

# Package: WPKDE (via r-universe)

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**Type** Package

**Title** Weighted Piecewise Kernel Density Estimation

**Version** 1.0

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**Description** Weighted Piecewise Kernel Density Estimation for large data.

**Depends** R (>= 4.3.0), Rcpp, plotly, RANN

**License** GPL (>= 2)

**Encoding** UTF-8

**LazyData** true

**NeedsCompilation** yes

**RoxygenNote** 7.3.2

**LinkingTo** Rcpp

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**Config/pak/sysreqs** cmake make libicu-dev libuv1-dev libssl-dev

**Repository** <https://xiaotongliu2001.r-universe.dev>

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findPeak	<i>Find peaks using the estimated values</i>
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**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)
```

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kdeC	<i>Two-dimensional fast weighted kernel density estimation</i>
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**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*

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**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)
```

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plot\_peak\_3d

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


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**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)
```

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r

*Simulated 2D Weighted Data Set*

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### 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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