

# Package ‘coRanking’

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**Title** Co-Ranking Matrix

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**Description** Calculates the co-ranking matrix to assess the quality of a dimensionality reduction.

**License** GPL-3

**Imports** methods, graphics, stats, Rtsne, scatterplot3d

**RoxygenNote** 5.0.1

**Collate** 'coranking-package.R' 'coranking.R' 'coranking\_internals.R' 'lcmc.R' 'criteria.R' 'image.R' 'rankmatrix.R' 'submatrix.R'

**Suggests** testthat, knitr, rmarkdown

**VignetteBuilder** knitr

**NeedsCompilation** yes

**Repository** CRAN

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coRanking-package      *Methods for the co-ranking matrix*

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### Description

coRanking provides methods for the calculation of the co-ranking matrix and derived measures to assess the quality of a dimensionality reduction

### Details

This package provides functions for calculating the co-ranking matrix, plotting functions and some derived measures for quality assessment of dimensionality reductions.

### References

Lee, J.A., Lee, J.A., Verleysen, M., 2009. Quality assessment of dimensionality reduction: Rank-based criteria. *Neurocomputing* 72.

Chen, L., Buja, A., 2006. Local Multidimensional Scaling for Nonlinear Dimension Reduction, Graph Layout and Proximity Analysis.

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coranking      *Co-Ranking Matrix*

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### Description

Calculate the co-ranking matrix to assess the quality of a dimensionality reduction.

### Usage

```
coranking(Xi, X, input = c("data", "dist", "rank"), use = "C")
```

### Arguments

Xi	high dimensional data
X	low dimensional data
input	type of input (see. details)
use	R or C backend

### Details

Calculate the coranking matrix, to assess the quality of a dimensionality reduction. Xi is input in high dimensions, X is input in low dimensions the type of input is given in input, if input = 'data' it will be transformed into a distance matrix with the dist function, if input == 'rank', Xi and X are expected to be rank matrices.

**Value**

a matrix of class 'coranking'

**Author(s)**

Guido Kraemer

**See Also**

[rankmatrix](#)

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imageplot

*Image function for the co-ranking matrix*

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**Description**

Plots the co-ranking matrix nicely

**Usage**

```
imageplot(Q, lwd = 2, bty = "n", main = "co-ranking matrix",  
          xlab = expression(R), ylab = expression(Ro),  
          col = colorRampPalette(colors = c("gray85", "red", "yellow", "green",  
          "blue"))(100), axes = FALSE, legend = TRUE, ...)
```

**Arguments**

Q	of class coranking.
lwd	linewidth in legend
bty	boxtype of legend
main	title of plot
xlab	label of the x axis
ylab	label of the y axis
col	a palette for coloring
axes	logical draw axes
legend	if T plot a legend.
...	parameters for the <a href="#">image</a> function.

**Details**

Plots the co-ranking matrix nicely for visual inspection. uses the `image` function internally, ... is passed down to the `image` function. The values in the co-ranking matrix are logscaled for better contrast.

**Author(s)**

Guido Kramer

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 LCMC

*The local continuity meta-criterion*


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**Description**

Calculate the local continuity meta-criterion from a co-ranking matrix.

**Usage**

```
LCMC(Q, K = 1:nrow(Q))
```

**Arguments**

Q                    a co-ranking matrix  
 K                    vector of integers describing neighborhood size

**Details**

The local continuity meta-criterion (Chen and Buja, 2006) is defined as

$$LCMC = \frac{K}{1-N} + \frac{1}{NK} \sum_{(k,l) \in UL_K} q_{kl}$$

Higher values mean a better performance of the dimensionality reduction.

**Value**

A number, the local continuity meta-criterion

**Author(s)**

Guido Kraemer

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 rankmatrix

*Rank matrix*


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**Description**

Replaces the elements of  $X$  with their rank in the column vector of the distance matrix

**Usage**

```
rankmatrix(X, input = c("data", "dist"), use = "C")
```

**Arguments**

<i>X</i>	data, dist object, or distance matrix
<i>input</i>	type of input
<i>use</i>	if 'C' uses the compiled library, else uses the native R code

**Details**

Each column vector in the distance matrix (or the distance matrix computed from the input) is replaced by a vector indicating the rank of the distance inside that vector.

This is a computation step necessary for the co-ranking matrix and provided mainly so that the user has the possibility to save computation time.

**Value**

returns a matrix of class 'rankmatrix'

**Author(s)**

Guido Kraemer

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