvShoot,ContNeighborhood,missing'
```r
getRiskIC(IC, risk, neighbor, sampleSize, Algo = "A", cont = "left")
```

## S4 method for signature 'IC,fiUnOvShoot,TotalVarNeighborhood,missing'
```r
getRiskIC(IC, risk, neighbor, sampleSize, Algo = "A", cont = "left")
```

### Arguments

- **IC**: object of class "InfluenceCurve"
- **risk**: object of class "RiskType".
- **neighbor**: object of class "Neighborhood".
- **L2Fam**: object of class "L2ParamFamily".
- **additional parameters (e.g. to be passed to E)**.
- **tol**: the desired accuracy (convergence tolerance).
- **sampleSize**: integer: sample size.
- **Algo**: "A" or "B".
- **cont**: "left" or "right".
- **withCheck**: logical: should a call to checkIC be done to check accuracy (defaults to TRUE).
- **diagnostic**: logical; if TRUE, the return value obtains an attribute "diagnostic" with diagnostic information on the integration.

### Details

To make sure that the results are valid, it is recommended to include an additional check of the IC properties of IC using checkIC.

### Value

The risk of an IC is computed.

### Methods

- **IC = "IC", risk = "asCov", neighbor = "missing", L2Fam = "missing"** asymptotic covariance of IC.
- **IC = "IC", risk = "asCov", neighbor = "missing", L2Fam = "L2ParamFamily"** asymptotic covariance of IC under L2Fam.
IC = "IC", risk = "trAsCov", neighbor = "missing", L2Fam = "missing"  asymptotic covariance of IC.

IC = "IC", risk = "trAsCov", neighbor = "missing", L2Fam = "L2ParamFamily"  asymptotic covariance of IC under L2Fam.

IC = "IC", risk = "asBias", neighbor = "ContNeighborhood", L2Fam = "missing"  asymptotic bias of IC under convex contaminations; uses method getBiasIC.

IC = "IC", risk = "asBias", neighbor = "ContNeighborhood", L2Fam = "L2ParamFamily"  asymptotic bias of IC under convex contaminations and L2Fam; uses method getBiasIC.

IC = "IC", risk = "asBias", neighbor = "TotalVarNeighborhood", L2Fam = "missing"  asymptotic bias of IC in case of total variation neighborhoods; uses method getBiasIC.

IC = "IC", risk = "asBias", neighbor = "TotalVarNeighborhood", L2Fam = "L2ParamFamily"  asymptotic bias of IC under L2Fam in case of total variation neighborhoods; uses method getBiasIC.

IC = "IC", risk = "asMSE", neighbor = "UncondNeighborhood", L2Fam = "missing"  asymptotic mean square error of IC.

IC = "IC", risk = "asMSE", neighbor = "UncondNeighborhood", L2Fam = "L2ParamFamily"  asymptotic mean square error of IC under L2Fam.

IC = "TotalVarIC", risk = "asUnOvShoot", neighbor = "UncondNeighborhood", L2Fam = "missing"  asymptotic under-/overshoot risk of IC.

IC = "IC", risk = "fiUnOvShoot", neighbor = "ContNeighborhood", L2Fam = "missing"  finite-sample under-/overshoot risk of IC.

IC = "IC", risk = "fiUnOvShoot", neighbor = "TotalVarNeighborhood", L2Fam = "missing"  finite-sample under-/overshoot risk of IC.

Note
This generic function is still under construction.

Author(s)
Matthias Kohl <Matthias.Kohl@stamats.de>
Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References
getweight-methods

Generating weights

Description

Generates weight functions of Hampel / BdSt type for different bias and norm types.

Usage

getweight(Weight, neighbor, biastype, ...)  
minbiasweight(Weight, neighbor, biastype, ...)  
# S4 method for signature 'HampelWeight,ContNeighborhood,BiasType'
getweight(Weight, neighbor, biastype, normW)  
# S4 method for signature 'HampelWeight,ContNeighborhood,BiasType'
minbiasweight(Weight, neighbor, biastype, normW)  
# S4 method for signature 'HampelWeight,ContNeighborhood,onesidedBias'
getweight(Weight, neighbor, biastype, ...)  
# S4 method for signature 'HampelWeight,ContNeighborhood,onesidedBias'
minbiasweight(Weight, neighbor, biastype, ...)  
# S4 method for signature 'HampelWeight,ContNeighborhood,asymmetricBias'
getweight(Weight, neighbor, biastype, ...)  
# S4 method for signature 'HampelWeight,ContNeighborhood,asymmetricBias'
minbiasweight(Weight, neighbor, biastype, ...)  
# S4 method for signature 'BdStWeight,TotalVarNeighborhood,BiasType'
getweight(Weight, neighbor, biastype, ...)  
# S4 method for signature 'BdStWeight,TotalVarNeighborhood,BiasType'
minbiasweight(Weight, neighbor, biastype, ...)  

Arguments

Weight Object of class "RobWeight".
neighbor Object of class "Neighborhood".
biastype Object of class "BiasType".
normW Object of class "NormType" — only for signature HampelWeight,ContNeighborhood,BiasType.
... possibly additional (unused) arguments — like in a call to the less specific methods.

Details

These functions generate the weight function in slot weight in a corresp. object of class RobWeight and descendants.
Value

Object of class "HampelWeight" resp. "BdStWeight"

Methods

**getweight** signature(Weight = "HampelWeight", neighbor = "ContNeighborhood", 
with additional argument biastype of class "BiasType": produces weight slot...

**minbiasweight** signature(Weight = "HampelWeight", neighbor = "ContNeighborhood", 
with additional argument biastype of class "BiasType": produces weight slot...

**getweight** signature(Weight = "HampelWeight", neighbor = "ContNeighborhood", 
produces weight slot...

**minbiasweight** signature(Weight = "HampelWeight", neighbor = "ContNeighborhood", 
produces weight slot...

**getweight** signature(Weight = "HampelWeight", neighbor = "ContNeighborhood", 
produces weight slot...

**minbiasweight** signature(Weight = "HampelWeight", neighbor = "ContNeighborhood", 
produces weight slot...

**getweight** signature(Weight = "BdStWeight", neighbor = "TotalVarNeighborhood", 
produces weight slot...

**minbiasweight** signature(Weight = "BdStWeight", neighbor = "TotalVarNeighborhood", 
produces weight slot...

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References


See Also

*BdStWeight-class, HampelWeight-class, IC-class*
HampelWeight-class

Robust Weight classes for weights of Hampel type

Description

Classes for weights of Hampel type.

Objects from the Class

Objects can be created by calls of the form `new("HampelWeight", ...);` to fill slot weight, you will use the generating functions `getweight` and `minbiasweight`.

Slots

- `name`: Object of class "character"; inherited from class RobWeight.
- `weight`: Object of class "function" — the weight function; inherited from class RobWeight.
- `clip`: Object of class "numeric" — clipping bound(s); inherited from class BoundedWeight.
- `stand`: Object of class "matrix" — standardization; inherited from class BdStWeight.
- `cent`: Object of class "numeric" — centering.

Extends

Class "RobWeight", via class "BoundedWeight". Class "BoundedWeight", via class "BdStWeight". Class "BdStWeight", directly.

Methods

- `cent` signature(object = "HampelWeight"): accessor function for slot `cent`.
- `cent<-` signature(object = "HampelWeight", value = "matrix"): replacement function for slot `cent`. This replacement method should be used with great care, as the slot `weight` is not simultaneously updated and hence, this may lead to inconsistent objects.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References


See Also

`BdStWeight-class`, `BoundedWeight-class`, `RobWeight-class`, `IC`, `InfluenceCurve-class`

Examples

```r
## prototype
new("HampelWeight")
```

---

**HampIC-class**  
*Influence curve of Hampel type*

**Description**

Class of (partial) influence curves of Hampel (= total variation or contamination) type; used as common mother class for classes ContIC and TotalVarIC.

**Objects from the Class**

Objects can be created by calls of the form `new("HampIC", ...)`.

**Slots**

- `callL2Fam` object of class "call": creates an object of the underlying L2-differentiable parametric family.
- `name` object of class "character"
- `Curve` object of class "EuclRandVarList"
- `modifyIC` object of class "OptionalFunction": function of four arguments: (1) `L2Fam` an L2 parametric family (2) `IC` an optional influence curve, (3) `withMakeIC` a logical argument whether to enforce the IC side conditions by `makeIC`, and (4) ... for arguments to be passed to calls to `makeIC`. Returns an object of class "IC". This function is mainly used for internal computations!
- `Risks` object of class "list": list of risks; cf. `RiskType-class`.
- `Infos` object of class "matrix" with two columns named method and message: additional informations.
- `stand` object of class "matrix": standardizing matrix.
- `weight` object of class "RobWeight": weight function
- `biastype` object of class "BiasType": bias type (symmetric/onsided/asymmetric)
- `normtype` object of class "NormType": norm type (Euclidean, information/self-standardized)
- `lowerCase` object of class "OptionalNumeric": optional constant for lower case solution.
- `neighborRadius` object of class "numeric": radius of the corresponding (unconditional) contamination neighborhood.
Extends

Class "IC", directly.
Class "InfluenceCurve", by class "IC".

Methods

stand signature(object = "HampIC"): accessor function for slot stand.
weight signature(object = "HampIC"): accessor function for slot weight.
biastype signature(object = "HampIC"): accessor function for slot biastype.
normtype signature(object = "HampIC"): accessor function for slot normtype.
lowerCase signature(object = "HampIC"): accessor function for slot lowerCase.
neighborRadius signature(object = "HampIC"): accessor function for slot neighborRadius.
neighborRadius<- signature(object = "HampIC"): replacement function for slot neighborRadius.
neighborRadius signature(object = "ANY"): returns NULL.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References


See Also

IC-class

Examples

IC1 <- new("HampIC")
plot(IC1)

IC  Generating function for IC-class

Description

Generates an object of class "IC".

Usage

IC(name, Curve = EuclRandVarList(RealRandVariable(Map = list(function(x){x}),
Domain = Reals())),
Risks, Infos, CallL2Fam = call("L2ParamFamily"), modifyIC = NULL)
**Arguments**

- **name**: Object of class "character"; the name of the IC.
- **CallL2Fam**: object of class "call": creates an object of the underlying L2-differentiable parametric family.
- **Curve**: object of class "EuclRandVarList".
- **Risks**: object of class "list": list of risks; cf. **RiskType-class**.
- **Infos**: matrix of characters with two columns named method and message: additional informations.
- **modifyIC**: object of class "OptionalFunction": function of four arguments: (1) L2Fam an L2 parametric family (2) IC an optional influence curve, (3) withMakeIC a logical argument whether to enforce the IC side conditions by makeIC, and (4) ... for arguments to be passed to calls to E in makeIC. Returns an object of class "IC". This function is mainly used for internal computations!

**Value**

Object of class "IC"

**Author(s)**

Matthias Kohl <Matthias.Kohl@stamats.de>

**References**


**See Also**

- **IC-class**

**Examples**

```r
IC1 <- IC()
plot(IC1)
```
IC-class

Influence curve

Description

Class of (partial) influence curves.

Objects from the Class

Objects can be created by calls of the form new("IC", ...). More frequently they are created via the generating function IC.

Slots

CallL2Fam Object of class "call": creates an object of the underlying L2-differentiable parametric family.
modifyIC object of class "OptionalFunction": function of four arguments: (1) L2Fam an L2 parametric family (2) IC an optional influence curve, (3) withMakeIC a logical argument whether to enforce the IC side conditions by makeIC, and (4) ... for arguments to be passed to calls to e in makeIC. Returns an object of class "IC". This function is mainly used for internal computations!
name Object of class "character".
Curve Object of class "EuclRandVarList".
Risks Object of class "list": list of risks; cf. RiskType-class.
Infos Object of class "matrix" with two columns named method and message: additional informations.

Extends

Class "InfluenceCurve", directly.

Methods

CallL2Fam signature(object = "IC"): accessor function for slot CallL2Fam.
CallL2Fam<- signature(object = "IC"): replacement function for slot CallL2Fam.
modifyIC signature(object = "IC"): accessor function for slot modifyIC.
checkIC signature(IC = "IC", L2Fam = "missing"): check centering and Fisher consistency of IC assuming the L2-differentiable parametric family which can be generated via the slot CallL2Fam of IC.
checkIC signature(IC = "IC", L2Fam = "L2ParamFamily"): check centering and Fisher consistency of IC assuming the L2-differentiable parametric family L2Fam.
evalIC signature(IC = "IC", x = "numeric"): evaluate IC at x.
evalIC signature(IC = "IC", x = "matrix"): evaluate IC at the rows of x.
infoPlot signature(object = "IC"): Plot absolute and relative information of IC.
plot signature(x = "IC", y = "missing")
show signature(object = "IC")
Author(s)
Matthias Kohl <Matthias.Kohl@stamats.de>

References

See Also
InfluenceCurve-class, IC

Examples
IC1 <- new("IC")
plot(IC1)

Description
Generates an object of class "InfluenceCurve".

Usage
InfluenceCurve(name, Curve = EuclRandVarList(EuclRandVariable(Domain = Reals())), Risks, Infos)

Arguments
name character string: name of the influence curve
Curve object of class "EuclRandVarList"
Risks list of risks
Infos matrix of characters with two columns named method and message: additional informations

Value
Object of class "InfluenceCurve"

Author(s)
Matthias Kohl <Matthias.Kohl@stamats.de>
References


See Also

InfluenceCurve-class

Examples

InfluenceCurve()

## The function is currently defined as
InfluenceCurve <- function(name, Curve = EuclRandVarList(EuclRandVariable(Domain = Reals())),
                       Risks, Infos){
  if(missing(name))
    name <- "influence curve"
  if(missing(Risks))
    Risks <- list()
  if(missing(Infos))
    Infos <- matrix(c(character(0),character(0)), ncol=2,
                     dimnames=list(character(0), c("method", "message")))

  return(new("InfluenceCurve", name = name, Curve = Curve,
             Risks = Risks, Infos = Infos))
}

InfluenceCurve-class Influence curve

Description

Class of influence curves (functions).

Objects from the Class

Objects can be created by calls of the form new("InfluenceCurve", ...). More frequently they are created via the generating function InfluenceCurve.

