Package 'WPKDE'

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Type Package

Title Weighted Piecewise Kernel Density Estimation

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Description Weighted Piecewise Kernel Density Estimation for large data.

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License GPL (>= 2)

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LinkingTo Rcpp

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Contents

findPeak *Find peaks using the estimated values*

Description

Find peaks using the estimated values

Usage

```
findPeak(k, filter, select)
```

Arguments

k	Output of the ‘kdeC‘ function, containing estimated values.
filter	A numeric value used to filter out results with estimated values less than the given ‘filter‘ argument.
select	A numeric value specifying the number of peaks to retain, selecting the K peaks with the largest estimated values.

Value

A three-column matrix (‘markMat‘) where: - Column 1: x-coordinates of the peaks - Column 2: y-coordinates of the peaks - Column 3: Corresponding estimated values of the peaks.

Examples

```
data(r)
k <- kdeC(r$dat, H = c(0.014, 0.014), gridsize = c(330, 330), cutNum = c(1, 1), w = r$z)
m <- findPeak(k, filter = 0, select = 100)
```

kdeC *Two-dimensional fast weighted kernel density estimation*

Description

Two-dimensional fast weighted kernel density estimation

Usage

```
kdeC(x, H, gridsize, cutNum, w)
```

Arguments

x	Data points in the format of an n x 2 matrix.
H	Bandwidth, a vector containing 2 numeric values.
gridsize	Number of points for each direction, a vector containing 2 integer values.
cutNum	Number of pieces to be cut for each direction, a vector containing 2 integer values.
w	Weight, a vector corresponding to parameter 'x'.

Value

A list containing three elements:

estimate	The estimated values of the kernel density.
evalpointsX	The evaluation points along the X direction.
evalpointsY	The evaluation points along the Y direction.

Examples

```
data(r)
k <- kdeC(r$dat, H = c(0.014, 0.014), gridsize = c(330, 330), cutNum = c(1, 1), w = r$z)
```

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plot_peak_2d *Plot of the 2D data points with peaks highlighted in green*

Description

Plot of the 2D data points with peaks highlighted in green

Usage

```
plot_peak_2d(dat, peaks, x.range = NA, y.range = NA)
```

Arguments

dat	Data points used for kernel density estimation.
peaks	A matrix of detected peaks with x- and y-coordinates.
x.range	(optional) A numeric 2D vector specifying the x-axis range for filtering.
y.range	(optional) A numeric 2D vector specifying the y-axis range for filtering.

Value

A scatter plot of the data points with the detected peaks highlighted in green.

Examples

```
data(r)
k <- kdeC(r$dat, H = c(0.014, 0.014), gridsize = c(330, 330), cutNum = c(1, 1), w = r$z)
m <- findPeak(k, filter = 0, select = 100)
plot_peak_2d(r$dat, m)
```

`plot_peak_3d` *Plot of the 3D data points with peaks highlighted in green*

Description

This function creates an interactive 3D scatter plot of data points and highlights the peaks that are within a specified tolerance distance from any data point.

Usage

```
plot_peak_3d(dat, peaks, x.range = NA, y.range = NA, tol = 1e-05)
```

Arguments

`dat`	A numeric matrix or data frame with at least three columns representing x, y, and z coordinates of data points.
`peaks`	A numeric matrix or data frame with at least two columns representing the x and y coordinates of peak candidates.
`x.range`	A numeric vector of length 2 specifying the x-axis range to include.
`y.range`	A numeric vector of length 2 specifying the y-axis range to include.
`tol`	A numeric value specifying the tolerance threshold: only peaks within this Euclidean distance from a data point are retained.

Examples

```
data(r)
k <- kdeC(r$dat, H = c(0.014, 0.014), gridsize = c(330, 330), cutNum = c(1, 1), w = r$z)
m <- findPeak(k, filter = 0, select = 100)
dat <- cbind(r$dat, r$z)
plot_peak_3d(dat, m)
```

r *Simulated 2D Weighted Data Set*

Description

This is a simulated dataset containing two-dimensional data points, their corresponding weights, and the true peaks' coordinates.

Usage

```
data(r)
```

Format

A list with 3 components:

dat A data.frame of size `100000 x 2`, representing data point coordinates.

m A numeric matrix of true peaks' coordinates.

z A numeric vector of length `100000`, representing weights for each data point.

Examples

```
data(r)
```

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