Package 'ROptRegTS'

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Title Optimally Robust Estimation for Regression-Type Models

Description Optimally robust estimation for regression-type models using S4 classes and methods.

Depends R(>= 3.4), methods, ROptEstOld(>= 1.2.0)

Imports distr(>= 2.8.0), distrEx(>= 2.8.0), RandVar(>= 1.2.0)

ByteCompile yes

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R topics documented:

Av1CondContIC *Generating function for Av1CondContIC-class*

Description

Generates an object of class "Av1CondContIC"; i.e., an influence curves η of the form

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

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

Usage

```
Av1CondContIC(name, CallL2Fam = call("L2RegTypeFamily"),
       Curve = EuclRandVarList(RealRandVariable(
               Map = list(function(x){x[1]*x[2]}),
               Domain = EuclideanSpace(dimension = 2))),
       Risks, Infos, clip = Inf, stand = as.matrix(1),
       cent = EuclRandVarList(RealRandVariable(
               Map = list(function(x){numeric(length(x))}),
               Domain = EuclideanSpace(dimension = 2))),
       lowerCase = NULL, neighborRadius = 0)
```

Arguments

name	object of class "character".
CallL2Fam	object of class "call": creates an object of the underlying L2-differentiable regression type 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	object of class "EuclRandVarList": centering function.
stand	matrix: standardizing matrix.
lowerCase	optional constant for lower case solution.
neighborRadius	radius of the corresponding (unconditional) contamination neighborhood.

Value

Object of class "Av1CondContIC"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

CondIC-class, Av1CondContIC-class

Examples

```
IC1 <- Av1CondContIC()
IC1
```

Av1CondContIC-class *Conditionally centered influence curve of contamination type*

Description

Class of conditionally centered (partial) influence curves of contamination type for average conditional contamination neighborhoods; i.e., influence curves η of the form

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

with clipping bound b, centering function a and standardizing matrix A. Λ stands for the L2 derivative of the corresponding L2 differentiable regression type family created via the call in the slot `CallL2Fam`.

Objects from the Class

Objects can be created by calls of the form `new("Av1CondContIC", ...)`. More frequently they are created via the generating function `Av1CondContIC`, respectively via the method `generateIC`.

Slots

`CallL2Fam`: object of class `"call"`: creates an object of the underlying L2-differentiable regression type family.

`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.

`clip`: object of class `"numeric"`: clipping bound.

`cent`: object of class `"EuclRandVarList"`: centering function.

`stand`: object of class `"matrix"`: standardizing matrix.

`lowerCase`: object of class `"OptionalNumeric"`: optional constant for lower case solution.

`neighborRadius`: object of class `"numeric"`: radius of the corresponding average conditional contamination neighborhood.

Extends

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

Methods

CallL2Fam<- signature(object = "Av1CondContIC"): replacement function for slot CallL2Fam.

cent signature(object = "Av1CondContIC"): accessor function for slot cent.

cent<- signature(object = "Av1CondContIC"): replacement function for slot cent.

clip signature(object = "Av1CondContIC"): accessor function for slot clip.

clip<- signature(object = "Av1CondContIC"): replacement function for slot clip.

stand signature(object = "Av1CondContIC"): accessor function for slot stand.

stand<- signature(object = "Av1CondContIC"): replacement function for slot stand.

lowerCase signature(object = "Av1CondContIC"): accessor function for slot lowerCase.

lowerCase<- signature(object = "Av1CondContIC"): replacement function for slot lowerCase.

neighborRadius signature(object = "Av1CondContIC"): accessor function for slot neighborRadius.

neighborRadius<- signature(object = "Av1CondContIC"): replacement function for slot neighborRadius.

generateIC signature(neighbor = "Av1CondContNeighborhood", L2Fam = "L2RegTypeFamily"): generate an object of class "Av1CondContIC". Rarely called directly.

show signature(object = "Av1CondContIC")

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

CondIC-class, Av1CondContIC

Examples

```
IC1 <- new("Av1CondContIC")
IC1
```

Av1CondContNeighborhood *Generating function for Av1CondContNeighborhood-class*

Description

Generates an object of class "Av1CondContNeighborhood".

Usage

```
Av1CondContNeighborhood(radius = 0, radiusCurve = function(x){1})
```

Arguments

radius	non-negative real: neighborhood radius.
radiusCurve	real-valued, non-negative function with L1 norm <= 1.

Value

Object of class "Av1CondContNeighborhood"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

Av1CondContNeighborhood-class

Examples

```
Av1CondContNeighborhood()

## The function is currently defined as
function(radius = 0, radiusCurve = function(x){1}){
    new("Av1CondContNeighborhood", radius = radius, radiusCurve = radiusCurve)
}
```

`Av1CondContNeighborhood-class`
Average conditional contamination neighborhood

Description

Class of average conditional contamination neighborhoods (exponent == 1); i.e. only radius curves ε with $\|\varepsilon\|_1 \leq 1$.

Objects from the Class

Objects can be created by calls of the form `new("Av1CondContNeighborhood", ...)`. More frequently they are created via the generating function `Av1CondContNeighborhood`.

Slots

`type`: Object of class `"character"`: "average conditional convex contamination neighborhood".

`radius`: Object of class `"numeric"`: neighborhood radius.

`radiusCurve`: Object of class `"function"`: radius curve with L1 norm <= 1.

`exponent`: equal to 1.

Extends

Class `"Av1CondNeighborhood"`, directly.
Class `"AvCondNeighborhood"`, by class `"Av1CondNeighborhood"`.
Class `"CondNeighborhood"`, by class `"Av1CondNeighborhood"`.
Class `"Neighborhood"`, by class `"Av1CondNeighborhood"`.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

`Av1CondNeighborhood-class`

Examples

```
new("Av1CondContNeighborhood")
```

`Av1CondNeighborhood-class`
Average conditional neighborhood

Description

Class of average conditional neighborhoods (exponent == 1); i.e. only radius curves ε with $\|\varepsilon\|_1 \leq 1$.

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.

`radiusCurve`**:** Object of class `"function"`: radius curve with L1 norm <= 1.

`exponent`**:** equal to 1.

Extends

Class `"AvCondNeighborhood"`, directly.
Class `"CondNeighborhood"`, by class `"AvCondNeighborhood"`.
Class `"Neighborhood"`, by class `"AvCondNeighborhood"`.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

`AvCondNeighborhood-class`

Av1CondTotalVarIC *Generating function for Av1CondTotalVarIC-class*

Description

Generates an object of class "Av1CondContIC"; i.e., an influence curves η of the form

$$\eta = Ax\Lambda_f \min(1, \max(c(x)/(|Ax|\Lambda_f), (c(x)+b)/(|Ax|\Lambda_f)))$$

with lower clipping function c, standardized bias b and standardizing matrix A. Λ_f stands for the L2 derivative of the corresponding error distribution.

Usage

```
Av1CondTotalVarIC(name, CallL2Fam = call("L2RegTypeFamily"),
        Curve = EuclRandVarList(RealRandVariable(
                Map = list(function(x) {x[1] * x[2]}),
                Domain = EuclideanSpace(dimension = 2))),
        Risks, Infos, clipUp = Inf, stand = as.matrix(1),
        clipLo = RealRandVariable(Map = list(function(x) {-Inf}),
                                  Domain = EuclideanSpace(dimension = 1)),
        lowerCase = NULL, neighborRadius = 0)
```

Arguments

name	object of class "character".
CallL2Fam	object of class "call": creates an object of the underlying L2-differentiable regression type 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.
clipUp	positive real: standardized bias.
clipLo	object of class "RealRandVariable": lower clipping function.
stand	matrix: standardizing matrix.
lowerCase	optional constant for lower case solution.
neighborRadius	radius of the corresponding (unconditional) contamination neighborhood.

Value

Object of class "Av1CondTotalVarIC"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

CondIC-class, Av1CondTotalVarIC-class

Examples

```
IC1 <- Av1CondTotalVarIC()
IC1
```

Av1CondTotalVarIC-class

Conditionally centered influence curve of total variaton type

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Description

Class of conditionally centered (partial) influence curves of contamination type for average conditional total variation neighborhoods; i.e., influence curves η of the form

$$\eta = Ax\Lambda_f \min(1, \max(c(x)/(|Ax|\Lambda_f), (c(x)+b)/(|Ax|\Lambda_f)))$$

with lower clipping function c, standardized bias b and standardizing matrix A. Λ_f stands for the L2 derivative of the corresponding error distribution.

Objects from the Class

Objects can be created by calls of the form `new("Av1CondTotalVarIC", ...)`. More frequently they are created via the generating function `Av1CondTotalVarIC`, respectively via the method `generateIC`.

Slots

`CallL2Fam`: object of class `"call"`: creates an object of the underlying L2-differentiable regression type family.

`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.

`clipUp`: object of class `"numeric"`: standardized bias.

`clipLo`: object of class `"RealRandVariable"`: lower clipping function.

`stand`: object of class `"matrix"`: standardizing matrix.

`lowerCase`: object of class `"OptionalNumeric"`: optional constant for lower case solution.

`neighborRadius`: object of class `"numeric"`: radius of the corresponding average conditional contamination neighborhood.

Extends

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

Methods

CallL2Fam<- `signature(object = "Av1CondTotalVarIC")`: replacement function for slot `CallL2Fam`.

clipLo `signature(object = "Av1CondTotalVarIC")`: accessor function for slot `clipLo`.

clipLo<- `signature(object = "Av1CondTotalVarIC")`: replacement function for slot `clipLo`.

clipUp `signature(object = "Av1CondTotalVarIC")`: accessor function for slot `clipUp`.

clipUp<- `signature(object = "Av1CondTotalVarIC")`: replacement function for slot `clipUp`.

stand `signature(object = "Av1CondTotalVarIC")`: accessor function for slot `stand`.

stand<- `signature(object = "Av1CondTotalVarIC")`: replacement function for slot `stand`.

lowerCase `signature(object = "Av1CondTotalVarIC")`: accessor function for slot `lowerCase`.

lowerCase<- `signature(object = "Av1CondTotalVarIC")`: replacement function for slot `lowerCase`.

neighborRadius `signature(object = "Av1CondTotalVarIC")`: accessor function for slot `neighborRadius`.

neighborRadius<- `signature(object = "Av1CondTotalVarIC")`: replacement function for slot `neighborRadius`.

generateIC `signature(neighbor = "Av1CondTotalVarNeighborhood", L2Fam = "L2RegTypeFamily")`: generate an object of class `"Av1CondTotalVarIC"`. Rarely called directly.

show `signature(object = "Av1CondTotalVarIC")`

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

`CondIC-class`, `Av1CondTotalVarIC`

Examples

```
IC1 <- new("Av1CondTotalVarIC")
IC1
```

`Av1CondTotalVarNeighborhood` *Generating function for Av1CondTotalVarNeighborhood-class*

Description

Generates an object of class `"Av1CondTotalVarNeighborhood"`.

Usage

```
Av1CondTotalVarNeighborhood(radius = 0, radiusCurve = function(x){1})
```

Arguments

`radius`	non-negative real: neighborhood radius.
`radiusCurve`	real-valued, non-negative function with L1 norm `<= 1`.

Value

Object of class `"Av1CondTotalVarNeighborhood"`

Author(s)

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

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

`Av1CondTotalVarNeighborhood-class`

Examples

```
Av1CondTotalVarNeighborhood()

## The function is currently defined as
function(radius = 0, radiusCurve = function(x){1}){
    new("Av1CondTotalVarNeighborhood", radius = radius, radiusCurve = radiusCurve)
}
```

Av1CondTotalVarNeighborhood-class
Average conditional total variation neighborhood

Description

Class of average conditional total variation neighborhoods (exponent == 1); i.e. only radius curves ε with $\|\varepsilon\|_1 \leq 1$.