Slots

name object of class "character"
Curve object of class "EuclRandVarList"
Risks object of class "list": list of risks; cf. RiskType-class.
Infos object of class "matrix" with two columns named method and message: additional informations.
InfluenceCurve-class

Methods

name signature(object = "InfluenceCurve"): accessor function for slot name.
name<- signature(object = "InfluenceCurve"): replacement function for slot name.
Curve signature(object = "InfluenceCurve"): accessor function for slot Curve.
Map signature(object = "InfluenceCurve"): accessor function for slot Map of slot Curve.
Domain signature(object = "InfluenceCurve"): accessor function for slot Domain of slot Curve.
Range signature(object = "InfluenceCurve"): accessor function for slot Range of slot Curve.
Infos signature(object = "InfluenceCurve"): accessor function for slot Infos.
Infos<- signature(object = "InfluenceCurve"): replacement function for slot Infos.
addInfo<- signature(object = "InfluenceCurve"): function to add an information to slot Infos.
Risks signature(object = "InfluenceCurve"): accessor function for slot Risks. By means of internal function .evallistRec recursively evaluates all non evaluated calls and writes back the evaluated calls to the calling environment.
Risks<- signature(object = "InfluenceCurve"): replacement function for slot Risks.
addRisk<- signature(object = "InfluenceCurve"): function to add a risk to slot Risks.
show signature(object = "InfluenceCurve")

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References


See Also

InfluenceCurve, RiskType-class

Examples

ew("InfluenceCurve")
**Description**

The wrapper `InfoPlot` (capital I!) takes most of arguments to the plot method `infoPlot` (lower case i!) by default and gives a user possibility to run the function with low number of arguments.

**Usage**

```r
InfoPlot(IC, data, ..., alpha.trsp = 100, with.legend = TRUE, rescale = FALSE, withCall = TRUE)
```

**Arguments**

- **IC**: object of class IC
- **data**: optional data argument — for plotting observations into the plot
- **...**: additional parameters (in particular to be passed on to plot)
- **alpha.trsp**: the transparency argument (0 to 100) for plotting the data
- **with.legend**: the flag for showing the legend of the plot
- **rescale**: the flag for rescaling the axes for better view of the plot
- **withCall**: the flag for the call output

**Value**

`
invisible(retV)` where `retV` is the return value of the respective call to the full-fledged function `infoPlot` with the additional item `wrapcall` with the call to the wrapper `InfoPlot` and `wrappedcall` the call to to the full-fledged function `infoPlot`.

**Details**

Calls `infoPlot` with suitably chosen defaults. If `withCall` == TRUE, the call to `infoPlot`, i.e., item `wrappedcall` of the (hidden) return value, is returned.

**Examples**

```r
# Gamma
fam <- GammaFamily()
IC <- optIC(model = fam, risk = asCov())
Y <- distribution(fam)
data <- r(Y)(500)
InfoPlot(IC, data, withCall = FALSE)
```
infoPlot

Plot absolute and relative information

Description

Plot absolute and relative information of influence curves.

Usage

infoPlot(object, ...)  
## S4 method for signature 'IC'
infoPlot(object, data = NULL,
         withSweave = getdistrOption("withSweave"),
         col = par("col"), lwd = par("lwd"), lty,
         colI = grey(0.5), lwdI = 0.7*par("lwd"), ltyI = "dotted",
         main = FALSE, inner = TRUE, sub = FALSE,
         col.inner = par("col.main"), cex.inner = 0.8,
         bmar = par("mar")[1], tmar = par("mar")[3],
         with-automatic.grid = TRUE,
         with.legend = TRUE, legend = NULL, legend.bg = "white",
         legend.location = "bottomright", legend.cex = 0.8,
         x.vec = NULL, scaleX = FALSE, scaleX.fct, scaleX.inv,
         scaleY = FALSE, scaleY.fct = pnorm, scaleY.inv = qnorm,
         scaleN = 9, x.ticks = NULL, y.ticks = NULL,
         mfColRow = TRUE, to.draw.arg = NULL,
         cex.pts = 1, cex.pts.fun = NULL, col.pts = par("col"),
         pch.pts = 19,
         cex.npts = 1, cex.npts.fun = NULL, col.npts = grey(.5),
         pch.npts = 20,
         jitter.fac = 1, with.lab = FALSE, cex.labs = 1, adj.labs = c(0, 0),
         col.labs = col.pts, lab.labs = NULL, lab.font = NULL, alpha.trsp = NA,
         which.labs = NULL, which.Order = NULL, which.nolabs = NULL,
         attr.pre = FALSE, return.Order = FALSE,
         ylab.abs = "absolute information",
         ylab.rel = "relative information",
         withSubst = TRUE)

Arguments

- **object**: object of class "InfluenceCurve"
- **data**: optional data argument — for plotting observations into the plot;
- **withSweave**: logical: if TRUE (for working with Sweave) no extra device is opened
- **main**: logical: is a main title to be used? or just as argument main in plot.default.
inner logical: do panels have their own titles? or character vector of / cast to length 'number of compared dimensions'; if argument to.drew.arg is used, this refers to a vector of length 1 (absolute information) + length(to.drew.arg), the actually plotted relative informations. For further information, see also main in plot.default.

sub logical: is a sub-title to be used? or just as argument sub in plot.default.

tmar top margin – useful for non-standard main title sizes; may be a vector with individual values for each of the panels to be plotted.

bmar bottom margin – useful for non-standard sub title sizes; may be a vector with individual values for each of the panels to be plotted.

col color of IC in argument object.

lwd linewidth of IC in argument object.

lty line-type of IC in argument object.

colI color of the classically optimal IC.

lwdI linewidth of the classically optimal IC.

ltyI line-type of the classically optimal IC.

cex.inner magnification to be used for inner titles relative to the current setting of cex; as in par.

col.inner character or integer code; color for the inner title

with-automatic.grid logical; should a grid be plotted alongside with the ticks of the axes, automatically? If TRUE a respective call to grid in argument panel.first is ignored.

with.legend logical; shall a legend be plotted?

legend either NULL or a list of length (number of plotted panels) of items which can be used as argument legend in command legend.

legend.location a valid argument x for legend — the place where to put the legend on the last issued plot — or a list of length (number of plotted panels) of such arguments, one for each plotted panel.

legend.bg background color for the legend

legend.cex magnification factor for the legend

x.vec a numeric vector of grid points to evaluate the influence curve; by default, x.vec is NULL; then the grid is produced automatically according to the distribution of the IC. x.vec can be useful for usage with a rescaling of the x-axis to avoid that the evaluation points be selected too unevenly (i.e. on an equally spaced grid in the original scale, but then, after rescaling non-equally). The grid has to be specified in original scale; i.e.; when used with rescaling, it should be chosen non-equally spaced.

scaleX logical; shall X-axis be rescaled (by default according to the cdf of the underlying distribution)?

scaleY logical; shall Y-axis be rescaled for abs.info-plot (by default according to a probit scale)?
scaleX.fct
an isotone, vectorized function mapping the domain of the IC to [0,1]; if scaleX is TRUE and scaleX.fct is missing, the cdf of the underlying observation distribution.

scaleX.inv
the inverse function to scaleX.fct, i.e., an isotone, vectorized function mapping [0,1] to the domain of the IC such that for any x in the domain, scaleX.inv(scaleX.fct(x)) = x; if scaleX is TRUE and scaleX.inv is missing, the quantile function of the underlying observation distribution.

scaleY.fct
an isotone, vectorized function mapping the range of the norm of the IC to [0,1]; defaulting to the cdf of \(N(0,1)\); can also be a list of functions with one list element for each of the panels to be plot.

scaleY.inv
an isotone, vectorized function mapping [0,1] into the range of the norm of the IC; defaulting to the quantile function of \(N(0,1)\); can also be a list of functions with one list element for each of the panels to be plot.

scaleN
integer; defaults to 9; on rescaled axes, number of x and y ticks if drawn automatically;

x.ticks
numeric; defaults to NULL; (then ticks are chosen automatically); if non-NULL, user-given x-ticks (on original scale);

y.ticks
numeric; defaults to NULL; (then ticks are chosen automatically); if non-NULL, user-given y-ticks (on original scale); can be a list with one (numeric or NULL) item per panel

mfColRow
shall default partition in panels be used — defaults to TRUE

to.draw.arg
Either NULL (default; everything is plotted) or a vector making a selection among the relative information plots; the absolute information being plotted in any case. This vector is either a vector of integers (the indices of the subplots to be drawn) or characters — the names of the subplots to be drawn: these names are to be chosen either among the row names of the trafo matrix rownames(trafo(eval(object@Call2Fam@CallFam))@par) or if the last expression is NULL a vector "dim<dimnr>"", dimnr running through the number of rows of the trafo matrix.

withSubst
logical; if TRUE (default) pattern substitution for titles and lables is used; otherwise no substitution is used.

col.pts
color of the points of the data argument plotted; can be a vector or a matrix. More specifically, if argument attr.pre is TRUE, it is recycled to fill a matrix of dimension \(n\) by 2 (\(n\) the number of observations prior to any selection) where filling is done in order column first. The two columns are used for possibly different colors for the actual IC from the argument and the classical IC which is also shown. The selection done via which.lbs and which.order is then done afterwards and on this matrix; argument col.npts is ignored in this case. If attr.pre is FALSE, col.pts is recycled to fill a matrix of dimension \(n.s\) by 2 where \(n.s\) is the number of observations selected for labelling and refers to the index ordering after the selection. Then argument col.npts determines the colors of the shown but non-labelled observations as given in argument which.nonlbs.

pch.pts
symbol of the points of the data argument plotted (may be a vector of length 2 or a matrix, see col.pts, with argument pch.npts as counterpart).

cex.pts
size of the points of the data argument plotted (may be a vector of length 2 or a matrix, see col.pts, with argument cex.npts as counterpart).
cex.pnts.fun: rescaling function for the size of the points to be plotted; either \texttt{NULL} (default), then \( \log(1+\text{abs}(x)) \) is used for each of the rescalings, or a function which is then used for each of the rescalings, or a list of functions; if it is a function or a list of functions, if necessary it is recycled to length \( 2 \times \text{dim} \) where \( 2 \) is for the classical IC and the IC in argument \text{object} \ and \text{dim} \ is the number of dimensions of the \text{pICs} to be plotted; in the index of this list, \( 2 \) is incremented first; then \text{dim}.

col.npts: color of the non-labelled points of the \text{data} argument plotted; (may be a vector of length \( 2 \), or it can be a matrix \text{nnlb} \leftarrow \text{sum(\text{which.\text{nolbs}})} \times 2, \text{nnlb} \ the number of non-labelled shown observations.

cpch.npts: symbol of the non-labelled points of the \text{data} argument plotted (may be a vector of length \( 2 \) or a matrix, see \text{col.npts}).

cex.npts: size of the non-labelled points of the \text{data} argument plotted (may be a vector of length \( 2 \) or a matrix, see \text{col.npts}).

cex.npts.fun: rescaling function for the size of the non-labelled points to be plotted; either \texttt{NULL} (default), then \( \log(1+\text{abs}(x)) \) is used for each of the rescalings, or a function which is then used for each of the rescalings, or a list of functions; if it is a function or a list of functions, if necessary it is recycled to length \( 2 \times \text{dim} \) where \( \text{dim} \) is the number of dimensions of the \text{pICs} to be plotted; in the index of this list, \( 2 \) is incremented first; then \text{dim}.

attr.pre: logical; do graphical attributes for plotted data refer to indices prior (\texttt{TRUE}) or posterior to selection via arguments \text{which.lbs}, \text{which.Order}, \text{which.nonlbs} (\texttt{FALSE})?

with.lab: logical; shall labels be plotted to the observations? (may be a vector of length \( 2 \), see \text{col.pnts} – but not a matrix)

cex.lbs: size of the labels; can be vectorized to an array of \text{dim.nlbs} x \( 2 \) x \text{npnl} where \text{npnl} is the number of plotted panels and \text{nlbs} the number of plotted labels; if it is a vector, it is recycled in order labels then ICs [arg IC/classic] then panels.

col.lbs: color of the labels; can be vectorized to a matrix of \text{dim.nlbs} x \( 2 \) as \text{col.pnts}.

adj.lbs: adjustment of the labels; can be vectorized to an array of \text{dim} \( 2 \times 2 \times \text{npnl} \) matrix, \text{npnl} the number of plotted panels; if it is a vector, it is recycled in order \((x,y)\)-coords then ICs [arg IC/classic] then panels.

lab.pnts: character or \texttt{NULL}; labels to be plotted to the observations; can be a vector of length \( n \), \( n \) the number of all observations prior to any selection with \text{which.lbs}, \text{which.Order}; if \text{lab.pnts} is \texttt{NULL}, observation indices are used.

lab.font: font to be used for labels; (may be a vector of length \( 2 \), see \text{with.lab}).

alpha.trsp: alpha transparency to be added ex post to colors \text{col.pch} and \text{col.nonlb}; if one-dim and NA all colors are left unchanged. Otherwise, with usual recycling rules \text{alpha.trsp} gets shortened/prolongated to length the number of panel data-symbols to be plotted. Coordinates of this vector \text{alpha.trsp} with NA are left unchanged, while for the remaining ones, the alpha channel in rgb space is set to the respective coordinate value of \text{alpha.trsp}. The non-NA entries must be integers in \([0,255]\) (0 invisible, 255 opaque).

jitter.fac: jittering factor used in case of a \texttt{DiscreteDistribution} for plotting points of the \text{data} argument in a jittered fashion (may be a vector of length \( 2 \), see \text{with.lab}).
which.lbs  either an integer vector with the indices of the observations to be plotted into graph or NULL — then no observation is excluded

which.Order  we order the observations (descending) according to the norm given by normtype(object); then which.Order either is an integer vector with the indices of the ordered observations (remaining after a possible reduction by argument which.lbs) to be plotted into graph or NULL — then no (further) observation is excluded.

which.nonlbs  indices of the observations which should be plotted but not labelled; either an integer vector with the indices of the observations to be plotted into graph or NULL — then all non-labelled observations are plotted.

return.Order  logical; if TRUE, a list of length two with order vectors is returned — one for ordering w.r.t. the given IC, one for ordering w.r.t. the classically optimal IC; more specifically, the order of the (remaining) observations given by their original index is returned (remaining means: after a possible reduction by argument which.lbs, and ordering is according to the norm given by normtype(object)); otherwise we return invisible() as usual.

ylab.abs  character; label to be used for y-axis in absolute information panel

ylab.rel  character; label to be used for y-axis in relative information panel

... further parameters for plot

Details

Absolute information is defined as the square of the length of an IC. The relative information is defined as the absolute information of one component with respect to the absolute information of the whole IC; confer Section 8.1 of Kohl (2005).

Any parameters of plot.default may be passed on to this particular plot method.

For main-, inner, and subtitles given as arguments main, inner, and sub, top and bottom margins are enlarged to 5 resp. 6 by default but may also be specified by tmar / bmar arguments. If main / inner / sub are logical then if the respective argument is FALSE nothing is done/plotted, but if it is TRUE, we use a default main title taking up the calling arguments in case of main, default inner titles taking up the class and (named) parameter slots of arguments in case of inner, and a "generated on <data>"-tag in case of sub. Of course, if main / inner / sub are character, this is used for the title; in case of inner it is then checked whether it has correct length. If argument withSubst is TRUE, in all title and axis lable arguments, the following patterns are substituted:

"%c" class of argument object

"%a" deparsed argument object

"%d" time/date-string when the plot was generated

If argument ... contains argument ylim, this may either be as in plot.default (i.e. a vector of length 2) or a vector of length 2*(number of plotted dimensions + e), where e is 1 or 0 depending on whether absolute information is plotted or not; in the case of longer length, if e is 1, the first two elements are the values for ylim in panel "Abs", while the last 2*(number of plotted dimensions) are the values for ylim for the plotted dimensions of the IC, one pair for each dimension.

