Package ‘rlcv’

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Title Robust Likelihood Cross Validation Bandwidth Selection

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License GPL (>= 3)

Encoding UTF-8

RoxygenNote 7.1.2

Imports statmod, stats

Suggests rmarkdown, knitr, copula

VignetteBuilder knitr

URL https://sites.google.com/tamu.edu/ximingwu/

NeedsCompilation no

Author Ximing Wu [aut, cre]

Maintainer Ximing Wu <xwu@tamu.edu>

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Description

Univariate kernel density

Usage

kde(x.obs, x.new = NULL, h)

Arguments

x.obs       Training (observed) data (n1 vector)
x.new       Evaluation data (n2 vector); default to x.obs
h           Bandwidth

Value

Density evaluated at x.new

Author(s)

Ximing Wu <xwu@tamu.edu>

References


Examples

x=rnorm(100)
x.new=seq(-5,5,length=50)
h=1.06*sd(x)*(length(x))^{(-1/5)}
f=kde(x.new=x.new,x.obs=x,h=h)
**kde_d**  

**Description**  
Multivariate kernel density

**Usage**  
kde_d(x.obs, x.new = NULL, h, stud = FALSE)

**Arguments**
- **x.obs**: Training (observed) data (n1 by d matrix, d>=2)
- **x.new**: Evaluation data (n2 by d matrix, d>=2); default to x.obs
- **h**: Bandwidth (d vector)
- **stud**: Indicator for whether data are studentized; default to FALSE

**Details**  
For multivariate distributions, bandwidth is calculated for studentized data.

**Value**  
Density evaluated at x.new

**Author(s)**
Ximing Wu <xwu@tamu.edu>

**References**

**Examples**
```r
x=matrix(rnorm(200),ncol=2)
x.new=matrix(rnorm(100),ncol=2)
h=c(1,1)
f=kde_d(x.new=x.new,x.obs=x,h=h)
```
lcv

Likelihood cross validation bandwidth for univariate densities

Description

Likelihood cross validation bandwidth for univariate densities

Usage

lcv(x.obs, x.new = NULL)

Arguments

  x.obs  Training (observed) data
  x.new  Evaluation data; default to x.obs

Value

  fhat: density evaluated at x.new; h: bandwidth

Author(s)

Ximing Wu <xwu@tamu.edu>

References


Examples

  x=r(t(200,df=5)
  x.new=seq(-5,5,length=100)
  fit=lcv(x.obs=x,x.new=x.new)
  # Mean squared errors
  f0=dt(x.new,df=5)
  mean((f0-fit$fhat)^2)

  matplot(x.new,cbind(f0,fit$fhat),type='l')
Description
Likelihood cross validation bandwidth for multivariate kernel densities

Usage
lcv_d(x.obs, x.new = NULL)

Arguments
x.obs Training (observed) data (n1 by d matrix, d>=2)
x.new Evaluation data (n2 by d matrix, d>=2); default to x.obs

Value
fhat: density evaluated at x.new; h: bandwidth

Author(s)
Ximing Wu <xwu@tamu.edu>

References

Examples
# old faithful data
x=datasets::faithful
x=cbind(x[,1],x[,2])
fit=lcv_d(x.obs=x)
# evaluation data
x1=seq(min(x[,1])*0.8,max(x[,1])*1.2,length=30)
x2=seq(min(x[,2])*0.8,max(x[,2])*1.2,length=30)
x11=rep(x1,each=30)
x22=rep(x2,30)
fhat=kde_d(x.new=cbind(x11,x22),x.obs=x,h=fit$h)
persp(x1,x2,matrix(fhat,30,30))
Description

Robust likelihood cross validation bandwidth for univariate densities

Usage

rlcv(x.obs, x.new = NULL)

Arguments

x.obs Training (observed) data
x.new Evaluation data; default to x.obs

Value

fhat: density evaluated at x.new; h: bandwidth

Author(s)

Ximing Wu <xwu@tamu.edu>

References


Examples

x = rt(200, df=5)
x.new = seq(-5, 5, length=100)
fit = rlcv(x.obs=x, x.new=x.new)
  # Mean squared errors
f0 = dt(x.new, df=5)
mean(((f0-fit$fhat)^2)
matplot(x.new, cbind(f0, fit$fhat), type='l')
Robust likelihood cross validation bandwidth for multivariate kernel densities

Description

Robust likelihood cross validation bandwidth for multivariate kernel densities

Usage

`rlcv_d(x.obs, x.new = NULL)`

Arguments

- `x.obs`: Training (observed) data (n1 by d matrix, d>=2)
- `x.new`: Evaluation data (n2 by d matrix, d>=2); default to x.obs

Value

- `fhat`: density evaluated at x.new; `h`: bandwidth

Author(s)

Ximing Wu <xwu@tamu.edu>

References


Examples

```r
data(x)  # old faithful data
x=cbind(x[,1],x[,2])
fit=rlcv_d(x.obs=x)
# evaluation data
x1=seq(min(x[,1])*0.8,max(x[,1])*1.2,length=30)
x2=seq(min(x[,2])*0.8,max(x[,2])*1.2,length=30)
x11=rep(x1,each=30)
x22=rep(x2,30)
fhat=kde_d(x.new=cbind(x11,x22),x.obs=x,h=fit$h)
persp(x1,x2,matrix(fhat,30,30))
```
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