Objects from the Class

Objects can be created by calls of the form new("Av1CondTotalVarNeighborhood", ...). More frequently they are created via the generating function Av1CondTotalVarNeighborhood.

Slots

type: Object of class "character": "average conditional total variation neighborhood".

radius: Object of class "numeric": neighborhood radius.

radiusCurve: Object of class "function": radius curve with L1 norm <= 1.

exponent: equal to 1.

Extends

Class "Av1CondNeighborhood", directly.
Class "AvCondNeighborhood", by class "Av1CondNeighborhood".
Class "CondNeighborhood", by class "Av1CondNeighborhood".
Class "Neighborhood", by class "Av1CondNeighborhood".

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

Av1CondNeighborhood-class

Examples

```
new("Av1CondTotalVarNeighborhood")
```

`Av2CondContIC` *Generating function for Av2CondContIC-class*

Description

Generates an object of class `"Av2CondContIC"`; i.e., an influence curves η of the form

$$\eta = AK^{-1}x(\Lambda_f - z)\min(1, c/|\Lambda_f - z|)$$

with $K = Exx^\tau$, clipping bound c, centering constant z and standardizing constant A. Λ_f stands for the L2 derivative of the corresponding error distribution.

Usage

```
Av2CondContIC(name, CallL2Fam = call("L2RegTypeFamily"),
        Curve = EuclRandVarList(RealRandVariable(
                Map = list(function(x) {x[1] * x[2]}),
                Domain = EuclideanSpace(dimension = 2))),
        Risks, Infos, clip = Inf, stand = 1, cent = 0, lowerCase = NULL,
        neighborRadius = 0)
```

Arguments

`name`	object of class `"character"`.
`CallL2Fam`	object of class `"call"`: creates an object of the underlying L2-differentiable regression type 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`	real: standardizing constant
`lowerCase`	optional constant for lower case solution.
`neighborRadius`	radius of the corresponding (unconditional) contamination neighborhood.

Value

Object of class `"Av2CondContIC"`

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

CondIC-class, Av2CondContIC-class

Examples

```
IC1 <- Av2CondContIC()
IC1
```

Av2CondContIC-class *Conditionally centered influence curve of contamination type*

Description

Class of conditionally centered (partial) influence curves of contamination type for average square conditional contamination neighborhoods; i.e., influence curves η of the form

$$\eta = AK^{-1}x(\Lambda_f - z)\min(1, c/|\Lambda_f - z|)$$

with $K = Exx^\tau$, clipping bound c, centering constant z and standardizing constant A. Λ_f stands for the L2 derivative of the corresponding error distribution.

Objects from the Class

Objects can be created by calls of the form `new("Av2CondContIC", ...)`. More frequently they are created via the generating function `Av2CondContIC`, respectively via the method `generateIC`.

Slots

`CallL2Fam`: object of class `"call"`: creates an object of the underlying L2-differentiable regression type family.

`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.

`clip`: object of class `"numeric"`: clipping bound.

`cent`: object of class `"numeric"`: centering constant.

`stand`: object of class `"numeric"`: standardizing constant.

`lowerCase`: object of class `"OptionalNumeric"`: optional constant for lower case solution.

`neighborRadius`: object of class `"numeric"`: radius of the corresponding average conditional contamination neighborhood.

Extends

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

Methods

CallL2Fam<- signature(object = "Av2CondContIC"): replacement function for slot CallL2Fam.

cent signature(object = "Av2CondContIC"): accessor function for slot cent.

cent<- signature(object = "Av2CondContIC"): replacement function for slot cent.

clip signature(object = "Av2CondContIC"): accessor function for slot clip.

clip<- signature(object = "Av2CondContIC"): replacement function for slot clip.

stand signature(object = "Av2CondContIC"): accessor function for slot stand.

stand<- signature(object = "Av2CondContIC"): replacement function for slot stand.

lowerCase signature(object = "Av2CondContIC"): accessor function for slot lowerCase.

lowerCase<- signature(object = "Av2CondContIC"): replacement function for slot lowerCase.

neighborRadius signature(object = "Av2CondContIC"): accessor function for slot neighborRadius.

neighborRadius<- signature(object = "Av2CondContIC"): replacement function for slot neighborRadius.

generateIC signature(neighbor = "Av2CondContNeighborhood", L2Fam = "L2RegTypeFamily"): generate an object of class "Av2CondContIC". Rarely called directly.

show signature(object = "Av2CondContIC")

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

CondIC-class, Av2CondContIC

Examples

```
IC1 <- new("Av2CondContIC")
IC1
```

Av2CondContNeighborhood *Generating function for Av2CondContNeighborhood-class*

Description

Generates an object of class "Av2CondContNeighborhood".

Usage

```
Av2CondContNeighborhood(radius = 0, radiusCurve = function(x){1})
```

Arguments

radius	non-negative real: neighborhood radius.
radiusCurve	real-valued, non-negative function with L2 norm <= 1.

Value

Object of class "Av1CondContNeighborhood"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

Av2CondContNeighborhood-class

Examples

```
Av2CondContNeighborhood()

## The function is currently defined as
function(radius = 0, radiusCurve = function(x){1}){
    new("Av2CondContNeighborhood", radius = radius, radiusCurve = radiusCurve)
}
```

`Av2CondContNeighborhood-class`
Average square conditional contamination neighborhood

Description

Class of average square conditional contamination neighborhoods (exponent == 2); i.e. only radius curves ε with $\|\varepsilon\|_2 \leq 1$.

Objects from the Class

Objects can be created by calls of the form `new("Av2CondContNeighborhood", ...)`. More frequently they are created via the generating function `Av2CondContNeighborhood`.

Slots

`type`: Object of class `"character"`: "average square conditional convex contamination neighborhood".

`radius`: Object of class `"numeric"`: neighborhood radius.

`radiusCurve`: Object of class `"function"`: radius curve with L2 norm <= 1.

`exponent`: equal to 2.

Extends

Class `"Av2CondNeighborhood"`, directly.
Class `"AvCondNeighborhood"`, by class `"Av2CondNeighborhood"`.
Class `"CondNeighborhood"`, by class `"Av2CondNeighborhood"`.
Class `"Neighborhood"`, by class `"Av2CondNeighborhood"`.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

`Av2CondNeighborhood-class`

Examples

```
new("Av2CondContNeighborhood")
```

`Av2CondNeighborhood-class`
Average square conditional neighborhood

Description

Class of average square conditional neighborhoods (exponent == 2); i.e. only radius curves ε with $\|\varepsilon\|_2 \leq 1$.

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.

`radiusCurve`: Object of class `"function"`: radius curve with L2 norm <= 1.

`exponent`: equal to 2.

Extends

Class `"AvCondNeighborhood"`, directly.
Class `"CondNeighborhood"`, by class `"AvCondNeighborhood"`.
Class `"Neighborhood"`, by class `"AvCondNeighborhood"`.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

`AvCondNeighborhood-class`

AvCondNeighborhood-class

Average conditional neighborhood

Description

Class of average conditional neighborhoods; i.e. only radius curves ε with $\|\varepsilon\|_\alpha \leq 1$ for given exponent α.

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.

`radiusCurve`**:** Object of class `"function"`: radius curve.

`exponent`**:** Object of class `"numeric"`: positive integer or `Inf`.

Extends

Class `"CondNeighborhood"`, directly.
Class `"Neighborhood"`, by class `"CondNeighborhood"`.

Methods

show `signature(object = "AvCondNeighborhood")`

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

CondNeighborhood-class

CondContIC *Generating function for CondContIC-class*

Description

Generates an object of class "CondContIC"; i.e., an influence curves η of the form

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

with clipping function b, centering function a and standardizing matrix A. Λ stands for the L2 derivative of the corresponding L2 differentiable parametric family which can be created via CallL2Fam.

Usage

```
CondContIC(name, CallL2Fam = call("L2RegTypeFamily"),
       Curve = EuclRandVarList(RealRandVariable(
               Map = list(function(x){x[1]*x[2]}),
               Domain = EuclideanSpace(dimension = 2))),
       Risks, Infos,
      clip = RealRandVariable(Map = list(function(x){ Inf }), Domain = Reals()),
       stand = as.matrix(1),
       cent = EuclRandVarList(RealRandVariable(
              Map = list(function(x){numeric(length(x))}),
              Domain = EuclideanSpace(dimension = 2))),
     lowerCase = NULL, neighborRadius = 0, neighborRadiusCurve = function(x){1})
```

Arguments

name	object of class "character".
CallL2Fam	object of class "call": creates an object of the underlying L2-differentiable regression type 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	object of class "RealRandVariable": clipping function.
cent	object of class "EuclRandVarList": centering function.
stand	matrix: standardizing matrix.
lowerCase	optional constant for lower case solution.
neighborRadius	radius of the corresponding conditional contamination neighborhood.
neighborRadiusCurve	radius curve of the corresponding conditional contamination neighborhood.

Value

Object of class "CondContIC"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

CondIC-class, CondContIC-class

Examples

```
IC1 <- CondContIC()
IC1
```

CondContIC-class *Conditionally centered influence curve of contamination type*

Description

Class of conditionally centered (partial) influence curves of contamination type for conditional contamination neighborhoods; i.e., influence curves η of the form

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

with clipping function b, centering function a and standardizing matrix A. Λ stands for the L2 derivative of the corresponding L2 differentiable regression type family created via the call in the slot CallL2Fam.

Objects from the Class

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

Slots

`CallL2Fam`: object of class `"call"`: creates an object of the underlying L2-differentiable regression type family.

`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.

`clip`: object of class `"RealRandVariable"`: clipping function.

`cent`: object of class `"EuclRandVarList"`: centering function.

`stand`: object of class `"matrix"`: standardizing matrix.

`lowerCase`: object of class `"OptionalNumeric"`: optional constant for lower case solution.

`neighborRadius`: object of class `"numeric"`: radius of the corresponding conditional contamination neighborhood.

`neighborRadiusCurve`: object of class `"function"`: radius curve of the corresponding conditional contamination neighborhood.

Extends

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

Methods

CallL2Fam<- `signature(object = "CondContIC")`: replacement function for slot `CallL2Fam`.

cent `signature(object = "CondContIC")`: accessor function for slot `cent`.

cent<- `signature(object = "CondContIC")`: replacement function for slot `cent`.

clip `signature(object = "CondContIC")`: accessor function for slot `clip`.

clip<- `signature(object = "CondContIC")`: replacement function for slot `clip`.

stand `signature(object = "CondContIC")`: accessor function for slot `stand`.

stand<- `signature(object = "CondContIC")`: replacement function for slot `stand`.

lowerCase `signature(object = "CondContIC")`: accessor function for slot `lowerCase`.

lowerCase<- `signature(object = "CondContIC")`: replacement function for slot `lowerCase`.

neighborRadius `signature(object = "CondContIC")`: accessor function for slot `neighborRadius`.

neighborRadius<- `signature(object = "CondContIC")`: replacement function for slot `neighborRadius`.

neighborRadiusCurve `signature(object = "CondContIC")`: accessor function for slot `neighborRadiusCurve`.

neighborRadiusCurve<- `signature(object = "CondContIC")`: replacement function for slot `neighborRadiusCurve`.

generateIC `signature(neighbor = "CondContNeighborhood", L2Fam = "L2RegTypeFamily")`: generate an object of class `"CondContIC"`. Rarely called directly.

show `signature(object = "CondContIC")`

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

CondIC-class, CondContIC

Examples

```
IC1 <- new("CondContIC")
IC1
```

CondContNeighborhood *Generating function for CondContNeighborhood-class*

Description

Generates an object of class "CondContNeighborhood".