Similarly, if argument ... contains arguments xaxt or yaxt, these may be vectorized, with one value for each of the panels to be plotted. This is useful for stacking panels over each other, using a common x-axis (see example below).
The \dots argument may also contain an argument withbox which if TRUE warrants that even if \texttt{xaxt} and \texttt{yaxt} both are FALSE, a box is drawn around the respective panel.

In addition, argument \dots may contain arguments \texttt{panel.first}, \texttt{panel.last}, i.e., hook expressions to be evaluated at the very beginning and at the very end of each panel (within the then valid coordinates). To be able to use these hooks for each panel individually, they may also be lists of expressions (of the same length as the number of panels and run through in the same order as the panels).

\textbf{Value}

An S3 object of class \texttt{c("plotInfo","DiagnInfo")}, i.e., a list containing the information needed to produce the respective plot, which at a later stage could be used by different graphic engines (like, e.g. \texttt{ggplot}) to produce the plot in a different framework. A more detailed description will follow in a subsequent version.

\textbf{Author(s)}

Matthias Kohl \texttt{<Matthias.Kohl@stamats.de>}

\textbf{References}


\textbf{See Also}

\texttt{L2ParamFamily-class, IC-class}

\textbf{Examples}

\begin{verbatim}
N <- NormLocationScaleFamily(mean=0, sd=1)
IC1 <- optIC(model = N, risk = asCov())
infoPlot(IC1)

## don't run to reduce check time on CRAN

## selection of subpanels for plotting
par(mfrow=c(1,2))
infoPlot(IC1, mfColRow = FALSE, to.draw.arg=c("Abs","sd"))
infoPlot(IC1, mfColRow = FALSE, to.draw.arg=c("Abs","sd"), log="y")

infoPlot(IC1, mfColRow = FALSE, to.draw.arg=c("Abs","mean"),
         panel.first= grid(), ylim = c(0,4), xlim = c(-6,6))
infoPlot(IC1, mfColRow = FALSE, to.draw.arg=c("Abs","mean"),
         panel.first= grid(), ylim = c(0,4,-3,3), xlim = c(-6,6))

par(mfrow=c(1,3))
infoPlot(IC1, mfColRow = FALSE, panel.first= grid(),
         ylim = c(0,4,0,-3,0,.8), xlim=c(-6,6))
par(mfrow=c(1,1))
\end{verbatim}
InfRobModel

Generating function for InfRobModel-class

Description

Generates an object of class "InfRobModel".

Usage

InfRobModel(center = L2ParamFamily(), neighbor = ContNeighborhood())

Arguments

center  object of class "ProbFamily"
neighbor object of class "UncondNeighborhood"

Value

Object of class "FixRobModel"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>
References


See Also

RobModel-class, FixRobModel-class

Examples

```
(M1 <- InfRobModel())
```

```r
## The function is currently defined as
function(center = L2ParamFamily(), neighbor = ContNeighborhood()){
    new("InfRobModel", center = center, neighbor = neighbor)
}
```

---

**InfRobModel-class**

*Robust model with infinitesimal (unconditional) neighborhood*

Description

Class of robust models with infinitesimal (unconditional) neighborhoods; i.e., the neighborhood is shrinking at a rate of $\sqrt{n}$.

Objects from the Class

Objects can be created by calls of the form `new("InfRobModel", ...`). More frequently they are created via the generating function `InfRobModel`.

Slots

- `center` Object of class "ProbFamily".
- `neighbor` Object of class "UncondNeighborhood".

Extends

Class "RobModel", directly.

Methods

- `neighbor<-` signature(object = "InfRobModel"): replacement function for slot `neighbor`
- `show` signature(object = "InfRobModel")

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>
interpolRisk-class

References


See Also

ProbFamily-class, UncondNeighborhood-class, InfRobModel

Examples

new("InfRobModel")

interpolRisk-class  Interpolated Risks

Description

Class of risks for which algorithms dispatch to speed-up algorithms

Usage

MBRRisk(samplesize=100)
OMSRRisk(samplesize=100)
RMXRRisk(samplesize=100)

Arguments

samplesize sample size at which to look at the risk.

Details

The main purpose of classes OMSRRisk, MBRRisk, and RMXRRisk is to help to dispatch into speed-up algorithms later in function roptest. In all these risks, we assume convex contamination neighborhoods. OMSRRisk stands for optimal MSE-robust estimation (where we assume a radius r of 0.5), RMXRRisk stands for optimal optimally RMX-robust estimation and MBRRisk stands for optimal Bias-robust estimation. All these risks have an additional slot samplesize, defaulting to 100, and for which there is a replacement and an accessor method.

Objects from the Class

interpolRisk is a virtual class: No objects may be created from it. The other classes are generated via generating functions.

Slots

type  Object of class "character": type of risk. (Inherited from RiskType).
Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

Examples

```r
new("OMSRRisk")
OMSRRisk()
RMXRRisk()
MBRRisk()
myrisk <- MBRisk(samplesize=100)
samplesize(myrisk)
samplesize(myrisk) <- 20
```

---

Description

Class of asymptotically linear estimates.

Objects from the Class

Objects can be created by calls of the form `new("kStepEstimate", ...`). More frequently they are created via the generating function `kStepEstimator`.

Slots

- `name`: Object of class "character": name of the estimator.
- `estimate`: Object of class "ANY": estimate.
- `estimate.call`: Object of class "call": call by which estimate was produced.
- `samplesize`: object of class "numeric" — the samplesize (only complete cases are counted) at which the estimate was evaluated.
- `completecases`: object of class "logical" — complete cases at which the estimate was evaluated.
- `asvar`: object of class "OptionalNumericOrMatrix" which may contain the asymptotic (co)variance of the estimator.
- `asbias`: Optional object of class "numeric": asymptotic bias.
- `pIC`: Optional object of class InfluenceCurve: influence curve.
- `nuis.idx`: object of class "OptionalNumeric": indices of estimate belonging to the nuisance part.
- `fixed`: object of class "OptionalNumeric": the fixed and known part of the parameter.
- `steps`: Object of class "integer": number of steps.
- `Infos`: object of class "matrix" with two columns named method and message: additional information.
- `trafo`: object of class "list": a list with components fct and mat (see below).
untransformed.estimate: Object of class "ANY": untransformed estimate.

untransformed.asvar: object of class "OptionalNumericOrMatrix" which may contain the asymptotic (co)variance of the untransformed estimator.

pICList Optional object of class "OptionalpICList": the list of (intermediate) (partial) influence curves used; only filled when called from kStepEstimator with argument withPICList==TRUE.

ICList Optional object of class "OptionalpICList": the list of (intermediate) (total) influence curves used; only filled when called from kStepEstimator with argument withICList==TRUE.

start The argument start — of class "StartClass" used in call to kStepEstimator.

startval Object of class matrix: the starting value with which the k-step Estimator was initialized (in $p$-space / transformed).

ustartval Object of class matrix: the starting value with which the k-step Estimator was initialized (in $k$-space / untransformed).

ksteps Object of class "OptionalMatrix": the intermediate estimates (in $p$-space) for the parameter; only filled when called from kStepEstimator.

uksteps Object of class "OptionalMatrix": the intermediate estimates (in $k$-space) for the parameter; only filled when called from kStepEstimator.

robestcall Object of class "OptionalCall", i.e., a call or NULL: only filled when called from roptest in package ROptEst.

Extends

Class "ALEstimate", directly.

Class "Estimate", by class "ALEstimate"

Methods

steps signature(object = "kStepEstimate"): accessor function for slot steps.

ksteps signature(object = "kStepEstimate"): accessor function for slot ksteps; has additional argument diff, defaulting to FALSE; if the latter is TRUE, the starting value from slot startval is prepended as first column; otherwise we return the corresponding increments in each step.

uksteps signature(object = "kStepEstimate"): accessor function for slot uksteps; has additional argument diff, defaulting to FALSE; if the latter is TRUE, the starting value from slot ustartval is prepended as first column; otherwise we return the corresponding increments in each step.

start signature(object = "kStepEstimate"): accessor function for slot start.

startval signature(object = "kStepEstimate"): accessor function for slot startval.

ustartval signature(object = "kStepEstimate"): accessor function for slot startval.

ICList signature(object = "kStepEstimate"): accessor function for slot ICList.

pICList signature(object = "kStepEstimate"): accessor function for slot pICList.

robestCall signature(object = "kStepEstimate"): accessor function for slot robestCall.

timings signature(object = "kStepEstimate"): accessor function for attribute "timings".

show signature(object = "kStepEstimate"): a show method;
**Author(s)**
Matthias Kohl <Matthias.Kohl@stamats.de> and Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

**See Also**
ALEstimate-class

---

### kStepEstimator

*Function for the computation of k-step estimates*

**Description**
Function for the computation of k-step estimates.

**Usage**
```r
kStepEstimator(x, IC, start = NULL, steps = 1L,
  useLast = getRobAStBaseOption("kStepUseLast"),
  withUpdateInKer = getRobAStBaseOption("withUpdateInKer"),
  IC.UpdateInKer = getRobAStBaseOption("IC.UpdateInKer"),
  withICList = getRobAStBaseOption("withICList"),
  withPICList = getRobAStBaseOption("withPICList"),
  na.rm = TRUE, startArgList = NULL, ...,
  withLogScale = TRUE, withEvalAsVar = TRUE,
  withMakeIC = FALSE, E.argList = NULL, diagnostic = FALSE)
```

**Arguments**
- **x**: sample
- **IC**: object of class "IC"
- **start**: initial estimate (for full parameter, i.e., in dimension $k$ respective joint length of main and nuisance part of the parameter): either a numerical value, or an object of class "Estimate" or a function producing either a numerical value, or an object of class "Estimate" when evaluated at $x$, ..., if missing or NULL, we use slot startPar of the L2family L2Fam from within IC
- **steps**: integer: number of steps
- **useLast**: which parameter estimate (initial estimate or k-step estimate) shall be used to fill the slots pIC, asvar and asbias of the return value.
- **withUpdateInKer**: if there is a non-trivial trafo in the model with matrix $D$, shall the parameter be updated on $\text{ker}(D)$?
- **IC.UpdateInKer**: if there is a non-trivial trafo in the model with matrix $D$, the IC to be used for this; if NULL the result of getboundedIC(L2Fam, D) is taken; this IC will then be projected onto $\text{ker}(D)$.
- **na.rm**: logical: if TRUE, the estimator is evaluated at complete.cases(x).
**kStepEstimator**

- **startArgList**: a list of arguments to be given to argument `start` if the latter is a function; this list by default already starts with two unnamed items, the sample `x`, and the model `eval(CallL2Fam(IC))`.
- **withPICIList**: logical: shall slot `pICIList` of return value be filled?
- **withICList**: logical: shall slot `ICList` of return value be filled?
- **withLogScale**: logical: if TRUE, a scale component (if existing and found with name `scalenname`) is computed on log-scale and backtransformed afterwards (default). This avoids crossing 0.
- **withEvalAsVar**: logical: if TRUE (default), tells R to evaluate the asymptotic variance or just to produces a call to do so.
- **withMakeIC**: logical: if TRUE the [p]IC is passed through `makeIC` before return.
- **E.argList**: NULL (default) or a named list of arguments to be passed to calls to `E` from `kStepEstimator`; potential clashes with arguments of the same name in ... are resolved by inserting the items of argument list `E.argList` as named items to the argument lists, so in case of collisions the item of `E.argList` overwrites the existing one from ....
- **diagnostic**: logical: if TRUE, diagnostic information on the performed integrations is gathered and shipped out as an attribute diagnostic of the return value of `kStepEstimator`.

**Details**

Given an initial estimation `start`, a sample `x` and an influence curve `IC` the corresponding k-step estimator is computed.

The default value of argument `useLast` is set by the global option `kStepUseLast` which by default is set to `FALSE`. In case of general models `useLast` remains unchanged during the computations. However, if slot `CallL2Fam` of `IC` generates an object of class "L2GroupParamFamily" the value of `useLast` is changed to TRUE. Explicitly setting `useLast` to TRUE should be done with care as in this situation the influence curve is re-computed using the value of the one-step estimate which may take quite a long time depending on the model.

If `useLast` is set to TRUE and slot `modifyIC` of `IC` is filled with some function (which can be used to re-compute the IC for a different parameter), the computation of `asvar`, `asbias` and `IC` is based on the k-step estimate.

Timings for the several substeps are available as attribute `timings` of the return value.

Diagnostics on the involved integrations are available if argument `diagnostic` is TRUE. Then there is attribute diagnostic attached to the return value, which may be inspected and accessed through `showDiagnostic` and `getDiagnostic`.

**Value**

Object of class "kStepEstimate".

**Author(s)**

Matthias Kohl <Matthias.Kohl@stamats.de>,
Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>
References


See Also

`IC-class, kStepEstimate-class`

Examples

```r
## don't run to reduce check time on CRAN
if(require(ROptEst)){
  ## 1. generate a contaminated sample
  ind <- rbinom(100, size=1, prob=0.05)
  x <- rnorm(100, mean=0, sd=(1-ind) + ind*9)

  ## 2. Kolmogorov(-Smirnov) minimum distance estimator
  (est0 <- MDEstimator(x=x, NormLocationScaleFamily()))

  ## 3. k-step estimation: radius known
  N1 <- NormLocationScaleFamily(mean=estimate(est0)["mean"], sd=estimate(est0)["sd"])
  N1.Rob <- InfRobModel(center = N1, neighbor = ContNeighborhood(radius = 0.5))
  IC1 <- optIC(model = N1.Rob, risk = asMSE())
  (est1 <- kStepEstimator(x, IC1, est0, steps = 3, withPIC = TRUE))
  estimate(est1)
  ksteps(est1)
  pICList(est1)
  start(est1)
  attr(est1,"timings")

  ## a transformed model
  tfct <- function(x){
    nms0 <- c("mean","sd")
    nms <- "comb"
    fval0 <- x[1]+2*x[2]
    names(fval0) <- nms
    mat0 <- matrix(c(1,2), nrow = 1, dimnames = list(nms,nms0))
    return(list(fval = fval0, mat = mat0))
  }

  N1.traf <- N1; trafo(N1.traf) <- tfct
  N1R.traf <- N1.Rob; trafo(N1R.traf) <- tfct
  IC1.traf <- optIC(model = N1R.traf, risk = asMSE())
  (est0.traf <- MDEstimator(x, N1.traf))
  (est1.traf <- kStepEstimator(x, IC1.traf, est0, steps = 3,
                               withIC = TRUE, withPIC = TRUE, withUpdateInKer = FALSE))
  (est1a.traf <- kStepEstimator(x, IC1.traf, est0, steps = 3,
                               withIC = TRUE, withPIC = TRUE, withUpdateInKer = TRUE))
  estimate(est1.traf)
```
Methods for function `kStepEstimator.start` in Package `RobAStBase`

Description

`kStepEstimator.start-methods`; these are called from within `kStepEstimator` to produce a numeric value of for the starting estimator in the end.

