

# Package ‘overlapping’

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**Type** Package

**Title** Estimation of Overlapping in Empirical Distributions

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**Description** Functions for estimating the overlapping area of two or more kernel density estimations from empirical data.

**Depends** R (>= 3.0.0), ggplot2, testthat

**License** GPL-2

**NeedsCompilation** no

**Repository** CRAN

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cutnumeric	<i>Numerical conversion</i>
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## Description

It divides a numerical variable  $x$  in classes, and returns for each class the central value.

Internal function, generally not to be called by the user.

**Usage**

```
cutnumeric(x, n = 1000)
```

**Arguments**

x	numeric vector
n	number of classes

**Details**

It calls the cut function, and then converts factor classes in numeric classes, returning for each class its central value.

**Value**

It returns a numerical vector. The values are the central points of classes obtained by the function cut.

**Author(s)**

Massimiliano Pastore

**See Also**

[cut](#)

**Examples**

```
x <- rnorm(50)
cutnumeric(x,5)
```

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final.plot

*Final plot*

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**Description**

Graphical representation of estimated densities and overlapping area.

**Usage**

```
final.plot(x, OV = NULL)
```

**Arguments**

x	list of numerical vectors to be compared; each vector is an element of the list, see <a href="#">overlap</a>
OV	Optional vector of overlapping areas obtained by <a href="#">overlap</a>

**Details**

It requires the package `ggplot2`.

**Author(s)**

Massimiliano Pastore

**Examples**

```
set.seed(20150605)
x <- list(X1=rnorm(100),X2=rt(50,8),X3=rchisq(80,2))
out <- overlap(x)
final.plot(x,out$OV)
```

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overlap

*Overlapping estimation*

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**Description**

It gives the overlapped estimated area of two or more kernel density estimations from empirical data.

**Usage**

```
overlap(x, nbins = 1024, plot = FALSE,
        partial.plot = FALSE, boundaries = NULL, ... )
```

**Arguments**

<code>x</code>	list of numerical vectors to be compared; each vector is an element of the list
<code>nbins</code>	number of equally spaced points at which the overlapping density is evaluated; see <a href="#">density</a> for details
<code>plot</code>	logical, if TRUE, final plot of estimated densities and overlapped areas is produced
<code>partial.plot</code>	logical, if TRUE, partial paired distributions are plotted
<code>boundaries</code>	an optional list for bounded distributions, see <a href="#">Details</a>
<code>...</code>	optional arguments to be passed to function <a href="#">density</a>

**Details**

If the list `x` contains more than two elements (i.e. more than two distributions) it computes overlapping between all paired distributions. Partial plots refer to these paired distributions.

If `plot=TRUE`, all overlapped areas are plotted. It requires `ggplot2`.

The optional list `boundaries` must contain two elements: `from` and `to`, indicating the empirical limits of input variables. Each element must be of length equal to the input data list `x` or, at least, length one when all boundaries are equal for all distributions. See examples below.

**Value**

It returns a list containing the following components:

DD	Data frame with information used for computing overlapping, containing the following variables: x, coordinates of the points where the density is estimated; y1 and y2, densities; ovy, density for estimating overlapping area (i.e. $\min(y1, y2)$ ); ally, density for estimating whole area (i.e. $\max(y1, y2)$ ); dominance, indicates which distribution has the highest density; k, label indicating which distributions are compared.
OV	Estimates of overlapped areas relative to each pair of distributions.
xpoints	List of abscissas of intersection points among the density curves.

**Note**

Call function `final.plot`.

**Author(s)**

Massimiliano Pastore

**References**

Pastore, M. (2018). Overlapping: a R package for Estimating Overlapping in Empirical Distributions. The Journal of Open Source Software, 3 (32), 1023. URL: <https://doi.org/10.21105/joss.01023>

**Examples**

```
set.seed(20150605)
x <- list(X1=rnorm(100), X2=rt(50,8), X3=rchisq(80,2))
out <- overlap(x, plot=TRUE)
out$OV

# including boundaries
x <- list(X1=runif(100), X2=runif(100,.5,1))
boundaries <- list( from = c(0,.5), to = c(1,1) )
out <- overlap(x, plot=TRUE, boundaries=boundaries)
out$OV

# equal boundaries
x <- list(X1=runif(100), X2=runif(50), X3=runif(30))
boundaries <- list( from = 0, to = 1 )
out <- overlap(x, plot=TRUE, boundaries=boundaries)
out$OV

# changing kernel
out <- overlap(x, plot=TRUE, kernel="rectangular")
out$OV
```

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