Usage

```
CondContNeighborhood(radius = 0, radiusCurve = function(x){1})
```

Arguments

radius	non-negative real: neighborhood radius.
radiusCurve	real-valued, non-negative function.

Value

Object of class "CondContNeighborhood"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

CondContNeighborhood-class

Examples

```
CondContNeighborhood()

## The function is currently defined as
function(radius = 0, radiusCurve = function(x){1}){
    new("CondContNeighborhood", radius = radius, radiusCurve = radiusCurve)
}
```

CondContNeighborhood-class

Conditional contamination neighborhood

Description

Class of conditional (error-free-variables) convex contamination neighborhoods.

Objects from the Class

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

Slots

`type`**:** Object of class `"character"`: "conditional convex contamination neighborhood".

`radius`**:** Object of class `"numeric"`: neighborhood radius.

`radiusCurve`**:** Object of class `"function"`: radius curve

Extends

Class `"CondNeighborhood"`, directly.
Class `"Neighborhood"`, by class `"CondNeighborhood"`.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

CondContNeighborhood, CondNeighborhood-class

Examples

```
new("CondContNeighborhood")
```

CondIC *Generating function for CondIC-class*

Description

Generates an object of class "CondIC".

Usage

```
CondIC(name, Curve = EuclRandVarList(EuclRandVariable(
       Map = list(function(x){x[1] * x[2]}),
       Domain = EuclideanSpace(dimension = 2),
       Range = Reals())),
       Risks, Infos, CallL2Fam = call("L2RegTypeFamily"))
```

Arguments

name	character string: name.
CallL2Fam	object of class "call": creates an object of "L2RegTypeFamily".
Curve	object of class "EuclRandVariable": curve
Risks	object of class "list": list of risks; cf. RiskType-class.
Infos	matrix of characters with two columns named method and message: additional informations.

Value

Object of class "CondIC"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Hampel et al. (1986) *Robust Statistics*. The Approach Based on Influence Functions. New York: Wiley.

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

CondIC-class

Examples

```
CondIC()

## The function is currently defined as
function(name, Curve = EuclRandVariable(Map = list(function(x){x[1]*x[2]}),
                            Domain = EuclideanSpace(dimension = 2)),
         Risks, Infos, CallL2Fam = call("L2RegTypeFamily")){
    if(missing(name))
        name <- "Influence curve for a L_2 differentiable regression type family"
    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("CondIC", name = name, Curve = Curve, Risks = Risks,
               Infos = Infos, CallL2Fam = CallL2Fam))
  }
```

CondIC-class *Conditionally centered partial influence curve*

Description

Class of conditionally centered partial influence curves.

Objects from the Class

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

Slots

`CallL2Fam`: Object of class `"call"`: creates an object of class `"L2RegTypeFamily"`.

`name`: Object of class `"character"`: name

`Curve`: Object of class `"EuclRandVariable"`: curve.

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

Methods

CallL2Fam<- `signature(object = "IC")`: replacement function for slot `CallL2Fam`.

checkIC `signature(IC = "CondIC", L2Fam = "missing")`: check conditional centering and Fisher consistency of `IC` assuming the L2-differentiable regression-type family which can be created via the slot `CallL2Fam` of `IC`.

checkIC `signature(IC = "CondIC", L2Fam = "L2RegTypeFamily")`: check conditional centering and Fisher consistency of `IC` assuming the L2-differentiable regression-type family `L2Fam`.

show `signature(object = "CondIC")`

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Hampel et al. (1986) *Robust Statistics*. The Approach Based on Influence Functions. New York: Wiley.

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

`InfluenceCurve-class`, `IC-class`

Examples

```
new("CondIC")
```

CondNeighborhood-class

Conditional neighborhood

Description

Class of conditonal (error-free-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.

`radiusCurve`**:** Object of class `"function"`: radius curve.

Extends

Class "Neighborhood", directly.

Methods

radiusCurve signature(object = "CondNeighborhood"): accessor function for slot radiusCurve.

show signature(object = "CondNeighborhood")

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

Neighborhood-class

CondTotalVarIC *Generating function for CondTotalVarIC-class*

Description

Generates an object of class "CondTotalVarIC"; i.e., an influence curves η of the form

$$\eta = max(c(x), min(Ax\Lambda_f, b(x)))$$

with lower clipping function c, upper clipping function b and standardizing matrix A. Λ_f stands for the L2 derivative of the corresponding error distribution.

Usage

```
CondTotalVarIC(name, CallL2Fam = call("L2RegTypeFamily"),
        Curve = EuclRandVarList(RealRandVariable(
                Map = list(function(x) {x[1] * x[2]}),
                Domain = EuclideanSpace(dimension = 2))),
        Risks, Infos,
       clipUp = RealRandVariable(Map = list(function(x) {Inf}), Domain = Reals()),
        stand = as.matrix(1),
       clipLo = RealRandVariable(Map = list(function(x) {-Inf}), Domain = Reals()),
       lowerCase = NULL, neighborRadius = 0, neighborRadiusCurve = function(x){1})
```

Arguments

name	object of class "character".
CallL2Fam	object of class "call": creates an object of the underlying L2-differentiable regression type 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.
clipUp	object of class "RealRandVariable": upper clipping function.
clipLo	object of class "RealRandVariable": lower clipping function.
stand	matrix: standardizing matrix.
lowerCase	optional constant for lower case solution.
neighborRadius	radius of the corresponding conditional total variation neighborhood.
neighborRadiusCurve	radius curve of the corresponding conditional total variation neighborhood.

Value

Object of class "CondTotalVarIC"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

CondIC-class, CondTotalVarIC-class

Examples

```
IC1 <- CondTotalVarIC()
IC1
```

CondTotalVarIC-class *Conditionally centered influence curve of total variaton type*

Description

Class of conditionally centered (partial) influence curves of contamination type for average conditional total variation

$$\eta = max(c(x), min(Ax\Lambda_f, b(x)))$$

with lower clipping function c, upper clipping function b and standardizing matrix A. Λ_f stands for the L2 derivative of the corresponding error distribution.

Objects from the Class

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

Slots

`CallL2Fam`**:** object of class `"call"`: creates an object of the underlying L2-differentiable regression type family.

`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.

`clipUp`**:** object of class `"RealRandVariable"`: upper clipping function.

`clipLo`**:** object of class `"RealRandVariable"`: lower clipping function.

`stand`**:** object of class `"matrix"`: standardizing matrix.

`lowerCase`**:** object of class `"OptionalNumeric"`: optional constant for lower case solution.

`neighborRadius`**:** object of class `"numeric"`: radius of the corresponding conditional contamination neighborhood.

`neighborRadiusCurve`**:** object of class `"numeric"`: radius curve of the corresponding conditional contamination neighborhood.

Extends

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

Methods

CallL2Fam<- `signature(object = "CondTotalVarIC")`: replacement function for slot `CallL2Fam`.

clipLo `signature(object = "CondTotalVarIC")`: accessor function for slot `clipLo`.

clipLo<- `signature(object = "CondTotalVarIC")`: replacement function for slot `clipLo`.

clipUp `signature(object = "CondTotalVarIC")`: accessor function for slot `clipUp`.

clipUp<- `signature(object = "CondTotalVarIC")`: replacement function for slot `clipUp`.

stand `signature(object = "CondTotalVarIC")`: accessor function for slot `stand`.

stand<- `signature(object = "CondTotalVarIC")`: replacement function for slot `stand`.

lowerCase `signature(object = "CondTotalVarIC")`: accessor function for slot `lowerCase`.

lowerCase<- `signature(object = "CondTotalVarIC")`: replacement function for slot `lowerCase`.

neighborRadius `signature(object = "CondTotalVarIC")`: accessor function for slot `neighborRadius`.

neighborRadius<- `signature(object = "CondTotalVarIC")`: replacement function for slot `neighborRadius`.

neighborRadiusCurve `signature(object = "CondTotalVarIC")`: accessor function for slot `neighborRadiusCurve`.

neighborRadiusCurve<- `signature(object = "CondTotalVarIC")`: replacement function for slot `neighborRadiusCurve`.

generateIC `signature(neighbor = "CondTotalVarNeighborhood", L2Fam = "L2RegTypeFamily")`: generate an object of class `"CondTotalVarIC"`. Rarely called directly.

show `signature(object = "CondTotalVarIC")`

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

`CondIC-class`, `CondTotalVarIC`

Examples

```
IC1 <- new("CondTotalVarIC")
IC1
```

CondTotalVarNeighborhood
Generating function for CondContNeighborhood-class

Description

Generates an object of class "CondTotalVarNeighborhood".

Usage

```
CondTotalVarNeighborhood(radius = 0, radiusCurve = function(x){1})
```

Arguments

radius	non-negative real: neighborhood radius.
radiusCurve	real-valued, non-negative function.

Value

Object of class "ContNeighborhood"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

CondTotalVarNeighborhood-class

Examples

```
CondTotalVarNeighborhood()

## The function is currently defined as
function(radius = 0, radiusCurve = function(x){1}){
    new("CondTotalVarNeighborhood", radius = radius, radiusCurve = radiusCurve)
}
```

CondTotalVarNeighborhood-class
Conditional total variation neighborhood

Description

Class of conditional (error-free-variables) total variation neighborhoods.

Objects from the Class

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

Slots

`type`**:** Object of class `"character"`: "conditional total variation neighborhood".

`radius`**:** Object of class `"numeric"`: neighborhood radius.

`radiusCurve`**:** Object of class `"function"`: radius curve

Extends

Class `"CondNeighborhood"`, directly.
Class `"Neighborhood"`, by class `"CondNeighborhood"`.

Author(s)

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

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

`CondTotalVarNeighborhood`, `CondNeighborhood-class`

Examples

```
new("CondTotalVarNeighborhood")
```

FixRobRegTypeModel *Generating function for FixRobRegTypeModel-class*

Description

Generates an object of class "FixRobRegTypeModel".

Usage

```
FixRobRegTypeModel(center = RegTypeFamily(), neighbor = ContNeighborhood())
```

Arguments

center	object of class "RegTypeFamily"
neighbor	object of class "Neighborhood"

Value

Object of class "FixRobRegTypeModel"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

FixRobRegTypeModel-class

Examples

```
FixRobRegTypeModel()

## The function is currently defined as
function(center = RegTypeFamily(), neighbor = ContNeighborhood()){
    new("FixRobRegTypeModel", center = center, neighbor = neighbor)
}
```

FixRobRegTypeModel-class

Robust regression-type model with fixed neighborhood

Description

Class of robust regression-type models with fixed (conditional or unconditional) neighborhoods.

Objects from the Class

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

Slots

`center`**:** Object of class `"RegTypeFamily"`.

`neighbor`**:** Object of class `"Neighborhood"`.

Extends

Class `"RobModel"`, directly.

Methods

neighbor<- `signature(object = "FixRobRegTypeModel")` replacement function for slot `neighbor`.

show `signature(object = "FixRobRegTypeModel")`

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

`RegTypeFamily-class`, `Neighborhood-class`, `FixRobRegTypeModel`

Examples

```
new("FixRobRegTypeModel")
```

generateIC-methods *Methods for Function generateIC in Package 'ROptRegTS'*

Description

Methods for function `generateIC` in package **ROptRegTS**.