Usage

```r
kstepestimator$start(start, ...)  # S4 method for signature 'numeric'
kstepestimator$start(start, nrvalues, ...)  # S4 method for signature 'Estimate'
kstepestimator$start(start, nrvalues, ...)  # S4 method for signature 'function'
kstepestimator$start(start, x, nrvalues, na.rm, L2Fam, startList)
```

Arguments

- **start**: the start slot of an object of class `kStepEstimator`
- **nrvalues**: numeric; dimension $k$ of the original model, i.e.; length of the untransformed parameter, or joint length of main and nuisance part of the parameter.
- **x**: the data at which the starting estimator is to be evaluated.
- **na.rm**: logical: if TRUE, the estimator is evaluated at `complete.cases(x)`.
- **startList**: a list of arguments to be given to the call to `start` if this is a function;
locMEstimator

L2Fam the parametric family;

... further arguments for kStepEstimator.start.

Value

a numeric vector with the corresponding value of the start estimator (in \( k \) space)

Methods

\texttt{kStepEstimator.start} signature(start = "numeric"): returns the unchanged argument start if it has the correct length; otherwise throws an error.

\texttt{kStepEstimator.start} signature(start = "Estimate"): returns slot untransformed.estimate of start if it is not NULL, and else slot estimate if the latter has dimension nrvalues.

\texttt{kStepEstimator.start} signature(start = "function"): returns \texttt{kStepEstimator.start(do.call(start, args=c(list(x, lRfam), startlist))} where, if \( \text{na.rm} \) == \text{TRUE}, beforehand \( x \) has been modified to \( x \leftarrow \text{complete.cases}(x) \).

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References


See Also

\texttt{kStepEstimator.ALEstimate-class}

\begin{center}
\begin{tabular}{ll}
\texttt{locMEstimator} & \textit{Generic function for the computation of location M estimates} \\
\end{tabular}
\end{center}

Description

Generic function for the computation of location M estimates.

Usage

\texttt{locMEstimator(x, IC, \ldots)}

\# S4 method for signature 'numeric,InfluenceCurve'
\texttt{locMEstimator(x, IC, eps = .Machine$double.eps*0.5, na.rm = TRUE)}
Arguments

x sample
IC object of class "InfluenceCurve"
... additional parameters
eps the desired accuracy (convergence tolerance).
na.rm logical: if TRUE, the estimator is evaluated at complete.cases(x).

Details

Given some sample x and some influence curve IC an M estimate is computed by solving the corresponding M equation.

Value

Object of class "MEstimate"

Methods

x = "numeric", IC = "InfluenceCurve" univariate location.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References


See Also

InfluenceCurve-class, MEstimate-class

Description

Generic function for providing centering and Fisher consistency of ICs.
Usage

makeIC(IC, L2Fam, ...)  
## S4 method for signature 'IC,L2ParamFamily'
makeIC(IC, L2Fam, ..., diagnostic = FALSE)  
## S4 method for signature 'list,L2ParamFamily'
makeIC(IC, L2Fam, forceIC = TRUE, name, Risks,
       Infos, modifyIC = NULL, ..., diagnostic = FALSE)  
## S4 method for signature 'function,L2ParamFamily'
makeIC(IC, L2Fam, forceIC = TRUE, name,
       Risks, Infos, modifyIC = NULL, ..., diagnostic = FALSE)

Arguments

IC object of class "IC" for signature IC="IC", respectively a list of functions in one argument for signature IC="list", respectively a function in one argument for signature IC="function".
L2Fam L2-differentiable family of probability measures; may be missing, in which case it is replaced by the family in slot CallL2Fam of IC.
forceIC logical; shall centeredness and Fisher consistency be enforced applying an affine linear transformation?
name Object of class "character"; the name of the IC
Risks object of class "list": list of risks; cf. RiskType-class.
Infos matrix of characters with two columns named method and message: additional informations.
modifyIC object of class "OptionalFunction": function of four arguments: (1) L2Fam an L2 parametric family (2) IC an optional influence curve, (3) withMakeIC a logical argument whether to enforce the IC side conditions by makeIC, and (4) ... for arguments to be passed to calls to E in makeIC. Returns an object of class "IC". This function is mainly used for internal computations!
... additional parameters to be passed to expectation E
diagnostic logical; if TRUE, diagnostic information on the integration is printed and returned as attribute diagnostic of the return value.

Details

Argument IC is transformed affinely such that the transformed IC satisfies the defining side conditions of an IC, i.e., centeredness and Fisher consistency:

\[ E[IC] = 0 \]

\[ E[IC \Lambda^T] = D \]

where \( \Lambda \) is the L2 derivative of the model and D is the Jacobian of transformation \( \text{trafo} \).

Diagnostics on the involved integrations are available if argument diagnostic is TRUE. Then there is attribute diagnostic attached to the return value, which may be inspected and accessed through showDiagnostic and getDiagnostic.
Value

An IC of class "IC" at the model.

Methods

makeIC signature(IC = "IC", L2Fam = "missing"): creates an object of class "IC" at the parametric model of its own slot Call L2Fam; enforces IC conditions centeredness and Fisher consistency, applying an affine linear transformation.

makeIC signature(IC = "IC", L2Fam = "L2ParamFamily"): creates an object of class "IC" at the parametric model L2Fam; enforces IC conditions centeredness and Fisher consistency, applying an affine linear transformation.

makeIC signature(IC = "list", L2Fam = "L2ParamFamily"): creates an object of class "IC" out of a list of functions given by argument IC at the parametric model L2Fam; enforces IC conditions centeredness and Fisher consistency, applying an affine linear transformation.

makeIC signature(IC = "function", L2Fam = "L2ParamFamily"): creates an object of class "IC" out of a function given by argument IC at the parametric model L2Fam; enforces IC conditions centeredness and Fisher consistency, applying an affine linear transformation.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References


See Also

L2ParamFamily-class, IC-class

Examples

## default IC
IC1 <- new("IC")

## L2-differentiable parametric family
B <- BinomFamily(13, 0.3)

## check IC properties
checkIC(IC1, B)

## make IC
IC2 <- makeIC(IC1, B)

## check IC properties
checkIC(IC2)
## masked-methods

Masked Methods from Packages ‘stats’ and ‘graphics’ in Package ‘RobAStBase’

### Description

masked methods from packages stats and graphics

### Usage

```r
clip(x1,...)  # S4 method for signature 'ANY'
clip(x1,x2,y1,y2)
start(x,...)  # S4 method for signature 'ANY'
start(x,...)
```

### Arguments

- `x,...` see `start`
- `x1,x2,y1,y2` see `clip`
MEstimate-class

Details

In order to make accessible the otherwise masked functions `start.clip`, we generate corresponding S4-methods.

Value

see `start`, `clip`

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

---

MEstimate-class MEstimate-class.

Description

Class of asymptotically linear estimates.

Objects from the Class

Objects can be created by calls of the form `new("MEstimate", ...)`. More frequently they are created via the generating function `locMEstimator`.

Slots

- `name` Object of class "character": name of the estimator.
- `estimate` Object of class "ANY": estimate.
- `samplesize` Object of class "numeric": sample size.
- `asvar` Optional object of class "matrix": asymptotic variance.
- `asbias` Optional object of class "numeric": asymptotic bias.
- `pIC` Optional object of class `InfluenceCurve`: influence curve.
- `nuis.idx` object of class "OptionalNumeric": indices of estimate belonging to the nuisance part.
- `mroot` Object of class "numeric": value of the M equation at the estimate.
- `infos` object of class "matrix" with two columns named `method` and `message`: additional informations.

Extends

Class "ALEstimate", directly.
Class "Estimate", by class "AEstimate".
Methods

Mroot signature(object = "MEstimate"): accessor function for slot Mroot.
show signature(object = "MEstimate")

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

See Also

ALEstimate-class

Examples

## prototype
new("MEstimate")

---

movToRef-methods  Methods for Functions moving from and to reference parameter in
                   Package ‘ROptEst’

Description

In optIC a gain in accuracy can be obtained when computing the optimally-robust ICs at a reference
parameter of the model (instead of an arbitrary one). To this end, moveL2Fam2RefParam moved the
model to the reference parameter and moveICBackFromRefParam moves the obtained optimal IC
back to the original parameter.

Usage

moveL2Fam2RefParam(L2Fam, ...)
moveICBackFromRefParam(IC, L2Fam, ...)

Arguments

L2Fam object of class L2ParamFamily
IC IC of class HampIC
... further arguments to be passed on.

Details

moveL2Fam2RefParam and moveICBackFromRefParam are used internally in functions robest and
roptest to compute the optimally robust influence function according to the arguments given to
them.
**Value**

moveL2Fam2RefParam

the L2 Family transformed to reference parameter.

moveICBackFromRefParam

the backtransformed IC.

**Methods**

moveL2Fam2RefParam signature(L2Fam = "L2ParamFamily"): returns L2Fam unchanged.

moveL2Fam2RefParam signature(L2Fam = "L2LocationFamily"): moves L2Fam to location 0.

moveL2Fam2RefParam signature(L2Fam = "L2ScaleFamily"): moves L2Fam to location 0 and scale 1.

moveL2Fam2RefParam signature(L2Fam = "L2LocationScaleFamily"): moves L2Fam to location 0 and scale 1.

moveL2Fam2RefParam signature(L2Fam = "L2LocationUnknownScaleFamily"): moves L2Fam to location 0.

moveL2Fam2RefParam signature(L2Fam = "L2ScaleUnknownLocationFamily"): moves L2Fam to location 0 and scale 1.

moveICBackFromRefParam signature(IC = "IC", L2Fam = "L2ParamFamily"): returns IC unchanged.

moveICBackFromRefParam signature(IC = "IC", L2Fam = "L2LocationFamily"): moves IC in IC back to original location in L2Fam.

moveICBackFromRefParam signature(IC = "IC", L2Fam = "L2ScaleFamily"): moves IC in IC back to original location and scale in L2Fam, rescaling risk where necessary.

moveICBackFromRefParam signature(IC = "IC", L2Fam = "L2LocationScaleFamily"): moves IC in IC back to original location and scale in L2Fam, rescaling risk where necessary.

moveICBackFromRefParam signature(IC = "IC", L2Fam = "L2LocationUnknownScaleFamily"): moves IC in IC back to original location and scale in L2Fam, rescaling risk where necessary.

moveICBackFromRefParam signature(IC = "IC", L2Fam = "L2ScaleUnknownLocationFamily"): moves IC in IC back to original location and scale in L2Fam, rescaling risk where necessary.

moveICBackFromRefParam signature(IC = "HampIC", L2Fam = "L2ParamFamily"): moves IC in IC back to original location and scale in L2Fam (and in addition changes Lagrange multipliers accordingly), rescaling risk where necessary.

**Author(s)**

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>
Description

Class of neighborhoods of families of probability measures.

Objects from the Class

A virtual Class: No objects may be created from it.

Slots

type Object of class "character": type of the neighborhood.
radius Object of class "numeric": neighborhood radius.

Methods

type signature(object = "Neighborhood"): accessor function for slot type.
radius signature(object = "Neighborhood"): accessor function for slot radius.
show signature(object = "Neighborhood")
radius<- signature(object = "Neighborhood"): replacement function for slot radius.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References


See Also

ProbFamily-class
normtype-methods

Methods for Function normtype in Package ‘RobAStBase’

Description

Methods

**normtype** signature(object = "interpolrisk"): returns the slot normtype of an object of class "interpolrisk".

Examples

```r
myrisk <- MBRRisk(samplesize=100)
normtype(myrisk)
```

oneStepEstimator Function for the computation of one-step estimates

Description

Function for the computation of one-step estimates.

Usage

```r
oneStepEstimator(x, IC, start = NULL,
    useLast = getRobAStBaseOption("kStepUseLast"),
    withUpdateInKer = getRobAStBaseOption("withUpdateInKer"),
    IC.UpdateInKer = getRobAStBaseOption("IC.UpdateInKer"),
    na.rm = TRUE, startArgList = NULL, withMakeIC = FALSE, ...,
    E.argList = NULL)
```

Arguments

- **x** sample
- **IC** object of class "InfluenceCurve"
- **start** initial estimate (for full parameter,i.e. in dimension \( k \) respective joint length of main and nuisance part of the parameter): either a numerical value, or an object of class "Estimate" or a function producing either a numerical value, or an object of class "Estimate" when evaluated at \( x, \ldots \); if missing or NULL, we use slot startPar of the L2family L2Fam from within IC.
- **useLast** which parameter estimate (initial estimate or one-step estimate) shall be used to fill the slots pIC, asvar and asbias of the return value.
withUpdateInKer

- if there is a non-trivial transformation in the model with matrix $D$, shall the parameter be updated on $\ker(D)$?

IC.UpdateInKer

- if there is a non-trivial transformation in the model with matrix $D$, the IC to be used for this; if NULL the result of `getboundedIC(L2Fam, D)` is taken; this IC will then be projected onto $\ker(D)$.

na.rm

- logical: if TRUE, the estimator is evaluated at `complete.cases(x)`.

startArgList

- a list of arguments to be given to argument `start` if the latter is a function; this list by default already starts with two unnamed items, the sample `x`, and the model `eval(CallL2Fam(IC))`; in case IC is not of class IC, the model argument L2Fam will be set to NULL.

withMakeIC

- logical: if TRUE the [p]IC is passed through `makeIC` before return.

E.argList

- NULL (default) or a named list of arguments to be passed to calls to `E` from `kStepEstimator`; potential clashes with arguments of the same name in ... are resolved by inserting the items of argument list `E.argList` as named items to the argument lists, so in case of collisions the item of `E.argList` overwrites the existing one from ...

**Details**

Given an initial estimation `start`, a sample `x` and an influence curve `IC` the corresponding one-step estimator is computed.

In case `IC` is an object of class "IC" the slots `asvar` and `asbias` of the return value are filled (based on the initial estimate).

The default value of argument `useLast` is set by the global option `kStepUseLast` which by default is set to `FALSE`. In case of general models `useLast` remains unchanged during the computations. However, if slot `CallL2Fam` of IC generates an object of class "L2GroupParamFamily" the value of `useLast` is changed to `TRUE`. Explicitly setting `useLast` to `TRUE` should be done with care as in this situation the influence curve is re-computed using the value of the one-step estimate which may take quite a long time depending on the model.

If `useLast` is set to `TRUE` and slot `modifyIC` of IC is filled with some function (which can be used to re-compute the IC for a different parameter), the computation of `asvar`, `asbias` and `IC` is based on the one-step estimate.