Methods

neighbor = "ContNeighborhood", L2Fam = "L2RegTypeFamily" generate an object of class `"ContIC"`. Rarely called directly.

neighbor = "TotalVarNeighborhood", L2Fam = "L2RegTypeFamily" generate an object of class `"TotalVarIC"`. Rarely called directly.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

See Also

generateIC

---

getAsRiskRegTS *Generic Function for Computation of Asymptotic Risks in case of Regression-Type Models*

Description

Generic function for the computation of asymptotic risks in case of regression-type models. This function is rarely called directly. It is used by other functions.

Usage

```
getAsRiskRegTS(risk, ErrorL2deriv, Regressor, neighbor, ...)

## S4 method for signature
## 'asMSE,UnivariateDistribution,Distribution,Neighborhood'
getAsRiskRegTS(
             risk, ErrorL2deriv, Regressor, neighbor, clip, cent, stand, trafo)

## S4 method for signature
## 'asMSE,UnivariateDistribution,Distribution,Av2CondContNeighborhood'
getAsRiskRegTS(
             risk, ErrorL2deriv, Regressor, neighbor, clip, cent, stand, trafo)
```

```
## S4 method for signature 'asMSE,EuclRandVariable,Distribution,Neighborhood'
getAsRiskRegTS(
             risk, ErrorL2deriv, Regressor, neighbor, clip, cent, stand, trafo)

## S4 method for signature
## 'asBias,
##   UnivariateDistribution,
##   UnivariateDistribution,
##   ContNeighborhood'
getAsRiskRegTS(
             risk, ErrorL2deriv, Regressor, neighbor, ErrorL2derivDistrSymm,
             trafo, maxiter, tol)

## S4 method for signature
## 'asBias,
##   UnivariateDistribution,
##   UnivariateDistribution,
##   Av1CondContNeighborhood'
getAsRiskRegTS(
             risk, ErrorL2deriv, Regressor, neighbor, ErrorL2derivDistrSymm,
             trafo, maxiter, tol)

## S4 method for signature
## 'asBias,
##   UnivariateDistribution,
##   UnivariateDistribution,
##   Av1CondTotalVarNeighborhood'
getAsRiskRegTS(
             risk, ErrorL2deriv, Regressor, neighbor, ErrorL2derivDistrSymm,
             trafo, maxiter, tol)

## S4 method for signature
## 'asBias,
##   UnivariateDistribution,
##   MultivariateDistribution,
##   ContNeighborhood'
getAsRiskRegTS(
             risk, ErrorL2deriv, Regressor, neighbor, ErrorL2derivDistrSymm,
             trafo, maxiter, tol)

## S4 method for signature
## 'asBias,
##   UnivariateDistribution,
##   MultivariateDistribution,
##   Av1CondContNeighborhood'
getAsRiskRegTS(
             risk, ErrorL2deriv, Regressor, neighbor, ErrorL2derivDistrSymm,
             trafo, maxiter, tol)
```

```
## S4 method for signature
## 'asBias,
##   UnivariateDistribution,
##   MultivariateDistribution,
##   Av1CondTotalVarNeighborhood'
getAsRiskRegTS(
             risk, ErrorL2deriv, Regressor, neighbor, ErrorL2derivDistrSymm,
             trafo, maxiter, tol)

## S4 method for signature
## 'asBias,UnivariateDistribution,Distribution,Av2CondContNeighborhood'
getAsRiskRegTS(
             risk, ErrorL2deriv, Regressor, neighbor, ErrorL2derivDistrSymm,
             trafo, maxiter, tol)

## S4 method for signature
## 'asBias,RealRandVariable,Distribution,ContNeighborhood'
getAsRiskRegTS(
            risk, ErrorL2deriv, Regressor, neighbor, ErrorDistr, trafo, z.start,
             A.start, maxiter, tol)

## S4 method for signature
## 'asBias,RealRandVariable,Distribution,Av1CondContNeighborhood'
getAsRiskRegTS(
            risk, ErrorL2deriv, Regressor, neighbor, ErrorDistr, trafo, z.start,
             A.start, maxiter, tol)

## S4 method for signature
## 'asUnOvShoot,
##   UnivariateDistribution,
##   UnivariateDistribution,
##   UncondNeighborhood'
getAsRiskRegTS(
             risk, ErrorL2deriv, Regressor, neighbor, clip, cent, stand)

## S4 method for signature
## 'asUnOvShoot,
##   UnivariateDistribution,
##   UnivariateDistribution,
##   CondNeighborhood'
getAsRiskRegTS(
             risk, ErrorL2deriv, Regressor, neighbor, clip, cent, stand)
```

Arguments

risk	object of class "asRisk".
ErrorL2deriv	L2-derivative of ErrorDistr.

Regressor	regressor.
neighbor	object of class "Neighborhood".
...	additional parameters.
clip	optimal clipping bound.
cent	optimal centering constant/function.
stand	standardizing matrix.
trafo	matrix: transformation of the parameter.
ErrorDistr	error distribution.
ErrorL2derivDistrSymm	symmetry of ErrorL2derivDistr.
maxiter	the maximum number of iterations
tol	the desired accuracy (convergence tolerance).
z.start	initial value for the centering constant/function.
A.start	initial value for the standardizing matrix.

Value

The asymptotic risk is computed.

Methods

risk = "asMSE", ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", neighbor = "Neighborhood"
computes asymptotic mean square error in methods for function getInfRobRegTypeIC.

risk = "asMSE", ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", neighbor = "Av2CondCont
computes asymptotic mean square error in methods for function getInfRobRegTypeIC.

risk = "asMSE", ErrorL2deriv = "EuclRandVariable", Regressor = "Distribution", neighbor = "Neighborhood"
computes asymptotic mean square error in methods for function getInfRobRegTypeIC.

risk = "asBias", ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor = "Cont
computes standardized asymptotic bias in methods for function getInfRobRegTypeIC.

risk = "asBias", ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor = "Av1C
computes standardized asymptotic bias in methods for function getInfRobRegTypeIC.

risk = "asBias", ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor = "Av1C
computes standardized asymptotic bias in methods for function getInfRobRegTypeIC.

risk = "asBias", ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", neighbor = "Co
computes standardized asymptotic bias in methods for function getInfRobRegTypeIC.

risk = "asBias", ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", neighbor = "Av
computes standardized asymptotic bias in methods for function getInfRobRegTypeIC.

risk = "asBias", ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", neighbor = "Av
computes standardized asymptotic bias in methods for function getInfRobRegTypeIC.

risk = "asBias", ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", neighbor = "Av2CondContN
computes standardized asymptotic bias in methods for function getInfRobRegTypeIC.

risk = "asBias", ErrorL2deriv = "RealRandVariable", Regressor = "Distribution", neighbor = "ContNeighborhood"
computes standardized asymptotic bias in methods for function getInfRobRegTypeIC.

risk = "asBias", ErrorL2deriv = "RealRandVariable", Regressor = "Distribution", neighbor = "Av1CondContNeigh
computes standardized asymptotic bias in methods for function `getInfRobRegTypeIC`.

risk = "asUnOvShoot", ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor =
computes asymptotic under-/overshoot risk in methods for function `getInfRobRegTypeIC`.

risk = "asUnOvShoot", ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor =
computes asymptotic under-/overshoot risk in methods for function `getInfRobRegTypeIC`.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1980) Estimates derived from robust tests. Ann. Stats. **8**: 106–115.

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Ruckdeschel, P. and Rieder, H. (2004) Optimal Influence Curves for General Loss Functions. Statistics & Decisions (submitted).

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

asRisk-class

---

getFiRiskRegTS *Generic Function for Computation of Finite-Sample Risks*

Description

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

Usage

```
getFiRiskRegTS(risk, ErrorDistr, Regressor, neighbor, ...)

## S4 method for signature
## 'fiUnOvShoot,Norm,UnivariateDistribution,ContNeighborhood'
getFiRiskRegTS(
             risk, ErrorDistr, Regressor, neighbor, clip, stand, sampleSize,
             Algo, cont)

## S4 method for signature
## 'fiUnOvShoot,Norm,UnivariateDistribution,TotalVarNeighborhood'
getFiRiskRegTS(
             risk, ErrorDistr, Regressor, neighbor, clip, stand, sampleSize,
```

```
              Algo, cont)

## S4 method for signature
## 'fiUnOvShoot,Norm,UnivariateDistribution,CondContNeighborhood'
getFiRiskRegTS(
              risk, ErrorDistr, Regressor, neighbor, clip, stand, sampleSize,
              cont)

## S4 method for signature
## 'fiUnOvShoot,Norm,UnivariateDistribution,CondTotalVarNeighborhood'
getFiRiskRegTS(
           risk, ErrorDistr, Regressor, neighbor, clip, stand, sampleSize, cont)
```

Arguments

risk	object of class "RiskType".
ErrorDistr	error distribution
Regressor	regressor
neighbor	object of class "Neighborhood".
...	additional parameters.
clip	optimal clipping bound/function.
stand	standardizing 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 Subsections 12.1.3 and 12.2.3 of Kohl (2005).

Value

The finite-sample risk is computed.

Methods

risk = "fiUnOvShoot", ErrorDistr = "Norm", Regressor = "UnivariateDistribution", neighbor = "ContNeighborhoo
computes finite-sample under-/overshoot risk in methods for function 'getFixRobRegTypeIC'.

risk = "fiUnOvShoot", ErrorDistr = "Norm", Regressor = "UnivariateDistribution", neighbor = "TotalVarNeighbor
computes finite-sample under-/overshoot risk in methods for function 'getFixRobRegTypeIC'.

risk = "fiUnOvShoot", ErrorDistr = "Norm", Regressor = "UnivariateDistribution", neighbor = "CondContNeighbo
computes finite-sample under-/overshoot risk in methods for function 'getFixRobRegTypeIC'.

risk = "fiUnOvShoot", ErrorDistr = "Norm", Regressor = "UnivariateDistribution", neighbor = "CondTotalVarNeig
computes finite-sample under-/overshoot risk in methods for function 'getFixRobRegTypeIC'.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Huber, P.J. (1968) Robust Confidence Limits. Z. Wahrscheinlichkeitstheor. Verw. Geb. **10**:269–278.

Rieder, H. (1989) A finite-sample minimax regression estimator. Statistics **20**(2): 211–221.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

fiRisk-class

`getFixClipRegTS` *Generic Function for the Computation of the Optimal Clipping Bound*

Description

Generic function for the computation of the optimal clipping bound/function. This function is rarely called directly. It is used to compute optimally robust ICs in case of fixed robust models.

Usage

```
getFixClipRegTS(clip, ErrorDistr, Regressor, risk, neighbor, ...)
```

Arguments

`clip`	optimal clipping bound.
`ErrorDistr`	error distribution.
`Regressor`	regressor.
`risk`	object of class `"RiskType"`.
`neighbor`	object of class `"Neighborhood"`.
`...`	additional parameters.

Value

The optimal clipping bound/function is computed.

Methods

clip = "numeric", ErrorDistr = "Norm", Regressor = "UnivariateDistribution", risk = "fiUnOvShoot", neighbor = "
optimal clipping bound for finite-sample under-/overshoot risk.

clip = "numeric", ErrorDistr = "Norm", Regressor = "UnivariateDistribution", risk = "fiUnOvShoot", neighbor = "
optimal clipping bound for finite-sample under-/overshoot risk.

clip = "numeric", ErrorDistr = "Norm", Regressor = "numeric", risk = "fiUnOvShoot", neighbor = "CondContNeig
optimal clipping function for finite-sample under-/overshoot risk.

clip = "numeric", ErrorDistr = "Norm", Regressor = "numeric", risk = "fiUnOvShoot", neighbor = "CondTotalVar
optimal clipping function for finite-sample under-/overshoot risk.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Huber, P.J. (1968) Robust Confidence Limits. Z. Wahrscheinlichkeitstheor. Verw. Geb. **10**:269–278.

Rieder, H. (1989) A finite-sample minimax regression estimator. Statistics **20**(2): 211–221.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

ContIC-class, TotalVarIC-class, Av1CondContIC-class, Av2CondContIC-class, Av1CondTotalVarIC-class, CondContIC-class, CondTotalVarIC-class

---

getFixRobRegTypeIC *Generic Function for the Computation of Optimally Robust Regression-Type ICs*

Description

Generic function for the computation of optimally robust regression-type ICs in case of fixed robust models. This function is rarely called directly.

Usage

```
getFixRobRegTypeIC(ErrorDistr, Regressor, risk, neighbor, ...)

## S4 method for signature
## 'Norm,UnivariateDistribution,fiUnOvShoot,UncondNeighborhood'
getFixRobRegTypeIC(ErrorDistr,
         Regressor, risk, neighbor, sampleSize, upper, maxiter, tol, warn, Algo, cont)
```

```
## S4 method for signature
## 'Norm,UnivariateDistribution,fiUnOvShoot,CondNeighborhood'
getFixRobRegTypeIC(ErrorDistr,
         Regressor, risk, neighbor, sampleSize, upper, maxiter, tol, warn, Algo, cont)
```

Arguments

ErrorDistr	error distribution
Regressor	regressor
risk	object of class "RiskType".
neighbor	object of class "Neighborhood".
...	additional parameters.
sampleSize	integer: sample size.
upper	upper bound for the optimal clipping bound.
maxiter	the maximum number of iterations.
tol	the desired accuracy (convergence tolerance).
warn	logical: print warnings.
Algo	"A" or "B".
cont	"left" or "right".

Value

The optimally robust IC is computed.

Methods

ErrorDistr = "Norm", Regressor = "UnivariateDistribution", risk = "fiUnOvShoot", neighbor = "UncondNeighborh
computes the optimally robust influence curve for one-dimensional normal regression and finite-sample under-/overshoot risk.

ErrorDistr = "Norm", Regressor = "UnivariateDistribution", risk = "fiUnOvShoot", neighbor = "CondNeighborhoo
computes the optimally robust influence curve for one-dimensional normal regression and finite-sample under-/overshoot risk.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Huber, P.J. (1968) Robust Confidence Limits. Z. Wahrscheinlichkeitstheor. Verw. Geb. **10**:269–278.

Rieder, H. (1989) A finite-sample minimax regression estimator. Statistics **20**(2): 211–221.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

FixRobRegTypeModel-class

---

getIneffDiff-methods *Methods for Function getIneffDiff in Package 'ROptRegTS'*

Description

Methods for function getIneffDiff in package **ROptRegTS**. These methods are rarely called directly. They are used to compute the radius minimax IC and the least favorable radius.

Methods

radius = "numeric", L2Fam = "L2RegTypeFamily", neighbor = "Neighborhood", risk = "asMSE"
computes difference of asymptotic MSE–inefficiency for the boundaries of a given radius interval.

radius = "numeric", L2Fam = "L2RegTypeFamily", neighbor = "Av2CondContNeighborhood", risk = "asMSE"
computes difference of asymptotic MSE–inefficiency for the boundaries of a given radius interval.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

See Also

getIneffDiff

---

getInfCentRegTS *Generic Function for the Computation of the Optimal Centering Constant/Function resp. Lower Clipping Bound/Function*

Description

Generic function for the computation of the optimal centering constant/function (contamination neighborhoods) respectively, of the optimal lower clipping bound/function (total variation neighborhoods). This function is rarely called directly. It is used to compute optimally robust ICs.

Usage

```
getInfCentRegTS(ErrorL2deriv, Regressor, neighbor, ...)

## S4 method for signature
## 'UnivariateDistribution,UnivariateDistribution,ContNeighborhood'
getInfCentRegTS(
             ErrorL2deriv, Regressor, neighbor, clip, cent, stand, z.comp)

## S4 method for signature
## 'UnivariateDistribution,UnivariateDistribution,TotalVarNeighborhood'
getInfCentRegTS(
             ErrorL2deriv, Regressor, neighbor, clip, cent, z.comp)

## S4 method for signature
## 'UnivariateDistribution,numeric,CondTotalVarNeighborhood'
getInfCentRegTS(
             ErrorL2deriv, Regressor, neighbor, clip, cent, z.comp)

## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   Av1CondContNeighborhood'
getInfCentRegTS(
            ErrorL2deriv, Regressor, neighbor, clip, cent, stand, z.comp, x.vec)

## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   Av1CondTotalVarNeighborhood'
getInfCentRegTS(
            ErrorL2deriv, Regressor, neighbor, clip, cent, stand, z.comp, x.vec,
             tol.z)

## S4 method for signature
## 'UnivariateDistribution,MultivariateDistribution,ContNeighborhood'
getInfCentRegTS(
             ErrorL2deriv, Regressor, neighbor, clip, cent, stand, z.comp)

## S4 method for signature
## 'UnivariateDistribution,
##   MultivariateDistribution,
##   Av1CondContNeighborhood'
getInfCentRegTS(
            ErrorL2deriv, Regressor, neighbor, clip, cent, stand, z.comp, x.vec)

## S4 method for signature
## 'UnivariateDistribution,Distribution,Av2CondContNeighborhood'
getInfCentRegTS(
```

```
            ErrorL2deriv, Regressor, neighbor, clip, cent, stand, z.comp, tol.z)

## S4 method for signature 'RealRandVariable,Distribution,ContNeighborhood'
getInfCentRegTS(
             ErrorL2deriv, Regressor, neighbor, ErrorDistr, stand, cent, clip,
             z.comp)

## S4 method for signature
## 'RealRandVariable,Distribution,Av1CondContNeighborhood'
getInfCentRegTS(
             ErrorL2deriv, Regressor, neighbor, ErrorDistr, stand, cent, clip,
             z.comp, x.vec)
```

Arguments

ErrorL2deriv	L2-derivative of ErrorDistr.
Regressor	regressor.
neighbor	object of class "Neighborhood".
...	additional parameters.
clip	optimal clipping bound.
cent	optimal centering constant/function.
stand	standardizing matrix.
z.comp	which components of the centering constant/function have to be computed.
x.vec	(approximated) support of Regressor.
tol.z	the desired accuracy (convergence tolerance).
ErrorDistr	error distribution.

Value

The optimal centering constant/function is computed.

Methods

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor = "ContNeighborhood"
computation of optimal centering constant.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor = "TotalVarNeighborhoo
computation of lower clipping bound.

ErrorL2deriv = "UnivariateDistribution", Regressor = "numeric", neighbor = "CondTotalVarNeighborhood"
computation of lower clipping bound.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor = "Av1CondContNeighb
computation of optimal centering function.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor = "Av1CondTotalVarNei
computation of optimal lower clipping function.

ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", neighbor = "ContNeighborhood
computation of optimal centering constant.

ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", neighbor = "Av1CondContNeigh
computation of optimal centering function.

ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", neighbor = "Av1CondTotalVarN
computation of optimal lower clipping function.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", neighbor = "Av2CondContNeighborhood"
computation of optimal centering constant.

ErrorL2deriv = "RealRandVariable", Regressor = "Distribution", neighbor = "ContNeighborhood"
computation of optimal centering constant.

ErrorL2deriv = "RealRandVariable", Regressor = "Distribution", neighbor = "Av1CondContNeighborhood"
computation of optimal centering function.

Author(s)

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References

Rieder, H. (1980) Estimates derived from robust tests. Ann. Stats. **8**: 106–115.

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

ContIC-class, Av1CondContIC-class, Av2CondContIC-class, Av1CondTotalVarIC-class, CondContIC-class, CondTotalVarIC-class

---

getInfClipRegTS *Generic Function for the Computation of the Optimal Clipping Bound*

Description

Generic function for the computation of the optimal clipping bound/function. This function is rarely called directly. It is used to compute optimally robust ICs in case infinitesimal models.

Usage

```
getInfClipRegTS(clip, ErrorL2deriv, Regressor, risk, neighbor, ...)

## S4 method for signature
## 'numeric,UnivariateDistribution,Distribution,asMSE,Neighborhood'
getInfClipRegTS(
            clip, ErrorL2deriv, Regressor, risk, neighbor, z.comp, stand, cent)

## S4 method for signature
## 'numeric,
```

```
##   UnivariateDistribution,
##   Distribution,
##   asMSE,
##   Av1CondTotalVarNeighborhood'
getInfClipRegTS(
            clip, ErrorL2deriv, Regressor, risk, neighbor, z.comp, stand, cent)

## S4 method for signature
## 'numeric,EuclRandVariable,Distribution,asMSE,Neighborhood'
getInfClipRegTS(
             clip, ErrorL2deriv, Regressor, risk, neighbor, ErrorDistr, stand,
             cent, trafo)

## S4 method for signature
## 'numeric,
##   UnivariateDistribution,
##   UnivariateDistribution,
##   asUnOvShoot,
##   UncondNeighborhood'
getInfClipRegTS(
             clip, ErrorL2deriv, Regressor, risk, neighbor, z.comp, cent)

## S4 method for signature
## 'numeric,UnivariateDistribution,numeric,asUnOvShoot,CondNeighborhood'
getInfClipRegTS(
             clip, ErrorL2deriv, Regressor, risk, neighbor)
```

Arguments

clip	optimal clipping bound.
ErrorL2deriv	L2-derivative of ErrorDistr.
Regressor	regressor.
risk	object of class "RiskType".
neighbor	object of class "Neighborhood".
...	additional parameters.
cent	optimal centering constant/function.
stand	standardizing matrix.
z.comp	which components of the centering constant/function have to be computed.
ErrorDistr	error distribution.
trafo	matrix: transformation of the parameter.

Value

The optimal clipping bound/function is computed.

Methods

clip = "numeric", ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asMSE", neighbor
optimal clipping bound for asymtotic mean square error.

clip = "numeric", ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asMSE", neighbor
optimal clipping bound for asymtotic mean square error.

clip = "numeric", ErrorL2deriv = "EuclRandVariable", Regressor = "Distribution", risk = "asMSE", neighbor = "N
optimal clipping bound for asymtotic mean square error.

clip = "numeric", ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", risk = "asUnOv
optimal clipping bound for asymtotic under-/overshoot risk.

clip = "numeric", ErrorL2deriv = "UnivariateDistribution", Regressor = "numeric", risk = "asUnOvShoot", neighb
optimal clipping function for asymtotic under-/overshoot risk.

Author(s)

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References

Rieder, H. (1980) Estimates derived from robust tests. Ann. Stats. **8**: 106–115.

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

ContIC-class, TotalVarIC-class, Av1CondContIC-class, Av2CondContIC-class, Av1CondTotalVarIC-class, CondContIC-class, CondTotalVarIC-class

---

getInfGammaRegTS *Generic Function for the Computation of the Optimal Clipping Bound*

Description

Generic function for the computation of the optimal clipping bound. This function is rarely called directly. It is called by getInfClipRegTS to compute optimally robust ICs.