**Value**

Object of class "kStepEstimate"

**Author(s)**

Matthias Kohl <Matthias.Kohl@stamats.de>,
Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>
References


See Also

`InfluenceCurve-class, kStepEstimate-class`

### optIC

**Generic function for the computation of optimally robust ICs**

**Description**

Generic function for the computation of optimally robust ICs.

**Usage**

```r
optIC(model, risk, ...) # S4 method for signature 'L2ParamFamily,asCov'
optIC(model, risk, withMakeIC = FALSE, ...)
```

**Arguments**

- `model`: probability model.
- `risk`: object of class "RiskType".
- `...`: additional parameters (here used for `makeIC`, resp. for `E`).
- `withMakeIC`: logical; if TRUE the [p]IC is passed through `makeIC` before return.

**Details**

The classical optimal IC which is optimal in sense of the Cramer-Rao bound is computed.

**Value**

Some optimally robust IC is computed.

**Methods**

- `model = "L2ParamFamily", risk = "asCov"` computes classical optimal influence curve for L2 differentiable parametric families.

**Author(s)**

Matthias Kohl <Matthias.Kohl@stamats.de>
OptionalInfluenceCurve-class

References


See Also

*InfluenceCurve-class, RiskType-class*

Examples

```r
B <- BinomFamily(size = 25, prob = 0.25)

## classical optimal IC
IC0 <- optIC(model = B, risk = asCov())
plot(IC0) # plot IC
checkIC(IC0, B)
```

OptionalInfluenceCurve-class

Some helper Classes in package 'RobAStBase'

Description

Some helper Classes in package 'RobAStBase': Classes OptionalInfluenceCurve, OptionalpICList, StartClass, pICList

Class Unions

OptionalInfluenceCurve is a class union of classes InfluenceCurve and NULL; OptionalInfluenceCurveOrCall is a class union of classes InfluenceCurve, call, and NULL — it is the slot class of slot pIC in ALEstimate; OptionalpICList is a class union of classes pICList and NULL — it is the slot class of slot pICList in kStepEstimate; StartClass is a class union of classes function, numeric and Estimate — it is the slot class of slot start in kStepEstimate.

List Classes

pICList is a descendant of class list which requires its members —if any— to be of class pIC.

Methods

* show signature(object = "OptionalpICList"): particular show-method.
* show signature(object = "pICList"): particular show-method.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>
References


See Also

InfluenceCurve, RiskType-class

outlyingPlotIC Function outlyingPlotIC in Package ‘RobAStBase’

Description

outlyingPlotIC produces an outlyingness plot based on distances applied to ICs

Usage

outlyingPlotIC(data, IC.x, IC.y = IC.x, dist.x = NormType(), dist.y, cutoff.x = cutoff.sememp(0.95), cutoff.y = cutoff.chisq(0.95), ..., cutoff.quantile.x = 0.95, cutoff.quantile.y = cutoff.quantile.x, id.n, cex pts = 1, lab pts = 0, alpha.trsp = NA, adj, cex.idn, col.idn, lty.cutoff, lwd.cutoff, col.cutoff, text.abline = TRUE, text.abline.x = NULL, text.abline.y = NULL, cex.abline = par("cex"), col.abline = col.cutoff, font.abline = par("font"), adj.abline = c(0,0), text.abline.x.x = NULL, text.abline.x.y = NULL, text.abline.y.x = NULL, text.abline.y.y = NULL, text.abline.x.fmt.cx = "%7.2f", text.abline.y.fmt.qx = "%4.2f%%", text.abline.y.fmt.qy = "%4.2f%%", robCov.x = TRUE, robCov.y = TRUE, tf.x = NULL, tf.y = NULL, jitter.fac=10, jitter.tol=.Machine$double.eps, doplot = TRUE, main = gettext("Outlyingness \n by means of a distance-distance plot") )

Arguments

data data coercable to matrix; the data at which to produce the ddPlot.
IC.x object of class IC the influence curve to produce the distances for the x axis.
IC.y object of class IC the influence curve to produce the distances for the y axis.
... further arguments to be passed to plot.default, text, and abline
dist.x object of class NormType; the distance for the x axis.
dist.y object of class NormType; the distance for the y axis.
cutoff.x object of class cutoff; the cutoff information for the x axis (the vertical line discriminating 'good' and 'bad' points).
cutoff.y object of class cutoff; the cutoff information for the y axis (the horizontal line discriminating 'good' and 'bad' points).
cutoff.quantile.x numeric; the cutoff quantile for the x axis.
cutoff.quantile.y numeric; the cutoff quantile for the y axis.
id.n a set of indices (or a corresponding logical vector); to select a subset of the data in argument data.
cex.pts the corresponding cex argument for plotted points.
lab.pts a vector of labels for the (unsubsetted) data.
jitter.pts the corresponding jitter argument for plotted points; may be a vector of length 2 – for separate factors for x- and y-coordinate.
alpha.trsp alpha transparency to be added ex post to colors col.pch and col.lbl; if one-dim and NA all colors are left unchanged. Otherwise, with usual recycling rules alpha.trsp gets shorted/prolongated to length the data-symbols to be plotted. Coordinates of this vector alpha.trsp with NA are left unchanged, while for the remaining ones, the alpha channel in rgb space is set to the respective coordinate value of alpha.trsp. The non-NA entries must be integers in [0,255] (0 invisible, 255 opaque).
adj the corresponding argument for text for labelling the outliers.
cex.idn the corresponding cex argument for text for labelling the outliers.
col.idn the corresponding col argument for text for labelling the outliers.
lty.cutoff the corresponding lty argument for abline for drawing the cutoff lines.
lwd.cutoff the corresponding lwd argument for abline for drawing the cutoff lines.
col.cutoff the corresponding col argument for abline for drawing the cutoff lines.
text.abline vector of logicals (cast to length 2): shall text be added to cutoff lines.
text.abline.x text to be added to cutoff lines in x direction; if NULL (default) we use “[pp] %-cutoff = [ff]” where [pp] is the percentage up to 2 digits and [ff] is the cutoff value up to 2 digits.
text.abline.y text to be added to cutoff lines in y direction; if NULL (default) we use “[pp] %-cutoff = [ff]” where [pp] is the percentage up to 2 digits and [ff] is the cutoff value up to 2 digits.
cex.abline vector of numerics (cast to length 2): cex-value for added cutoff text.
col.abline vector of length 2: color for added cutoff text.
font.abline vector of length 2: font for added cutoff text.
adj.abline cast to 2 x 2 matrix (by recycling rules): adjustment values for added cutoff text.
text.abline.x.y y-coordinate of text to be added to cutoff lines in x direction; if NULL (default) set to mid of mean(par("usr"))[c(3,4)].
outlyingPlotIC

The `outlyingPlotIC` function calls a corresponding `ddPlot` method to produce the plot. The function takes several arguments:

- `text.abline.y.x`: x-coordinate of text to be added to cutoff lines in y direction; if NULL (default) set to mid of `mean(par("usr")[c(1,2)])`.
- `text.abline.x.x`: x-coordinate of text to be added to cutoff lines in x direction; if NULL (default) set to 1.05 times the cutoff value.
- `text.abline.y.y`: y-coordinate of text to be added to cutoff lines in y direction; if NULL (default) set to 1.05 times the cutoff value.
- `text.abline.x.fmt.cx`: format string (see `gettextf`) to format the cutoff value in label in x direction.
- `text.abline.x.fmt.qx`: format string to format cutoff probability in label in x direction.
- `text.abline.y.fmt.cy`: format string to format the cutoff value in label in y direction.
- `text.abline.y.fmt.qy`: format string to format cutoff probability in label in y direction.
- `robcov.x`: shall x-distances be based on MCD, i.e., robust covariances (TRUE) or on classical covariance be used?
- `robcov.y`: shall y-distances be based on MCD, i.e., robust covariances (TRUE) or on classical covariance be used?
- `tf.x`: transformation for x axis: a function returning the transformed x-coordinates when applied to the data; if `tf.x` is NULL (default), internally this is set to the evaluation function of the `ic.x`.
- `tf.y`: transformation for y axis: a function returning the transformed y-coordinates when applied to the data; if `tf.x` is NULL (default), internally this is set to the evaluation function of `ic.y`.
- `jitter.fac`: factor for jittering, see `jitter`;
- `jitter.tol`: threshold for jittering: if distance between points is smaller than `jitter.tol`, points are considered replicates.
- `doplot`: logical; shall a plot be produced? if FALSE only the return values are produced.
- `main`: the main title.

**Details**

If argument `doplot` is FALSE: A list (returned as `invisible()`) with items

- `id.x`: the indices of (possibly transformed) data (within subset id.n) beyond the x-cutoff
- `id.y`: the indices of (possibly transformed) data (within subset id.n) beyond the y-cutoff
plot-methods

Methods for Function plot in Package 'RobAStBase'

Description

plot-methods

id.xy the indices of (possibly transformed) data (within subset id.n) beyond the x-cutoff and the y-cutoff
qtx the quantiles of the distances of the (possibly transformed) data in x direction
qty the quantiles of the distances of the (possibly transformed) data in y direction
cutoff.x.v the cutoff value in x direction
cutoff.y.v the cutoff value in y direction

If argument doplot is TRUE: An S3 object of class c("plotInfo", "DiagnInfo"), i.e., a list containing the information needed to produce the respective plot, which at a later stage could be used by different graphic engines (like, e.g., ggplot) to produce the plot in a different framework. A more detailed description will follow in a subsequent version.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

Examples

```r
if(require(ROptEst)){
  ## generates normal location and scale family with mean = -2 and sd = 3
  N0 <- NormLocationScaleFamily()
  N0.IC0 <- optIC(model = N0, risk = asCov())
  N0.Rob1 <- InfRobModel(center = N0, neighbor = ContNeighborhood(radius = 0.5))
  N0.IC1 <- optIC(model = N0.Rob1, risk = asMSE())
  set.seed(123)
  xn <- c(rnorm(100), rcauchy(20)+20)
  outlyingPlotIC(xn, IC.x=N0.IC0)
  outlyingPlotIC(xn, IC.x=N0.IC1)

  ## example for usage with cutoff.quant()
  classIC <- optIC(NormLocationScaleFamily(mean = 3.3, sd = 0.67),
                   risk = asCov())
  outlyingPlotIC(data = chem[-17], classIC, cex.pts = 3, jitter.fac = 1,
                 cutoff.x = cutoff.quant(), tf.x = function(x)(x))
}
```
Usage

plot(x, y, ...)

## S4 method for signature 'IC,missing'
plot(x, ..., withSweave = getdistrOption("withSweave"),
     main = FALSE, inner = TRUE, sub = FALSE,
     col.inner = par("col.main"), cex.inner = 0.8,
     bmar = par("mar")[1], tmar = par("mar")[3],
     with.automatic.grid = TRUE,
     with.legend = FALSE, legend = NULL, legend.bg = "white",
     legend.location = "bottomright", legend.cex = 0.8,
     with.MBR = FALSE, MBRB = NA, MBR.fac = 2, col.MBR = par("col"),
     lty.MBR = "dashed", lwd.MBR = 0.8,
     x.vec = NULL, scaleX = FALSE, scaleX.fct, scaleX.inv,
     scaleY = FALSE, scaleY.fct = pnorm, scaleY.inv=qnorm,
     scaleN = 9, x.ticks = NULL, y.ticks = NULL,
     mfColRow = TRUE, to.draw.arg = NULL,
     withSubst = TRUE)

## S4 method for signature 'IC,numeric'
plot(x, y, ...,
     cex.pts = 1, cex.pts.fun = NULL, col.pts = par("col"),
     pch.pts = 19,
     cex.npts = 1, cex.npts.fun = NULL, col.npts = par("col"),
     pch.npts = 20,
     jitter.fac = 1, with.lab = FALSE, cex.lbs = 1, adj.lbs = c(0,0),
     col.lbs = col.pts, lab.pts = NULL, lab.font = NULL,
     alpha.trsp = NA, which.lbs = NULL,
     which.Order = NULL, which.nonlbs = NULL, attr.pre = FALSE,
     return.Order = FALSE)

Arguments

x object of class "IC": IC to be plotted
y missing or numeric (a dataset, e.g.)
withSweave logical: if TRUE (for working with Sweave) no extra device is opened
main logical: is a main title to be used? or just as argument main in plot.default.
inner logical: do panels have their own titles? or character vector of inner titles/ cast to length 'number of plotted dimensions'; if argument to. draw.arg is used, this refers to a vector of length length(to.draw.arg), the actually plotted dimensions. For further information, see also description of argument main in plot.default.
sub logical: is a sub-title to be used? or just as argument sub in plot.default.
tmar top margin – useful for non-standard main title sizes
bmar bottom margin – useful for non-standard sub title sizes
cex.inner  magnification to be used for inner titles relative to the current setting of cex; as in \texttt{par}

col.inner character or integer code; color for the inner title

\texttt{with-automatic.grid}

logical; should a grid be plotted alongside with the ticks of the axes, automatically? If \texttt{TRUE} a respective call to \texttt{grid} in argument \texttt{panel.first} is ignored.

\texttt{with.legend}

logical; shall a legend be plotted?

legend  either \texttt{NULL} or a list of length (number of plotted panels) of items which can be used as argument \texttt{legend} in command \texttt{legend}.

\texttt{legend.location}

a valid argument \texttt{x} for \texttt{legend} — the place where to put the legend on the last issued plot — or a list of length (number of plotted panels) of such arguments, one for each plotted panel.

\texttt{legend.bg}

background color for the legend

\texttt{legend.cex}

magnification factor for the legend

\texttt{withMBR}

logical; shall horizontal lines with min and max of MBRE be plotted for comparison?

\texttt{MBRB}

matrix (or \texttt{NA}); coerced by usual recycling rules to a matrix with as many rows as plotted panels and with first column the lower bounds and the second column the upper bounds for the respective coordinates (ideally given by the MBR-IC).

\texttt{MBR.fac}

positive factor; scales the bounds given by argument \texttt{MBRB}

\texttt{col.MBR}

color for the MBR lines; as usual \texttt{col}-argument;

\texttt{lty.MBR}

line type for the MBR lines; as usual \texttt{lty}-argument;

\texttt{lwd.MBR}

line width for the MBR lines; as usual \texttt{lwd}-argument;

\texttt{x.vec}

a numeric vector of grid points to evaluate the influence curve; by default, \texttt{x.vec} is \texttt{NULL}; then the grid is produced automatically according to the distribution of the IC. \texttt{x.vec} can be useful for usage with a rescaling of the x-axis to avoid that the evaluation points be selected too unevenly (i.e. on an equally spaced grid in the original scale, but then, after rescaling non-equally). The grid has to be specified in original scale; i.e.; when used with rescaling, it should be chosen non-equally spaced.

\texttt{scaleX}

logical; shall X-axis be rescaled (by default according to the cdf of the underlying distribution)?