Usage

```
getInfGammaRegTS(ErrorL2deriv, Regressor, risk, neighbor, ...)

## S4 method for signature
## 'UnivariateDistribution,UnivariateDistribution,asMSE,ContNeighborhood'
getInfGammaRegTS(
            ErrorL2deriv, Regressor, risk, neighbor, z.comp, stand, cent, clip)
```

```
## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   asMSE,
##   Av1CondContNeighborhood'
getInfGammaRegTS(
            ErrorL2deriv, Regressor, risk, neighbor, z.comp, stand, cent, clip)

## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   asMSE,
##   Av1CondTotalVarNeighborhood'
getInfGammaRegTS(
            ErrorL2deriv, Regressor, risk, neighbor, z.comp, stand, cent, clip)

## S4 method for signature
## 'UnivariateDistribution,
##   MultivariateDistribution,
##   asMSE,
##   ContNeighborhood'
getInfGammaRegTS(
            ErrorL2deriv, Regressor, risk, neighbor, z.comp, stand, cent, clip)

## S4 method for signature
## 'UnivariateDistribution,
##   MultivariateDistribution,
##   asMSE,
##   Av1CondContNeighborhood'
getInfGammaRegTS(
            ErrorL2deriv, Regressor, risk, neighbor, z.comp, stand, cent, clip)

## S4 method for signature
## 'UnivariateDistribution,
##   MultivariateDistribution,
##   asMSE,
##   Av1CondTotalVarNeighborhood'
getInfGammaRegTS(
            ErrorL2deriv, Regressor, risk, neighbor, z.comp, stand, cent, clip)

## S4 method for signature
## 'UnivariateDistribution,Distribution,asMSE,Av2CondContNeighborhood'
getInfGammaRegTS(
            ErrorL2deriv, Regressor, risk, neighbor, z.comp, stand, cent, clip)

## S4 method for signature
## 'RealRandVariable,Distribution,asMSE,ContNeighborhood'
getInfGammaRegTS(
```

```
             ErrorL2deriv, Regressor, risk, neighbor, ErrorDistr, stand, cent,
             clip)

## S4 method for signature
## 'RealRandVariable,Distribution,asMSE,Av1CondContNeighborhood'
getInfGammaRegTS(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorDistr, stand, cent,
             clip)

## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   asUnOvShoot,
##   ContNeighborhood'
getInfGammaRegTS(
             ErrorL2deriv, Regressor, risk, neighbor, cent, clip)

## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   asUnOvShoot,
##   TotalVarNeighborhood'
getInfGammaRegTS(
             ErrorL2deriv, Regressor, risk, neighbor, cent, clip)

## S4 method for signature
## 'UnivariateDistribution,numeric,asUnOvShoot,CondContNeighborhood'
getInfGammaRegTS(
             ErrorL2deriv, Regressor, risk, neighbor, clip)

## S4 method for signature
## 'UnivariateDistribution,numeric,asUnOvShoot,CondTotalVarNeighborhood'
getInfGammaRegTS(
             ErrorL2deriv, Regressor, risk, neighbor, clip)
```

Arguments

ErrorL2deriv	L2-derivative of ErrorDistr.
Regressor	regressor.
risk	object of class "RiskType".
neighbor	object of class "Neighborhood".
...	additional parameters.
clip	optimal clipping bound.
cent	optimal centering constant/function.
stand	standardizing matrix.
z.comp	which components of the centering constant/function have to be computed.
ErrorDistr	error distribution.

Details

The function is used in case of asymptotic G-risks; confer Ruckdeschel and Rieder (2004).

Methods

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", risk = "asMSE", neighbor = "Con
used by `getInfClipRegTS`.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", risk = "asMSE", neighbor = "Av1
used by `getInfClipRegTS`.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", risk = "asMSE", neighbor = "Av1
used by `getInfClipRegTS`.

ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", risk = "asMSE", neighbor = "C
used by `getInfClipRegTS`.

ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", risk = "asMSE", neighbor = "Av
used by `getInfClipRegTS`.

ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", risk = "asMSE", neighbor = "Av
used by `getInfClipRegTS`.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asMSE", neighbor = "Av2CondContI
used by `getInfClipRegTS`.

ErrorL2deriv = "RealRandVariable", Regressor = "Distribution", risk = "asMSE", neighbor = "ContNeighborhood
used by `getInfClipRegTS`.

ErrorL2deriv = "RealRandVariable", Regressor = "Distribution", risk = "asMSE", neighbor = "Av1CondContNeigh
used by `getInfClipRegTS`.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", risk = "asUnOvShoot", neighbor =
used by `getInfClipRegTS`.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", risk = "asUnOvShoot", neighbor =
used by `getInfClipRegTS`.

ErrorL2deriv = "UnivariateDistribution", Regressor = "numeric", risk = "asUnOvShoot", neighbor = "CondContN
used by `getInfClipRegTS`.

ErrorL2deriv = "UnivariateDistribution", Regressor = "numeric", risk = "asUnOvShoot", neighbor = "CondTotalV
used by `getInfClipRegTS`.

Author(s)

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References

Rieder, H. (1980) Estimates derived from robust tests. Ann. Stats. **8**: 106–115.

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Ruckdeschel, P. and Rieder, H. (2004) Optimal Influence Curves for General Loss Functions. Statistics & Decisions (submitted).

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

asMSE-class, asUnOvShoot-class, ContIC-class, Av1CondContIC-class, Av2CondContIC-class, Av1CondTotalVarIC-class, CondContIC-class, CondTotalVarIC-class

---

getInfRobRegTypeIC *Generic Function for the Computation of Optimally Robust Regression-Type ICs*

Description

Generic function for the computation of optimally robust regression-type ICs in case of infinitesimal robust models. This function is rarely called directly.

Usage

```
getInfRobRegTypeIC(ErrorL2deriv, Regressor, risk, neighbor, ...)

## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   asBias,
##   ContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo, upper, maxiter, tol, warn)

## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   asBias,
##   Av1CondContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo, upper, maxiter, tol, warn)

## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   asBias,
##   Av1CondTotalVarNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo, upper, maxiter, tol, warn)

## S4 method for signature
## 'UnivariateDistribution,Distribution,asBias,Av2CondContNeighborhood'
```

```
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo, upper, maxiter, tol, warn)

## S4 method for signature
## 'UnivariateDistribution,Distribution,asCov,ContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo)

## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   asCov,
##   TotalVarNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo)

## S4 method for signature
## 'UnivariateDistribution,Distribution,asCov,CondContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo)

## S4 method for signature
## 'UnivariateDistribution,Distribution,asCov,CondTotalVarNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo)

## S4 method for signature
## 'UnivariateDistribution,Distribution,asCov,Av1CondContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo)

## S4 method for signature
## 'UnivariateDistribution,Distribution,asCov,Av2CondContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo)

## S4 method for signature
## 'UnivariateDistribution,
##   Distribution,
##   asCov,
##   Av1CondTotalVarNeighborhood'
```

```
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo)

## S4 method for signature
## 'UnivariateDistribution,Distribution,asGRisk,ContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo, upper, maxiter, tol, warn)

## S4 method for signature
## 'UnivariateDistribution,Distribution,asGRisk,Av1CondContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo, upper, maxiter, tol, warn)

## S4 method for signature
## 'UnivariateDistribution,Distribution,asGRisk,Av2CondContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo, upper, maxiter, tol, warn)

## S4 method for signature
## 'UnivariateDistribution,
##   Distribution,
##   asGRisk,
##   Av1CondTotalVarNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo, upper, maxiter, tol, warn)

## S4 method for signature
## 'UnivariateDistribution,
##   MultivariateDistribution,
##   asBias,
##   ContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo, upper, maxiter, tol, warn)

## S4 method for signature
## 'UnivariateDistribution,
##   MultivariateDistribution,
##   asBias,
##   Av1CondContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo, upper, maxiter, tol, warn)
```

```
## S4 method for signature
## 'UnivariateDistribution,
##   MultivariateDistribution,
##   asBias,
##   Av1CondTotalVarNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo, upper, maxiter, tol, warn)

## S4 method for signature
## 'RealRandVariable,Distribution,asBias,ContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorSymm, RegSymm,
             ErrorDistr, ErrorL2derivSymm, ErrorL2derivDistrSymm, Finfo, trafo,
             upper, z.start, A.start, maxiter, tol, warn)

## S4 method for signature
## 'RealRandVariable,Distribution,asBias,Av1CondContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorSymm, RegSymm,
             ErrorDistr, ErrorL2derivSymm, ErrorL2derivDistrSymm, Finfo, trafo,
             upper, z.start, A.start, maxiter, tol, warn)

## S4 method for signature
## 'RealRandVariable,Distribution,asCov,ContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorDistr, Finfo, trafo)

## S4 method for signature
## 'RealRandVariable,Distribution,asCov,Av1CondContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorDistr, Finfo, trafo)

## S4 method for signature
## 'RealRandVariable,Distribution,asGRisk,ContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorSymm, RegSymm,
             ErrorDistr, ErrorL2derivSymm, ErrorL2derivDistrSymm, Finfo, trafo,
             upper, z.start, A.start, maxiter, tol, warn)

## S4 method for signature
## 'RealRandVariable,Distribution,asGRisk,Av1CondContNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorSymm, RegSymm,
             ErrorDistr, ErrorL2derivSymm, ErrorL2derivDistrSymm, Finfo, trafo,
             upper, z.start, A.start, maxiter, tol, warn)
```

```
## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   asUnOvShoot,
##   UncondNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo, upper, maxiter, tol, warn)

## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   asUnOvShoot,
##   CondNeighborhood'
getInfRobRegTypeIC(
             ErrorL2deriv, Regressor, risk, neighbor, ErrorL2derivDistrSymm,
             RegSymm, Finfo, trafo, upper, maxiter, tol, warn)
```

Arguments

ErrorL2deriv	L2-derivative of ErrorDistr.
Regressor	regressor.
risk	object of class "RiskType".
neighbor	object of class "Neighborhood".
...	additional parameters.
ErrorSymm	symmetry of ErrorDistr.
ErrorL2derivDistrSymm	symmetry of ErrorL2derivDistr.
RegSymm	symmetry of RegDistr.
ErrorDistr	error distribution.
ErrorL2derivSymm	symmetry of ErrorL2deriv.
Finfo	Fisher information matrix.
trafo	matrix: transformation of the parameter.
upper	upper bound for the optimal clipping bound.
maxiter	the maximum number of iterations
tol	the desired accuracy (convergence tolerance).
warn	logical: print warnings.
z.start	initial value for the centering constant/function.
A.start	initial value for the standardizing matrix.

Value

The optimally robust IC is computed.

Methods

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", risk = "asBias", neighbor = "Cont
computes the bias optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", risk = "asBias", neighbor = "Av1C
computes the bias optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", risk = "asBias", neighbor = "Av1C
computes the bias optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asBias", neighbor = "Av2CondContN
computes the bias optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asCov", neighbor = "ContNeighborh
computes the classical optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", risk = "asCov", neighbor = "Total
computes the classical optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asCov", neighbor = "CondContNeigh
computes the classical optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asCov", neighbor = "CondTotalVarN
computes the classical optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asCov", neighbor = "Av1CondContN
computes the classical optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asCov", neighbor = "Av2CondContN
computes the classical optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asCov", neighbor = "Av1CondTotalV
computes the classical optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asGRisk", neighbor = "ContNeighbo
computes the optimally robust influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asGRisk", neighbor = "Av1CondCon
computes the optimally robust influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asGRisk", neighbor = "Av2CondCon
computes the optimally robust influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", risk = "asGRisk", neighbor = "Av1CondTota
computes the optimally robust influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", risk = "asBias", neighbor = "Co
computes the bias optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", risk = "asBias", neighbor = "Av
computes the bias optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", risk = "asBias", neighbor = "Av
computes the bias optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "RealRandVariable", Regressor = "Distribution", risk = "asBias", neighbor = "ContNeighborhood"
computes the bias optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "RealRandVariable", Regressor = "Distribution", risk = "asCov", neighbor = "ContNeighborhood"
computes the classical optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "RealRandVariable", Regressor = "Distribution", risk = "asCov", neighbor = "Av1CondContNeigh
computes the classical optimal influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "RealRandVariable", Regressor = "Distribution", risk = "asGRisk", neighbor = "ContNeighborhoo
computes the optimally robust influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "RealRandVariable", Regressor = "Distribution", risk = "asGRisk", neighbor = "Av1CondContNei
computes the optimally robust influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", risk = "asUnOvShoot", neighbor =
computes the optimally robust influence curve for L2 differentiable regression-type families.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", risk = "asUnOvShoot", neighbor =
computes the optimally robust influence curve for L2 differentiable regression-type families.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1980) Estimates derived from robust tests. Ann. Stats. **8**: 106–115.

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

InfRobRegTypeModel-class

---

getInfStandRegTS *Generic Function for the Computation of the Standardizing Matrix*

Description

Generic function for the computation of the standardizing matrix which takes care of the Fisher consistency of the corresponding IC. This function is rarely called directly. It is used to compute optimally robust ICs.

Usage

```
getInfStandRegTS(ErrorL2deriv, Regressor, neighbor, ...)

## S4 method for signature
## 'UnivariateDistribution,UnivariateDistribution,ContNeighborhood'
getInfStandRegTS(
            ErrorL2deriv, Regressor, neighbor, z.comp, clip, cent, stand, trafo)

## S4 method for signature
## 'UnivariateDistribution,UnivariateDistribution,TotalVarNeighborhood'
```

```
getInfStandRegTS(
             ErrorL2deriv, Regressor, neighbor, clip, cent)

## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   CondTotalVarNeighborhood'
getInfStandRegTS(
             ErrorL2deriv, Regressor, neighbor, clip, cent)

## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   Av1CondContNeighborhood'
getInfStandRegTS(
            ErrorL2deriv, Regressor, neighbor, z.comp, clip, cent, stand, trafo)

## S4 method for signature
## 'UnivariateDistribution,
##   UnivariateDistribution,
##   Av1CondTotalVarNeighborhood'
getInfStandRegTS(
            ErrorL2deriv, Regressor, neighbor, z.comp, clip, cent, stand, trafo)

## S4 method for signature
## 'UnivariateDistribution,MultivariateDistribution,ContNeighborhood'
getInfStandRegTS(
            ErrorL2deriv, Regressor, neighbor, z.comp, clip, cent, stand, trafo)

## S4 method for signature
## 'UnivariateDistribution,
##   MultivariateDistribution,
##   Av1CondContNeighborhood'
getInfStandRegTS(
            ErrorL2deriv, Regressor, neighbor, z.comp, clip, cent, stand, trafo)

## S4 method for signature
## 'UnivariateDistribution,
##   MultivariateDistribution,
##   Av1CondTotalVarNeighborhood'
getInfStandRegTS(
            ErrorL2deriv, Regressor, neighbor, z.comp, clip, cent, stand, trafo)

## S4 method for signature
## 'UnivariateDistribution,Distribution,Av2CondContNeighborhood'
getInfStandRegTS(
            ErrorL2deriv, Regressor, neighbor, z.comp, clip, cent, stand, trafo)
```

```
## S4 method for signature 'RealRandVariable,Distribution,ContNeighborhood'
getInfStandRegTS(
            ErrorL2deriv, Regressor, neighbor, ErrorDistr, A.comp, stand, clip,
             cent, trafo)

## S4 method for signature
## 'RealRandVariable,Distribution,Av1CondContNeighborhood'
getInfStandRegTS(
            ErrorL2deriv, Regressor, neighbor, ErrorDistr, A.comp, stand, clip,
             cent, trafo)
```

Arguments

ErrorL2deriv	L2-derivative of ErrorDistr.
Regressor	regressor.
neighbor	object of class "Neighborhood".
...	additional parameters.
ErrorDistr	error distribution.
clip	optimal clipping bound/function.
cent	optimal centering constant/function.
stand	standardizing matrix.
z.comp	which components of the centering constant/function have to be computed.
A.comp	which components of the standardizing matrix have to be computed.
trafo	matrix: transformation of the parameter.

Value

The standardizing matrix is computed.

Methods

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor = "ContNeighborhood"
computes standardizing matrix.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor = "TotalVarNeighborhoo
computes standardizing constant.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor = "CondTotalVarNeighb
computes standardizing constant.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor = "Av1CondContNeighb
computes standardizing matrix.

ErrorL2deriv = "UnivariateDistribution", Regressor = "UnivariateDistribution", neighbor = "Av1CondTotalVarNei
computes standardizing matrix.

ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", neighbor = "ContNeighborhood
computes standardizing matrix.

ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", neighbor = "Av1CondContNeigh
computes standardizing matrix.

ErrorL2deriv = "UnivariateDistribution", Regressor = "MultivariateDistribution", neighbor = "Av1CondTotalVarN
computes standardizing matrix.

ErrorL2deriv = "UnivariateDistribution", Regressor = "Distribution", neighbor = "Av2CondContNeighborhood"
computes standardizing matrix.

ErrorL2deriv = "RealRandVariable", Regressor = "Distribution", neighbor = "ContNeighborhood"
computes standardizing matrix.

ErrorL2deriv = "RealRandVariable", Regressor = "Distribution", neighbor = "Av1CondContNeighborhood"
computes standardizing matrix.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1980) Estimates derived from robust tests. Ann. Stats. **8**: 106–115.

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

ContIC-class, TotalVarIC-class, Av1CondContIC-class, Av2CondContIC-class, Av1CondTotalVarIC-class, CondContIC, CondTotalVarIC

`InfRobRegTypeModel` *Generating function for InfRobRegTypeModel-class*

Description

Generates an object of class "InfRobRegTypeModel".

Usage

```
InfRobRegTypeModel(center = L2RegTypeFamily(), neighbor = ContNeighborhood())
```

Arguments

center	object of class "L2RegTypeFamily"
neighbor	object of class "Neighborhood"

Value

Object of class "InfRobRegTypeModel"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

InfRobRegTypeModel-class

Examples

```
InfRobRegTypeModel()

## The function is currently defined as
function(center = L2RegTypeFamily(), neighbor = ContNeighborhood()) {
    new("InfRobRegTypeModel", center = center, neighbor = neighbor)
}
```

InfRobRegTypeModel-class

Robust regression-type model with infinitesimal neighborhood

Description

Class of robust regression-type models with infinitesimal (conditional or 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("InfRobRegTypeModel", ...)`. More frequently they are created via the generating function `InfRobRegTypeModel`.

Slots

`center`: Object of class `"L2RegTypeFamily"`.

`neighbor`: Object of class `"Neighborhood"`.

Extends

Class `"RobModel"`, directly.

Methods

neighbor<- `signature(object = "InfRobRegTypeModel")`: replacement function for slot `neighbor`.

show `signature(object = "InfRobRegTypeModel")`

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

L2RegTypeFamily-class, Neighborhood-class, InfRobRegTypeModel

Examples

```
new("InfRobRegTypeModel")
```

`L2RegTypeFamily` *Generating function for L2RegTypeFamily-class*

Description

Generates an object of class "RegTypeFamily".

Usage

```
L2RegTypeFamily(name, distribution = LMCondDistribution(), distrSymm,
        main = 0, nuisance, trafo, param, props = character(0),
        L2deriv = EuclRandVarList(EuclRandVariable(
                  Map = list(function(x) {x[1] * x[2]}),
                  Domain = EuclideanSpace(dimension = 2),
                  dimension = 1)),
        ErrorDistr = Norm(), ErrorSymm, RegDistr = Norm(), RegSymm,
      Regressor = RealRandVariable(Map = list(function(x) {x}), Domain = Reals()),
      ErrorL2deriv = EuclRandVarList(RealRandVariable(Map = list(function(x) {x}),
                                                      Domain = Reals()))),
        ErrorL2derivSymm, ErrorL2derivDistr, ErrorL2derivDistrSymm, FisherInfo)
```

Arguments

name	name of the family
distribution	conditional distribution (given the regressor)
distrSymm	symmetry of distribution
ErrorDistr	error distribution
ErrorSymm	object of class "DistributionSymmetry": symmetry of ErrorDistr
main	main parameter
nuisance	optional nuisance parameter
trafo	matrix: optional transformation of the parameter
param	parameter of the family
props	properties of the family
RegDistr	regressor distribution
RegSymm	object of class "DistributionSymmetry": symmetry of RegDistr
Regressor	regressor
L2deriv	object of class "EuclRandVariable": L2 derivative
ErrorL2deriv	object of class "EuclRandVariable": L2 derivative of ErrorDistr
ErrorL2derivDistr	distribution of ErrorL2deriv
ErrorL2derivSymm	object of class "FunSymmList": symmetry of ErrorL2deriv
ErrorL2derivDistrSymm	object of class "DistrSymmList": symmetry of ErrorL2derivDistr
FisherInfo	Fisher information matrix

Details

If name is missing, the default "L2 differentiable regression type family" is used. If param is missing, the parameter is created via main, nuisance and trafo as described in ParamFamParameter. In case distrSymm, ErrorSymm, RegSymm is missing, they are set to NoSymmetry(). If FisherInfo is missing, it is computed via numerical integration.

Value

Object of class "L2RegTypeFamily"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

L2RegTypeFamily-class

Examples

```
L2RegTypeFamily()
```

L2RegTypeFamily-class *L2 differentiable parametric regression-type family*

Description

Class for L2 differentiable parametric regression-type families.

Objects from the Class

Objects can be created by calls of the form `new("L2RegTypeFamily", ...)`. More frequently they are created via the generating function `L2RegTypeFamily`.

Slots

`L2deriv`: Object of class `"EuclRandVarList"`: L2 derivative.

`ErrorL2deriv`: Object of class `"EuclRandVarList"`: L2 derivative of `ErrorDistr`.

`ErrorL2derivSymm`: Object of class `"FunSymmList"`: symmetry of `ErrorL2deriv`.

`ErrorL2derivDistr`: Object of class `"DistrList"`: distribution of `ErrorL2deriv`.

`ErrorL2derivDistrSymm`: Object of class `"DistrSymmList"`: symmetry of `ErrorL2derivDistr`.

`FisherInfo`: Object of class `"PosDefSymmMatrix"`: Fisher information.

`ErrorDistr`: Object of class `"Distribution"`: error distribution.

`ErrorSymm`: Object of class `"DistributionSymmetry"`: symmetry of `ErrorDistr`.

`RegDistr`: Object of class `"Distribution"`: regressor distribution.

`RegSymm`: Object of class `"DistributionSymmetry"`: symmetry of `RegDistr`.

`Regressor`: Object of class `"EuclRandVariable"`: regressor.

`param`: Object of class `"ParamFamParameter"`: parameter of the family.

`props`: Object of class `"character"`: properties of the family.

`name`: Object of class `"character"`: name of the family.

`distribution`: Object of class `"CondDistribution"`: conditional distribution given the regressor.

`distrSymm`: Object of class `"DistributionSymmetry"`: symmetry of `distribution`.