\texttt{scaleY}

logical; shall Y-axis be rescaled (by default according to a probit scale)?

\texttt{scaleX.fct}

an isotone, vectorized function mapping the domain of the IC to [0,1]; if \texttt{scaleX} is \texttt{TRUE} and \texttt{scaleX.fct} is missing, the cdf of the underlying observation distribution; can also be a list of functions with one list element for each of the panels to be plot.

\texttt{scaleX.inv}

the inverse function to \texttt{scale.fct}, i.e., an isotone, vectorized function mapping [0,1] to the domain of the IC such that for any \texttt{x} in the domain, \texttt{scaleX.inv(scaleX.fct(x))=x}; if \texttt{scaleX} is \texttt{TRUE} and \texttt{scaleX.inv} is missing, the quantile function of the underlying observation distribution; can also be a list of functions with one list element for each of the panels to be plot.
scaleY.fct: an isotone, vectorized function mapping for each coordinate the range of the respective coordinate of the IC to \([0,1]\); defaulting to the cdf of \(\mathcal{N}(0,1)\).

scaleY.inv: an isotone, vectorized function mapping for each coordinate the range \([0,1]\) into the range of the respective coordinate of the IC; defaulting to the quantile function of \(\mathcal{N}(0,1)\).

scaleN: integer; defaults to 9; on rescaled axes, number of x and y ticks if drawn automatically.

x.ticks: numeric; defaults to NULL; (then ticks are chosen automatically); if non-NULL, user-given x-ticks (on original scale);

y.ticks: numeric; defaults to NULL; (then ticks are chosen automatically); if non-NULL, user-given y-ticks (on original scale); can be a list with one (numeric or NULL) item per panel.

mfColRow: shall default partition in panels be used — defaults to TRUE.

to.draw.arg: Either NULL (default; everything is plotted) or a vector of either integers (the indices of the subplots to be drawn) or characters — the names of the subplots to be drawn: these names are to be chosen either among the row names of the trafo matrix rownames(trafo(eval(x@Call12Fam@param))) or if the last expression is NULL a vector "dim<dimnr>", dimnr running through the number of rows of the trafo matrix.

withSubst: logical; if TRUE (default) pattern substitution for titles and labels is used; otherwise no substitution is used.

cex.pts: size of the points of the second argument plotted, can be a vector; if argument attr.pre is TRUE, it is recycled to the length of all observations and determines the sizes of all plotted symbols, i.e., the selection is done within this argument; in this case argument col.npts is ignored. If attr.pre is FALSE, cex.pts is recycled to the number of the observations selected for labelling and refers to the index ordering after the selection. Then argument cex.npts determines the sizes of the shown but non-labelled observations as given in argument which.nlbs.

cex.pts.fun: rescaling function for the size of the points to be plotted; either NULL (default), then \(\log(1+\text{abs}(x))\) is used for each of the rescalings, or a function which is then used for each of the rescalings, or a list of functions; if it is a function or a list of functions, if necessary it is recycled to length dim where dim is the number of dimensions of the pICs to be plotted.

col.pts: color of the points of the second argument plotted, can be a vector as in cex.pts (with col.npts as counterpart).

pch.pts: symbol of the points of the second argument plotted, can be a vector as in cex.pts (with pch.npts as counterpart).

col.npts: color of the non-labelled points of the data argument plotted; (may be a vector).

pch.npts: symbol of the non-labelled points of the data argument plotted (may be a vector).

cex.npts: size of the non-labelled points of the data argument plotted (may be a vector).

cex.npts.fun: rescaling function for the size of the non-labelled points to be plotted; either NULL (default), then \(\log(1+\text{abs}(x))\) is used for each of the rescalings, or a
function which is then used for each of the rescalings, or a list of functions; if it is a function or a list of functions, if necessary it is recycled to length \texttt{dim} where \texttt{dim} is the number of dimensions of the pICs to be plotted.

\textbf{with.lab} logical; shall labels be plotted to the observations?

\textbf{cex.\_lbs} size of the labels; can be vectorized to a matrix of \texttt{dim nlbs x npnl} where \texttt{npnl} is the number of plotted panels and \texttt{nlbs} the number of plotted labels; if it is a vector, it is recycled in order label then panel.

\textbf{col.\_lbs} color of the labels; can be vectorized as \texttt{col.pts}.

\textbf{adj.\_lbs} adjustment of the labels; can be vectorized to a 2 x \texttt{npnl} matrix, \texttt{npnl} the number of plotted panels; if it is a vector, it is recycled in order (x,y)-coords then panel.

\textbf{lab.\_pts} character or \texttt{NULL}; labels to be plotted to the observations; if \texttt{NULL} observation indices;

\textbf{lab.\_font} font to be used for labels (of the observations).

\textbf{alpha.trsp} alpha transparency to be added ex post to colors \texttt{col.pch} and \texttt{col.lbl}; if one-dim and \texttt{NA} all colors are left unchanged. Otherwise, with usual recycling rules \texttt{alpha.trsp} gets shorted/prolongated to length the data-symbols to be plotted. Coordinates of this vector \texttt{alpha.trsp} with \texttt{NA} are left unchanged, while for the remaining ones, the alpha channel in rgb space is set to the respective coordinate value of \texttt{alpha.trsp}. The non-\texttt{NA} entries must be integers in \([0,255]\) (0 invisible, 255 opaque).

\textbf{jitter.fac} jittering factor used in case of a \texttt{DiscreteDistribution} for plotting points of the second argument in a jittered fashion.

\textbf{attr.pre} logical; do graphical attributes for plotted data refer to indices prior (TRUE) or posterior to selection via arguments \texttt{which.lbs}, \texttt{which.Order}, \texttt{which.nonlbs} (FALSE)?

\textbf{which.lbs} either an integer vector with the indices of the observations to be plotted into graph or \texttt{NULL} — then no observation is excluded

\textbf{which.Order} we order the observations (descending) according to the norm given by \texttt{normtype(object)}; then \texttt{which.Order} either is an integer vector with the indices of the \texttt{ordered} observations (remaining after a possible reduction by argument \texttt{which.lbs}) to be plotted (with labels) into graph or \texttt{NULL} — then no (further) observation is excluded.

\textbf{which.nonlbs} indices of the observations which should be plotted but not labelled; either an integer vector with the indices of the observations to be plotted into graph or \texttt{NULL} — then all non-labelled observations are plotted

\textbf{return.Order} logical; if TRUE, an order vector is returned; more specifically, the order of the (remaining) observations given by their original index is returned (remaining means: after a possible reduction by argument \texttt{which.lbs}, and ordering is according to the norm given by \texttt{normtype(object)}); otherwise we return \texttt{invisible()} as usual.

\textbf{...} further parameters for \texttt{plot}
Details

Any parameters of plot.default may be passed on to this particular plot method.

We start describing the IC,missing-method: For main-, inner, and subtitles given as arguments main, inner, and sub, top and bottom margins are enlarged to 5 resp. 6 by default but may also be specified by tmar / bmar arguments. If main / inner / sub are logical then if the respective argument is FALSE nothing is done/plotted, but if it is TRUE, we use a default main title taking up the calling arguments in case of main, default inner titles taking up the class and (named) parameter slots of arguments in case of inner, and a "generated on <data>"-tag in case of sub. Of course, if main / inner / sub are character, this is used for the title; in case of inner it is then checked whether it has correct length. If argument withSubst is TRUE, in all title and axis label arguments, the following patterns are substituted:

"%C" class of argument object
"%A" deparsed argument object
"%D" time/date-string when the plot was generated

If argument ... contains argument ylim, this may either be as in plot.default (i.e. a vector of length 2) or a vector of length 2*(number of plotted dimensions + 2), where the first two elements are the values for ylim in panel "d", the first two are for ylim resp. xlim for panels "p" and "q", and the last 2*(number of plotted dimensions) are the values for ylim for the plotted dimensions of the L2-derivative, one pair for each dimension.

The IC,numeric-method calls the IC,missing-method but in addition plots the values of a dataset into the IC.

In addition, argument ... may contain arguments panel.first, panel.last, i.e., hook expressions to be evaluated at the very beginning and at the very end of each panel (within the then valid coordinates). To be able to use these hooks for each panel individually, they may also be lists of expressions (of the same length as the number of panels and run through in the same order as the panels).

Value

An S3 object of class c("plotInfo","DiagnInfo"), i.e., a list containing the information needed to produce the respective plot, which at a later stage could be used by different graphic engines (like, e.g. ggplot) to produce the plot in a different framework. A more detailed description will follow in a subsequent version.

Examples

IC1 <- new("IC")
plot(IC1)
plot(IC1, main = TRUE, panel.first= grid(),
     col = "blue", cex.main = 2, cex.inner = 1)

### selection of subpanels for plotting
N <- NormLocationScaleFamily(mean=0, sd=1)
IC2 <- optIC(model = N, risk = asCov())
par(mfrow=c(1,1))
plot(IC2, main = TRUE, panel.first= grid(),
     col = "blue", cex.main = 2, cex.inner = 1)
plotic

Description

The wrapper `plotic` takes most of arguments to the `plot` method by default and gives a user possibility to run the function with low number of arguments.

Usage

```r
plotic(IC, y, ..., alpha.trsp = 100, with.legend = TRUE, rescale = FALSE, withCall = TRUE)
```

Arguments

- **IC**: object of class `IC`
- **y**: optional data argument — for plotting observations into the plot
- **...**: additional parameters (in particular to be passed on to `plot`)
- **alpha.trsp**: the transparency argument (0 to 100) for plotting the data
- **with.legend**: the flag for showing the legend of the plot
- **rescale**: the flag for rescaling the axes for better view of the plot
- **withCall**: the flag for the call output

Value

`invisible(retV)` where `retV` is the return value of the respective call to the full-fledged plot method with the additional item `wrapcall` with the call to `plotic` and `wrappedcall` the call to to the full-fledged plot method.
Details

Calls plot with suitably chosen defaults; if withCall == TRUE, the call to plot, i.e., item
wrappedcall from the (hidden) return value, is printed.

Examples

```r
# Gamma
fam <- GammaFamily()
rfam <- InfRobModel(fam, ContNeighborhood(0.5))
IC <- optIC(model = fam, risk = asCov())
Y <- distribution(fam)
y <- r(Y)(1000)
PlotIC(IC, y, withCall = FALSE)
```

Description

We generalize function `qqplot` from package `stats` to be applicable to distribution and probability
model objects. In this context, `qqplot` produces a QQ plot of data (argument `x`) against a (model)
distribution. For arguments `y` of class `RobModel`, points at a high “distance” to the model are plotted
smaller. For arguments `y` of class `kStepEstimate`, points at with low weight in the [p]IC are plotted
bigger and their color gets faded out slowly. Graphical parameters may be given as arguments to
`qqplot`.

Usage

```r
qqplot(x, y, ...)  # S4 method for signature 'ANY,RobModel'
qqplot(x, y, 
   n = length(x), withIdLine = TRUE, withConf = TRUE,
   withConf.pw = withConf, withConf.sim = withConf,
   plot.it = TRUE, xlab = deparse(substitute(x)),
   ylab = deparse(substitute(y)), ..., distance = NormType(),
   n.adj = TRUE)
qqplot(x, y, n = length(x), withIdLine = TRUE, 
   withConf = TRUE, withConf.pw = withConf, withConf.sim = withConf,
   plot.it = TRUE, xlab = deparse(substitute(x)), ylab =
   deparse(substitute(y)), ..., cex.pts.fun = NULL, n.adj = TRUE)
qqplot(x, y, 
   n = length(x), withIdLine = TRUE, withConf = TRUE,
   withConf.pw = withConf, withConf.sim = withConf,
   plot.it = TRUE, xlab = deparse(substitute(x)),
   ylab = deparse(substitute(y)), ...,
```
exp.cex2.lbs = -.15,
exp.cex2.pts = -.35,
exp.fadcol.lbs = 1.85,
exp.fadcol.pts = 1.85,
bg = "white"

Arguments

- **x**: data to be checked for compatibility with distribution/model y.
- **y**: object of class "RobModel", of class "InfRobModel" or of class "kStepEstimate".
- **n**: numeric; number of quantiles at which to do the comparison.
- **withIdLine**: logical; shall line y = x be plotted in?
- **withConf**: logical; shall confidence lines be plotted?
- **withConf.pw**: logical; shall pointwise confidence lines be plotted?
- **withConf.sim**: logical; shall simultaneous confidence lines be plotted?
- **plot.it**: logical; shall be plotted at all (inherited from `qqplot`)?
- **xlab**: x-label
- **ylab**: y-label
- **...**: further parameters for method `qqplot` with signature ANY,ProbFamily (see `qqplot`) or with function plot
- **cex.pts.fun**: rescaling function for the size of the points to be plotted; either NULL (default), then log(1+abs(x)) is used, or a function which is then used.
- **n.adj**: logical; shall sample size be adjusted for possible outliers according to radius of the corresponding neighborhood?
- **distance**: a function mapping observations x to the positive reals; used to determine the size of the plotted points (the larger distance(x), the smaller the points are plotted).
- **exp.cex2.lbs**: for objects kStepEstimate based on a [p]IC of class HampIC: exponent for the weights of this [p]IC used to magnify the labels.
- **exp.cex2.pts**: for objects kStepEstimate based on a [p]IC of class HampIC: exponent for the weights of this [p]IC used to magnify the symbols.
- **exp.fadcol.lbs**: for objects kStepEstimate based on a [p]IC of class HampIC: exponent for the weights of this [p]IC used to find out-fading colors.
- **exp.fadcol.pts**: for objects kStepEstimate based on a [p]IC of class HampIC: exponent for the weights of this [p]IC used to find out-fading colors.
- **bg**: background color to fade against

Details

`qqplot` signature(x = "ANY", y = "RobModel"): produces a QQ plot of a dataset x against the theoretical quantiles of distribution of robust model y.

`qqplot` signature(x = "ANY", y = "InfRobModel"): produces a QQ plot of a dataset x against the theoretical quantiles of distribution of infinitesimally robust model y.
qqplot signature(x = "ANY", y = "kStepEstimate"): produces a QQ plot of a dataset x against the theoretical quantiles of the model distribution of model at which the corresponding kStepEstimate y had been calibrated at. By default, if the [p]IC of the kStepEstimate is of class HampIC, i.e., has a corresponding weight function, points (and, if with.lab==TRUE, labels) are scaled and faded according to this weight function. Corresponding arguments exp.cex2.pts and exp.fadcol.pts control this scaling and fading, respectively (and analogously exp.cex2.lbs and exp.fadcol.lbs for the labels). The choice of these arguments has to be done on a case-by-case basis. Positive exponents induce fading, magnification with increasing weight, for negative exponents the same is true for decreasing weight; higher (absolute) values increase the speed of fading / magnification.

Value

As for function qqplot from package stats: a list with components

- **x**: The x coordinates of the points that were/would be plotted
- **y**: The corresponding quantiles of the second distribution, including NAs.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References


See Also

qqplot from package stats – the standard QQ plot function, qqplot from package distr for comparisons of distributions, and qqplot from package distrMod (which is called intermediately by this method), as well as qqbounds, used by qqplot to produce confidence intervals.

Examples

```r
## \donttest to reduce check time

qqplot(rnorm(40, mean = 15, sd = sqrt(30)), Chisq(df=15))
RobM <- InfRobModel(center = NormLocationFamily(mean=13, sd=sqrt(28)),
                   neighbor = ContNeighborhood(radius = 0.4))

x <- rnorm(20, mean = 15, sd = sqrt(30))
qqplot(x, RobM)
qqplot(x, RobM, alpha.CI=0.9, add.points.CI=FALSE)

## further examples for ANY,kStepEstimator-method
## in example to roptest() in package ROptEst
```
Methods for Function `returnlevelplot` in Package ‘RobAStBase’

Description

We generalize function `returnlevelplot` from package `distrMod` to be applicable to distribution and probability model objects. In this context, `returnlevelplot` produces a rescaled QQ plot of data (argument x) against a (model) distribution. For arguments y of class RobModel, points at a high “distance” to the model are plotted smaller. For arguments y of class kStepEstimate, points at with low weight in the [p]IC are plotted bigger and their color gets faded out slowly. This parallels the behaviour of the respective `qqplot` methods. Graphical parameters may be given as arguments to `returnlevelplot`.

Usage

```r
returnlevelplot(x, y, ...)  
## S4 method for signature 'ANY,RobModel'
returnlevelplot(x, y,  
  n = length(x), withIdLine = TRUE, withConf = TRUE,  
  withConf.pw = withConf, withConf.sim = withConf,  
  plot.it = TRUE, xlab = deparse(substitute(x)),  
  ylab = deparse(substitute(y)), ..., distance = NormType(),  
  n.adj = TRUE)  
## S4 method for signature 'ANY,InfRobModel'
returnlevelplot(x, y, n = length(x), withIdLine = TRUE,  
  withConf = TRUE, withConf.pw = withConf, withConf.sim = withConf,  
  plot.it = TRUE, xlab = deparse(substitute(x)), ylab =  
  deparse(substitute(y)), ..., cex.pts.fun = NULL, n.adj = TRUE)  
## S4 method for signature 'ANY,kStepEstimate'
returnlevelplot(x, y,  
  n = length(x), withIdLine = TRUE, withConf = TRUE,  
  withConf.pw = withConf, withConf.sim = withConf,  
  plot.it = TRUE, xlab = deparse(substitute(x)),  
  ylab = deparse(substitute(y)), ...,  
  exp.cex2.lbs = -.15,  
  exp.cex2.pts = -.35,  
  exp.fadcol.lbs = 1.85,  
  exp.fadcol.pts = 1.85,  
  bg = "white")
```

Arguments

- `x` data to be checked for compatibility with distribution/model y.
- `y` object of class "RobModel", of class "InfRobModel" or of class "kStepEstimate".
- `n` numeric; number of quantiles at which to do the comparison.
withIdLine logical; shall line \( y = x \) be plotted in?
withConf logical; shall confidence lines be plotted?
withConf.pw logical; shall pointwise confidence lines be plotted?
withConf.sim logical; shall simultaneous confidence lines be plotted?
plot.it logical; shall be plotted at all (inherited from \texttt{returnlevelplot})?
xlab x-label
ylab y-label
... further parameters for method \texttt{returnlevelplot} with signature ANY,ProbFamily (see \texttt{returnlevelplot}) or with function \texttt{plot}

cex.pts.fun rescaling function for the size of the points to be plotted; either NULL (default), then \( \log(1+\text{abs}(x)) \) is used, or a function which is then used.
n.adj logical; shall sample size be adjusted for possible outliers according to radius of the corresponding neighborhood?
distance a function mapping observations \( x \) to the positive reals; used to determine the size of the plotted points (the larger distance(\( x \)), the smaller the points are plotted.
exp.cex2.lbs for objects \texttt{kStepEstimate} based on a \([p]\)IC of class \texttt{HampIC}: exponent for the weights of this \([p]\)IC used to magnify the labels.
exp.cex2.pts for objects \texttt{kStepEstimate} based on a \([p]\)IC of class \texttt{HampIC}: exponent for the weights of this \([p]\)IC used to magnify the symbols.
exp.fadcol.lbs for objects \texttt{kStepEstimate} based on a \([p]\)IC of class \texttt{HampIC}: exponent for the weights of this \([p]\)IC used to find out-fading colors.
exp.fadcol.pts for objects \texttt{kStepEstimate} based on a \([p]\)IC of class \texttt{HampIC}: exponent for the weights of this \([p]\)IC used to find out-fading colors.
b g background color to fade against

Details

\texttt{returnlevelplot} signature(\( x = "\text{ANY}" \), \( y = "\text{RobModel}" \)): produces a QQ plot of a dataset \( x \) against the theoretical quantiles of distribution of robust model \( y \).
\texttt{returnlevelplot} signature(\( x = "\text{ANY}" \), \( y = "\text{InfRobModel}" \)): produces a QQ plot of a dataset \( x \) against the theoretical quantiles of distribution of infinitesimally robust model \( y \).
\texttt{returnlevelplot} signature(\( x = "\text{ANY}" \), \( y = "\text{kStepEstimate}" \)): produces a QQ plot of a dataset \( x \) against the theoretical quantiles of the model distribution of model at which the corresponding \texttt{kStepEstimate} \( y \) had been calibrated at. By default, if the \([p]\)IC of the \texttt{kStepEstimate} is of class \texttt{HampIC}, i.e.; has a corresponding weight function, points (and, if \texttt{withLab} = TRUE, labels) are scaled and faded according to this weight function. Corresponding arguments \texttt{exp.cex2.pts} and \texttt{exp.fadcol.pts} control this scaling and fading, respectively (and analogously \texttt{exp.cex2.lbs} and \texttt{exp.fadcol.lbs} for the labels). The choice of these arguments has to be done on a case-by-case basis. Positive exponents induce fading, magnification with increasing weight, for negative exponents the same is true for decreasing weight; higher (absolute) values increase the speed of fading / magnification.
Value

As for function `returnlevelplot` from package `stats`.

Note

The confidence bands given in our version of the return level plot differ from the ones given in package `ismev`. We use non-parametric bands, hence also allow for non-parametric deviances from the model, whereas in package `ismev` they are based on profiling, hence only check for variability within the parametric class.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References


See Also

`qqplot` from package `stats` – the standard QQ plot function, `returnlevelplot` from package `distrMod` (which is called intermediately by this method), as well as `qqbounds`, used by `returnlevelplot` to produce confidence intervals.

Examples

```r
returnlevelplot(rnorm(40, mean = 15, sd = sqrt(30)), Chisq(df=15))
RobM <- InfRobModel(center = NormLocationFamily(mean=13, sd=sqrt(28)),
    neighbor = ContNeighborhood(radius = 0.4))

## `\donttest` to reduce check time
x <- rnorm(20, mean = 15, sd = sqrt(30))
returnlevelplot(x, RobM)
returnlevelplot(x, RobM, alpha.CI=0.9, add.points.CI=FALSE)

## further examples for ANY,kStepEstimator-method
## in example to roptest() in package ROptEst
```

---

**RobAStBaseMASK**

**Masking of/by other functions in package "RobAStBase"**

**Description**

Provides information on the (intended) masking of and (non-intended) masking by other other functions in package `RobAStBase`
Usage

RobAStBaseMASK(library = NULL)

Arguments

library a character vector with path names of R libraries, or NULL. The default value of NULL corresponds to all libraries currently known. If the default is used, the loaded packages are searched before the libraries

Value

no value is returned

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

Examples

RobAStBaseMASK()

---

RobAStBaseOptions Function to change the global variables of the package ‘RobAStBase’

Description

With RobAStBaseOptions you can inspect and change the global variables of the package RobASt-Base.

Usage

RobAStBaseOptions(...)  
getRobAStBaseOption(x)

Arguments

... any options can be defined, using name = value or by passing a list of such tagged values.

x a character string holding an option name.

Value

RobAStBaseOptions() returns a list of the global variables.  
RobAStBaseOptions(x) returns the global variable x.  
getRobAStBaseOption(x) returns the global variable x.  
RobAStBaseOptions(x=y) sets the value of the global variable x to y.
Global Options

**kStepUseLast**: The default value of argument `kStepUseLast` is FALSE. Explicitly setting `kStepUseLast` to TRUE should be done with care as in this situation the influence curve in case of `oneStepEstimator` and `kStepEstimator` is re-computed using the value of the one- resp. k-step estimate which may take quite a long time depending on the model.

**withUpdateInKer**: if there is a non-trivial trafo in the model with matrix $D$, shall the parameter be updated on $\ker(D)$? Defaults to FALSE.

**IC.UpdateInKer**: if there is a non-trivial trafo in the model with matrix $D$, the IC to be used for this; if NULL the result of `getboundedIC(L2Fam,D)` is taken; this IC will then be projected onto $\ker(D)$; defaults to NULL.

**all.verbose**: argument `verbose` passed on by default to many calls of `optIC, radiusminimaxIC, getinfRobIC` etc.; well suited for testing purposes. Defaults to FALSE.

**withPICList**: logical: shall slot `PICList` of return value of `kStepEstimator` be filled? Defaults to FALSE.

**withICList**: logical: shall slot `ICList` of return value of `kStepEstimator` be filled? Defaults to FALSE.

**modifyICwarn**: logical: should a (warning) information be added if `modifyIC` is applied and hence some optimality information could no longer be valid? Defaults to TRUE.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

See Also

`options, getOption`

Examples

```r
RobAStBaseOptions()
RobAStBaseOptions("kStepUseLast")
RobAStBaseOptions("kStepUseLast" = TRUE)
# or
RobAStBaseOptions(kStepUseLast = 1e-6)
getRobAStBaseOption("kStepUseLast")
```

Description

Control classes in package RobAStBase.

Objects from the Class

This class is virtual; that is no objects may be created.
RobModel-class

Slots

name Object of class "character": name of the control object.

Methods

name signature(object = "RobAStControl"): accessor function for slot name.
name<- signature(object = "RobAStControl", value = "character"): replacement function for slot name.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References


Description

Class of robust models. A robust model consists of family of probability measures center and a neighborhood neighbor about this family.

Objects from the Class

A virtual Class: No objects may be created from it.

RobModel-class       Robust model

Slots

center Object of class "ProbFamily"
neighbor Object of class "Neighborhood"

Methods

center signature(object = "RobModel"): accessor function for slot center.
center<- signature(object = "RobModel"): replacement function for slot center.
neighbor signature(object = "RobModel"): accessor function for slot neighbor.
neighbor<- signature(object = "RobModel"): replacement function for slot neighbor.
trafo signature(object = "RobModel", param = "missing"): accessor function for slot trafo of slot center.
trafo<- signature(object = "RobModel"): replacement function for slot trafo of slot center.
RobWeight-class

Author(s)
Matthias Kohl <Matthias.Kohl@stamats.de>

References

See Also
ProbFamily-class, Neighborhood-class

RobWeight-class Robust Weight classes

Description
Classes for robust weights.

Objects from the Class
Objects can be created by calls of the form new("RobWeight", ...).

Slots
name Object of class "character".
weight Object of class "function" — the weight function.

Methods
name signature(object = "RobWeight"): accessor function for slot name.
name<- signature(object = "RobWeight"): replacement function for slot name.
weight signature(object = "RobWeight"): accessor function for slot weight.
weight<- signature(object = "RobWeight"): replacement function for slot weight.

Author(s)
Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References
See Also

InfluenceCurve-class, IC

Examples

## prototype
new("RobWeight")

```r
myrisk <- MBRRisk(samplesize=100)
samplesize(myrisk)
samplesize(myrisk) <- 20
```

TotalVarIC

Generating function for TotalVarIC-class

Description

Generates an object of class "TotalVarIC"; i.e., an influence curves \( \eta \) of the form

\[
\eta = c \lor A \Lambda \land d
\]

with lower clipping bound \( c \), upper clipping bound \( d \) and standardizing matrix \( A \). \( \Lambda \) stands for the L2 derivative of the corresponding L2 differentiable parametric family which can be created via CallL2Fam.
Usage

TotalVarIC(name, CallL2Fam = call("L2ParamFamily"),
Curve = EuclRandVarList(RealRandVariable(Map = c(function(x) {x}),
Domain = Reals())),
Risks, Infos, clipLo = -Inf, clipUp = Inf, stand = as.matrix(1),
lowerCase = NULL, neighborRadius = 0, w = new("BdStWeight"),
normtype = NormType(), biastype = symmetricBias(),
modifyIC = NULL)

Arguments

name object of class "character".
CallL2Fam object of class "call": creates an object of the underlying L2-differentiable
parametric family.
Curve object of class "EuclRandVarList".
Risks object of class "list": list of risks; cf. RiskType-class.
Infos matrix of characters with two columns named method and message: additional
informations.
clipLo negative real: lower clipping bound.
clipUp positive real: lower clipping bound.
stand matrix: standardizing matrix
w BdStWeight: weight object
lowerCase optional constant for lower case solution.
neighborRadius radius of the corresponding (unconditional) contamination neighborhood.
biastype BiasType: type of the bias
normtype NormType: type of the norm
modifyIC object of class "OptionalFunction": function of four arguments: (1) L2Fam
an L2 parametric family (2) IC an optional influence curve, (3) withMakeIC a
logical argument whether to enforce the IC side conditions by makeIC, and (4)
... for arguments to be passed to calls to E in makeIC. Returns an object of
class "IC". This function is mainly used for internal computations!

Value

Object of class "TotalVarIC"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

sertation.
TotalVarIC-class

See Also
- IC-class, ContIC

Examples

```r
IC1 <- TotalVarIC()
plot(IC1)
```

---

**Description**

Class of (partial) influence curves of total variation type. i.e., an influence curves $\eta$ of the form

$$\eta = c \lor AA \land d$$

with lower clipping bound $c$, upper clipping bound $d$ and standardizing matrix $A$. A stands for the L2 derivative of the corresponding L2 differentiable parametric family which can be created via CallL2Fam.

**Objects from the Class**

Objects can be created by calls of the form `new("TotalVarIC", ...)` More frequently they are created via the generating function `TotalVarIC`, respectively via the method `generateIC`.