Extends

Class `"RegTypeFamily"`, directly.
Class `"ParamFamily"`, by class `"RegTypeFamily"`.
Class `"ProbFamily"`, by class `"RegTypeFamily"`.

Methods

L2deriv `signature(object = "L2RegTypeFamily")`: acessor function for slot `L2deriv`

FisherInfo `signature(object = "L2RegTypeFamily")`: acessor function for slot `FisherInfo`

ErrorL2deriv `signature(object = "L2RegTypeFamily")`: acessor function for slot `ErrorL2deriv`.

ErrorL2derivDistr `signature(object = "L2RegTypeFamily")`: acessor function for slot `ErrorL2derivDistr`.

ErrorL2derivSymm `signature(object = "L2RegTypeFamily")`: acessor function for slot `ErrorL2derivSymm`

ErrorL2derivDistrSymm `signature(object = "L2RegTypeFamily")`: acessor function for slot `ErrorL2derivDistrSymm`

checkL2deriv `signature(object = "L2RegTypeFamily")`: check centering of `L2deriv` and compute precision of Fisher information.

checkIC `signature(IC = "IC", L2Fam = "missing")`: check centering and Fisher consistency of `IC` assuming the L2-differentiable regression-type family which can be created via the slot `CallL2Fam` of `IC`.

checkIC `signature(IC = "IC", L2Fam = "L2RegTypeFamily")`: check centering and Fisher consistency of `IC` assuming the L2-differentiable regression-type family `L2Fam`.

E `signature(object = "L2RegTypeFamily", fun = "EuclRandVariable", cond = "missing")`: expectation of `fun` under `object`.

E `signature(object = "L2RegTypeFamily", fun = "EuclRandMatrix", cond = "missing")`: expectation of `fun` under `object`.

E `signature(object = "L2RegTypeFamily", fun = "EuclRandVarList", cond = "missing")`: expectation of `fun` under `object`.

show `signature(object = "L2RegTypeFamily")`

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

`RegTypeFamily-class`

Examples

```
new("L2RegTypeFamily")
```

leastFavorableRadius-methods

Methods for Function leastFavorableRadius in Package 'ROptRegTS'

Description

Methods for function `leastFavorableRadius` in package **ROptRegTS**.

Methods

L2Fam = "L2RegTypeFamily", neighbor = "Neighborhood", risk = "asGRisk" The least favorable radius and the corresponding inefficiency are computed.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

See Also

`leastFavorableRadius`

NormLinRegFamily *Generating function for linear regression family*

Description

Generates an object of class `"L2RegTypeFamily"` which represents a linear regression family with standard normal distributed errors and random regressor.

Usage

```
NormLinRegFamily(theta, trafo, RegDistr = Norm(),
                 RegSymm, Reg2Mom)
```

Arguments

`theta`	linear regression parameter
`trafo`	matrix: transformation of the parameter
`RegDistr`	regressor distribution
`RegSymm`	symmetry of the regressor distribution
`Reg2Mom`	second moment matrix of regressor

Details

In case `theta` is missing, it is set to 0. If `Reg2Mom` is missing, it is computed via `E`.

Value

Object of class "L2RegTypeFamily"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

L2RegTypeFamily-class

Examples

```
(LM1 <- NormLinRegFamily(Reg2Mom = matrix(1)))
Map(L2deriv(LM1)[[1]])
FisherInfo(LM1)
checkL2deriv(LM1)
```

NormLinRegInterceptFamily

Generating Function for Linear Regression Family with Unknown Intercept

---

Description

Generates an object of class "L2RegTypeFamily" which represents a linear regression family with standard normal distributed errors and random regressor where the intercept is unknown.

Usage

```
NormLinRegInterceptFamily(theta, intercept = 0, trafo, RegDistr = Norm(),
                          RegSymm, Reg2Mom, nuisance = FALSE)
```

Arguments

theta	linear regression parameter
intercept	intercept parameter
trafo	matrix: transformation of the parameter
RegDistr	regressor distribution
RegSymm	symmetry of the regressor distribution
Reg2Mom	second moment matrix of regressor
nuisance	logical: is intercept nuisance parameter

Details

In case `theta` is missing, it is set to 0. If `Reg2Mom` is missing, it is computed via `E`.

Value

Object of class `"L2RegTypeFamily"`

Author(s)

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

References

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

`L2RegTypeFamily-class`

Examples

```
(LM1 <- NormLinRegInterceptFamily(Reg2Mom = matrix(1)))
Map(L2deriv(LM1)[[1]])
FisherInfo(LM1)
checkL2deriv(LM1)
```

NormLinRegScaleFamily *Generating Function for Linear Regression Family with Unknown Scale*

Description

Generates an object of class `"L2RegTypeFamily"` which represents a linear regression family with standard normal distributed errors and random regressor where the scale of the error distribution is unknown.

Usage

```
NormLinRegScaleFamily(theta, scale = 1, trafo, RegDistr = Norm(),
                      RegSymm, Reg2Mom, nuisance = FALSE)
```

Arguments

theta	linear regression parameter
scale	scale parameter for error distribution
trafo	matrix: transformation of the parameter
RegDistr	regressor distribution
RegSymm	symmetry of the regressor distribution
Reg2Mom	second moment matrix of regressor
nuisance	logical: is scale nuisance parameter

Details

In case theta is missing, it is set to 0. If Reg2Mom is missing, it is computed via E.

Value

Object of class "L2RegTypeFamily"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

L2RegTypeFamily-class

Examples

```
(LM1 <- NormLinRegScaleFamily(Reg2Mom = matrix(1)))
Map(L2deriv(LM1)[[1]])
FisherInfo(LM1)
checkL2deriv(LM1)
```

optIC-methods *Methods for Function optIC in Package 'ROptRegTS'*

Description

Methods for function optIC in package **ROptRegTS**.

Usage

```
## S4 method for signature 'L2RegTypeFamily,asCov'
optIC(model, risk)

## S4 method for signature 'InfRobRegTypeModel,asRisk'
optIC(model, risk, z.start = NULL,
                A.start = NULL, upper = 1e4, maxiter = 50,
                tol = .Machine$double.eps^0.4, warn = TRUE)

## S4 method for signature 'InfRobRegTypeModel,asUnOvShoot'
optIC(model, risk, upper = 1e4,
                maxiter = 50, tol = .Machine$double.eps^0.4, warn = TRUE)

## S4 method for signature 'FixRobRegTypeModel,fiUnOvShoot'
optIC(model, risk, sampleSize,
                upper = 1e4, maxiter = 50, tol = .Machine$double.eps^0.4,
                warn = TRUE, Algo = "A", cont = "left")
```

Arguments

model	probability model.
risk	object of class "RiskType".
z.start	initial value for the centering constant.
A.start	initial value for the standardizing matrix.
upper	upper bound for the optimal clipping bound.
maxiter	the maximum number of iterations.
tol	the desired accuracy (convergence tolerance).
warn	logical: print warnings.
sampleSize	integer: sample size.
Algo	"A" or "B".
cont	"left" or "right".

Details

In case of the finite-sample risk "fiUnOvShoot" one can choose between two algorithms for the computation of this risk where the least favorable contamination is assumed to be "left" or "right" of some boundary curve. For more details we refer to Subsections 12.1.3 and 12.2.3 of Kohl (2005).

Value

Some optimally robust IC is computed.

Methods

model = "L2RegTypeFamily", risk = "asCov" computes classical optimal influence curve for L2 differentiable regression-type families.

model = "InfRobRegTypeModel", risk = "asRisk" computes optimally robust influence curve for robust regression-type models with infinitesimal neighborhoods and various asymptotic risks.

model = "InfRobRegTypeModel", risk = "asUnOvShoot" computes optimally robust influence curve for robust regression-type models with infinitesimal neighborhoods and asymptotic under-/overshoot risk.

model = "FixRobRegTypeModel", risk = "fiUnOvShoot" computes optimally robust influence curve for robust regression-type models with fixed neighborhoods and finite-sample under-/overshoot risk.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

References

Huber, P.J. (1968) Robust Confidence Limits. Z. Wahrscheinlichkeitstheor. Verw. Geb. **10**:269–278.

Rieder, H. (1980) Estimates derived from robust tests. Ann. Stats. **8**: 106–115.

Rieder, H. (1994) *Robust Asymptotic Statistics*. New York: Springer.

Kohl, M. (2005) *Numerical Contributions to the Asymptotic Theory of Robustness*. Bayreuth: Dissertation.

See Also

optIC

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radiusMinimaxIC-methods

Methods for Function radiusMinimaxIC in Package 'ROptRegTS'

Description

Methods for function radiusMinimaxIC in package **ROptRegTS**.

Methods

L2Fam = "L2RegTypeFamily", neighbor = "Neighborhood", risk = "asGRisk" computation of the radius minimax IC for an L2 differentiable regression-type family.

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

See Also

radiusMinimaxIC

RegTypeFamily *Generating function for RegTypeFamily-class*

Description

Generates an object of class "RegTypeFamily".

Usage

```
RegTypeFamily(name, distribution = LMCondDistribution(), distrSymm,
        ErrorDistr = Norm(), ErrorSymm, main = 0, nuisance, trafo,
        param, props = character(0), RegDistr = Norm(), RegSymm,
        Regressor = RealRandVariable(c(function(x) {x}), Domain = Reals()))
```

Arguments

name	name of the family
distribution	conditional distribution (given the regressor)
distrSymm	symmetry of distribution
ErrorDistr	error distribution
ErrorSymm	symmetry of ErrorDistr
main	main parameter
nuisance	optional nuisance parameter
trafo	matrix: optional transformation of the parameter
param	parameter of the family
props	properties of the family
RegDistr	regressor distribution
RegSymm	symmetry of RegDistr
Regressor	regressor

Details

If name is missing, the default "regression type family" is used. If param is missing, the parameter is created via main, nuisance and trafo as described in ParamFamParameter. In case distrSymm, ErrorSymm or RegSymm is missing, they are set to NoSymmetry().

Value

Object of class "RegTypeFamily"

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

See Also

ParamFamily-class

Examples

```
RegTypeFamily()
```

RegTypeFamily-class *Parametric regression-type family*

Description

Class for parametric regression-type families.

Objects from the Class

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

Slots

ErrorDistr: object of class "Distribution": error distribution.

ErrorSymm: object of class "DistributionSymmetry": symmetry of the error distribution.

RegDistr: object of class "Distribution": regressor distribution.

RegSymm: object of class "DistributionSymmetry": symmetry of the regressor distribution.

Regressor: object of class "EuclRandVariable": regressor.

param: object of class "ParamFamParameter": parameter of the family.

props: object of class "character": properties of the family.

name: object of class "character": name of the family.

distribution: object of class "CondDistribution": distribution given the regressor.

Extends

Class "ParamFamily", directly.
Class "ProbFamily", by class "ParamFamily".

Methods

ErrorDistr `signature(object = "RegTypeFamily")`: accessor function for slot `ErrorDistr`.

ErrorSymm `signature(object = "RegTypeFamily")`: accessor function for slot `ErrorSymm`.

RegDistr `signature(object = "RegTypeFamily")`: accessor function for slot `RegDistr`.

Regressor `signature(object = "RegTypeFamily")`: accessor function for slot `Regressor`.

RegSymm `signature(object = "RegTypeFamily")`: accessor function for slot `RegSymm`.

show `signature(object = "RegTypeFamily")`

Author(s)

Matthias Kohl <Matthias.Kohl@stamats.de>

See Also

ParamFamily-class

Examples

```
new("RegTypeFamily")
```

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