**Slots**

- **CallL2Fam** object of class "call": creates an object of the underlying L2-differentiable parametric family.
- **name** object of class "character".
- **Curve** object of class "EuclRandVarList".
- **modifyIC** object of class "OptionalFunction": function of four arguments: (1) L2Fam an L2 parametric family (2) IC an optional influence curve, (3) withMakeIC a logical argument whether to enforce the IC side conditions by makeIC, and (4) ... for arguments to be passed to calls to E in makeIC. Returns an object of class "IC". This function is mainly used for internal computations!
- **Risks** object of class "list": list of risks; cf. RiskType-class.
- **Infos** object of class "matrix" with two columns named method and message: additional information.
- **clipLo** object of class "numeric": lower clipping bound.
- **clipUp** object of class "numeric": upper clipping bound.
- **stand** object of class "matrix": standardizing matrix.
- **weight** object of class "BdStWeight": weight function.
biastype object of class "BiasType": bias type (symmetric/onsided/asymmetric)
normtype object of class "NormType": norm type (Euclidean, information/self-standardized)
neighborRadius object of class "numeric": radius of the corresponding (unconditional) contamination neighborhood.

Extends

Class "HampIC", directly.
Class "IC", by class "HampIC".
Class "InfluenceCurve", by class "IC".

Methods

CallL2Fam<- signature(object = "TotalVarIC"): replacement function for slot CallL2Fam.
clipLo signature(object = "TotalVarIC"): accessor function for slot clipLo.
clipLo<- signature(object = "TotalVarIC"): replacement function for slot clipLo.
clipUp signature(object = "TotalVarIC"): accessor function for slot clipUp.
clipUp<- signature(object = "TotalVarIC"): replacement function for slot clipUp.
clip signature(x1 = "TotalVarIC"): returns clipUp-clipLo.
stand<- signature(object = "TotalVarIC"): replacement function for slot stand.
lowerCase<- signature(object = "TotalVarIC"): replacement function for slot lowerCase.
neighbor signature(object = "TotalVarIC"): generates an object of class "TotalVarNeighborhood" with radius given in slot neighborRadius.
generateIC signature(neighbor = "TotalVarNeighborhood", L2Fam = "L2ParamFamily"): generate an object of class "TotalVarIC". Rarely called directly.
show signature(object = "TotalVarIC")

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References


See Also

IC-class, ContIC, HampIC-class

Examples

ICI <- new("TotalVarIC")
plot(ICI)
TotalVarNeighborhood  Generating function for TotalVarNeighborhood-class

Description
Generates an object of class "TotalVarNeighborhood".

Usage
TotalVarNeighborhood(radius = 0)

Arguments
radius non-negative real: neighborhood radius.

Value
Object of class "ContNeighborhood"

Author(s)
Matthias Kohl <Matthias.Kohl@stamats.de>

References

See Also
TotalVarNeighborhood-class

Examples
TotalVarNeighborhood()

## The function is currently defined as
function(radius = 0){
   new("TotalVarNeighborhood", radius = radius)
}


TotalVarNeighborhood-class

Total variation neighborhood

Description

Class of (unconditional) total variation neighborhoods.

Objects from the Class

Objects can be created by calls of the form `new("TotalVarNeighborhood", ...)`. More frequently they are created via the generating function `TotalVarNeighborhood`.

Slots

- `type`: Object of class "character": "(uncond.) total variation neighborhood".
- `radius`: Object of class "numeric": neighborhood radius.

Extends

Class "UncondNeighborhood", directly.
Class "Neighborhood", by class "UncondNeighborhood".

Methods

No methods defined with class "TotalVarNeighborhood" in the signature.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References


See Also

`TotalVarNeighborhood`, `UncondNeighborhood-class`

Examples

`new("TotalVarNeighborhood")`
UncondNeighborhood-class

Unconditional neighborhood

Description

Class of unconditional (errors-in-variables) neighborhoods.

Objects from the Class

A virtual Class: No objects may be created from it.

Slots

- type: Object of class "character": type of the neighborhood.
- radius: Object of class "numeric": neighborhood radius.

Extends

Class "Neighborhood", directly.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References


See Also

- Neighborhood-class
Index

*Topic **classes**
  ALEstimate-class, 4
  BdStWeight-class, 7
  biastype-methods, 8
  BoundedWeight-class, 8
  ContIC-class, 20
  ContNeighborhood-class, 23
  cutoff-class, 25
  FixRobModel-class, 32
  getRiskFctBV-methods, 38
  HampelWeight-class, 44
  HampIC-class, 45
  IC-class, 48
  InfluenceCurve-class, 50
  InfRobModel-class, 60
  interpolRisk-class, 61
  kStepEstimate-class, 62
  kStepEstimator.start-methods, 67
  MEstimate-class, 73
  movToRef-methods, 74
  Neighborhood-class, 76
  normtype-methods, 77
  OptionalInfluenceCurve-class, 80
  RobAStControl-class, 98
  RobModel-class, 99
  RobWeight-class, 100
  samplesize-methods, 101
  TotalVarIC-class, 103
  TotalVarNeighborhood-class, 106
  UncondNeighborhood-class, 107

*Topic **distribution**
  plot-methods, 84
  qplot, 91
  returnlevelplot, 94
  RobAStBaseMASK, 96

*Topic **documentation**
  RobAStBaseMASK, 96

*Topic **hplot**
  cutoff, 24

*Topic **methods**
  ddPlot-methods, 26
  outlyingPlotIC, 81
  qqplot, 91
  returnlevelplot, 94

*Topic **models**
  ContNeighborhood, 22
  ContNeighborhood-class, 23
  FixRobModel, 31
  FixRobModel-class, 32
  getBoundedIC, 36
  InfRobModel, 59
  InfRobModel-class, 60
  Neighborhood-class, 76
  RobModel-class, 99
  TotalVarNeighborhood, 105
  TotalVarNeighborhood-class, 106
  UncondNeighborhood-class, 107

*Topic **package**
  RobAStBase-package, 3

*Topic **programming**
  RobAStBaseMASK, 96

*Topic **robust**
  checkIC, 9
  comparePlot-methods, 12
  ContIC, 18
  evalIC, 30
  generateIC, 33
  generateIC.fct-methods, 34
  getBiasIC, 35
  getFiRisk, 37
  getRiskIC, 39
  getweight-methods, 42
  IC, 46
getRiskIC, 39
getRiskIC, IC, asMSE, UncondNeighborhood, L2ParamFamily-method
getRiskIC, IC, asMSE, UncondNeighborhood, missing-method
getRiskIC, IC, fiUnOvShoot, ContNeighborhood, missing-method
getRiskIC, IC, fiUnOvShoot, TotalVarNeighborhood-method
getRiskIC, IC, trAsCov, missing, L2ParamFamily-method
getRiskIC, IC, trAsCov, missing, missing-method
getRiskIC-methods (getRiskIC), 39
getRobAStBaseOption (RobAStBaseOptions), 97
gettextf, 29, 83
geweight, 7, 44
geweight-methods, 42
geweight, BdStWeight, TotalVarNeighborhood, BiasType-method
(geweight-methods), 42
geweight, HampelWeight, ContNeighborhood, asymmetric-method
(geweight-methods), 42
geweight, HampelWeight, ContNeighborhood, BiasType-method
(geweight-methods), 42
geweight, HampelWeight, ContNeighborhood, onesided-bias-method
(geweight-methods), 42
HampelWeight-class, 44
HampIC-class, 45
IC, 7, 9, 45, 46, 49, 101
IC-class, 48
IC.UpdateInKer (RobAStBaseOptions), 97
ICList (kStepEstimate-class), 62
ICList, kStepEstimate-method (kStepEstimate-class), 62
InfluenceCurve, 49, 51, 81
InfluenceCurve-class, 50
InfoPlot, 52
infoPlot, 53
infoPlot, IC-method (infoPlot), 53
infoPlot-methods (infoPlot), 53
Infos (InfluenceCurve-class), 50
Infos, InfluenceCurve-method (InfluenceCurve-class), 50
InfRobModel-class, 60
InterRobModel-class, 61
InfRobModel-method, 59, 61
kStepEstimator, 64, 68
kStepEstimator.start
(kStepEstimator.start-methods), 67
kStepEstimator.start, Estimate-method (kStepEstimator.start-methods), 67
kStepEstimator.start, function-method (kStepEstimator.start-methods), 67
kStepEstimator.start, numeric-method (kStepEstimator.start-methods), 67
ksteps (kStepEstimate-class), 62
kStepEstimate-class, 62
KStepEstimate-method (kStepEstimate-class), 62
kStepEstimator.start-methods, 67
ksteps (kStepEstimate-class), 62
legend, 13, 54, 86
locMEstimator, 68
locMEstimator, numeric, InfluenceCurve-method (locMEstimator), 68
locMEstimator-methods (locMEstimator), 68
lowerCase (HampIC-class), 45
lowerCase, HampIC-method (HampIC-class), 45
lowerCase<- (ContIC-class), 20
lowerCase<-, ContIC-method (ContIC-class), 20
lowerCase<-, TotalVarIC-method (TotalVarIC-class), 103
makeIC, 69
makeIC, function, L2ParamFamily-method (makeIC), 69
makeIC, IC, L2ParamFamily-method (makeIC), 69
neighborRadius<- (HampIC-class), 45
neighborRadius<-, HampIC-method (HampIC-class), 45
normtype (normtype-methods), 77
normtype, HampIC-method (HampIC-class), 45
normtype, interpolRisk-method (normtype-methods), 77
normtype-methods, 77
OMSRRisk (interpolRisk-class), 61
OMSRRisk-class (interpolRisk-class), 61
oneStepEstimator, 77
optIC, 79
optIC, L2ParamFamily, asCov-method (optIC), 79
optIC-methods (optIC), 79
OptionalCall-class
 (kStepEstimate-class), 62
OptionalInfluenceCurveOrCall-class (OptionalInfluenceCurve-class), 80
OptionalPicList-class (OptionalInfluenceCurve-class), 80
options, 98
outlyingPlotIC, 26, 81

par, 13, 54, 86
pIC (ALEstimate-class), 4
pIC, ALEstimate-method (ALEstimate-class), 4
pIC, CvMMDEstimate-method (ALEstimate-class), 4
pIC, CvMMD-Estimate-method (ALEstimate-class), 4
pIC, MCAEstimate-method (ALEstimate-class), 4
pIC, MCEstimate-method (ALEstimate-class), 4
pIC, ML-AEestimate-method (ALEstimate-class), 4
pIC, MLEstimate-method (ALEstimate-class), 4
PicList (kStepEstimate-class), 62
PicList, kStepEstimate-method (kStepEstimate-class), 62
pICList-class (OptionalInfluenceCurve-class), 80
plot, 17
plot (plot-methods), 84
plot, IC, missing-method (plot-methods), 84
plot, IC, numeric-method (plot-methods), 84
plot-methods, 84
plot.default, 13, 53, 54, 85
PlotIC, 90
qqbounds, 93, 96
qqplot, 97, 91, 92, 93, 96
qqplot, ANY, InfRobModel-method (qqplot), 91
qqplot, ANY, kStepEstimate-method (qqplot), 91
qqplot, ANY, RobModel-method (qqplot), 91
qqplot-methods (qqplot), 91
radius (Neighborhood-class), 76
radius, Neighborhood-method (Neighborhood-class), 76
radius<-(Neighborhood-class), 76
radius<-, Neighborhood-method (Neighborhood-class), 76
Range, InfluenceCurve-method (InfluenceCurve-class), 50
returnlevelplot, 94, 94, 95, 96
returnlevelplot, ANY, InfRobModel-method (returnlevelplot), 94
returnlevelplot, ANY, kStepEstimate-method (returnlevelplot), 94
returnlevelplot, ANY, RobModel-method (returnlevelplot), 94
returnlevelplot-methods (returnlevelplot), 94
Risks (InfluenceCurve-class), 50
Risks, InfluenceCurve-method (InfluenceCurve-class), 50
Risks<- (InfluenceCurve-class), 50
Risks<-, InfluenceCurve-method (InfluenceCurve-class), 50
RMXRRisk (interpolRisk-class), 61
RMXRRisk-class (interpolRisk-class), 61
RobAStBase (RobAStBase-package), 3
RobAStBase-package, 3
RobAStBaseMASK, 96
RobAStBaseOptions, 97
RobAStControl-class, 98
robestCall (kStepEstimate-class), 62
robestCall, kStepEstimate-method
(kStepEstimate-class), 62
RobModel-class, 99
RobWeight-class, 100
samplesize (samplesize-methods), 101
samplesize, interpolRisk-method
(samplesize-methods), 101
samplesize<-(samplesize-methods), 101
samplesize<-, interpolRisk-method
(samplesize-methods), 101
show, ALEEstimate-method
(ALEstimate-class), 4
show, ContIC-method (ContIC-class), 20
show, FixRobModel-method
(FixRobModel-class), 32
show, IC-method (IC-class), 48
show, InfluenceCurve-method
(InfluenceCurve-class), 50
show, InfRobModel-method
(InfRobModel-class), 60
show, kStepEstimate-method
(kStepEstimate-class), 62
show, MCALEstimate-method
(ALEstimate-class), 4
show, MEstimate-method
(MEstimate-class), 73
show, Neighborhood-method
( Neighborhood-class), 76
show, OptionalpICList-method
(OptionalInfluenceCurve-class), 80
show, pICList-method
(OptionalInfluenceCurve-class), 80
show, TotalVarIC-method
(TotalVarIC-class), 103
showDiagnostic, 10, 65, 70
stand (HampIC-class), 45
stand, BdStWeight-method
(BdStWeight-class), 7
stand<-, (ContIC-class), 20
stand<-, BdStWeight-method
(BdStWeight-class), 7
stand<-, ContIC-method (ContIC-class), 20
stand<-, TotalVarIC-method
(TotalVarIC-class), 103
start, 72, 73
start (masked-methods), 72
start, ANY-method (masked-methods), 72
start, kStepEstimate-method
(kStepEstimate-class), 62
start-methods (masked-methods), 72
StartClass-class
(OptionalInfluenceCurve-class), 80
startval (kStepEstimate-class), 62
startval, kStepEstimate-method
(kStepEstimate-class), 62
steps (kStepEstimate-class), 62
steps, kStepEstimate-method
(kStepEstimate-class), 62
text, 28, 82
timings (kStepEstimate-class), 62
timings, kStepEstimate-method
(kStepEstimate-class), 62
TotalVarIC, 101
TotalVarIC-class, 103
TotalVarNeighborhood, 105, 106
TotalVarNeighborhood-class, 106
trafo, RobModel, missing-method
(RobModel-class), 99
trafo<-, RobModel-method
(RobModel-class), 99
type, Neighborhood-method
( Neighborhood-class), 76
uksteps (kStepEstimate-class), 62
uksteps, kStepEstimate-method
(kStepEstimate-class), 62
UncondNeighborhood-class, 107
ustartval (kStepEstimate-class), 62
ustartval, kStepEstimate-method
(kStepEstimate-class), 62
weight (RobWeight-class), 100
weight, HampIC-method (HampIC-class), 45
weight, RobWeight-method
(RobWeight-class), 100
weight<-(RobWeight-class), 100
weight <- RobWeight-method
(RobWeight-class), 100
weight <- methods (RobWeight-class), 100
withICList (RobASTBaseOptions), 97
withPICList (RobASTBaseOptions), 97
withUpdateInKer (RobASTBaseOptions), 97