Package: clusterindices (via r-universe)

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Type Package

Title Cluster Validity Indices

Version 1.0

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Depends R (>= 4.0)

Imports factoextra, graphics, lowmemtkmeans, Rfast, Rfast2, stats

Description Numerous indices to choose the optimal number of clusters when performing k-means. Relevant papers include: Tsagris M. and Kontemeniotis N. (2025). Lobachevskii Journal of Mathematics <doi:10.1134/S1995080225613700>. Garcia-Escudero Luis A., Gordaliza Alfonso, Matran Carlos, Mayo-Iscar Agustin. (2008) <doi:10.1214/07-AOS515>.

License GPL (>= 2)

NeedsCompilation no

Repository https://cran.r-universe.dev

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Contents

`clusterindices-package` *Cluster Validity Indices*

Description

Numerous indices to choose the optimal number of clusters when performing k-means.

Details

Package:	clusterindices
Type:	Package
Version:	1.0
Date:	2026-06-05
License:	GPL-2

Maintainers

Michail Tsagris <mtsagris@uoc.gr>

Author(s)

Michail Tsagris <mtsagris@uoc.gr> and Nikolaos Kontemeniotis <kontemeniotisn@gmail.com>.

References

Tsagris M. and Kontemeniotis N. (2025). Simplicial clustering using the α–transformation. Lobachevskii Journal of Mathematics, 46: 6471–6482. https://arxiv.org/pdf/2509.05945.

Garcia-Escudero Luis A., Gordaliza Alfonso, Matran Carlos, Mayo-Iscar Agustin. (2008). A general trimming approach to robust cluster analysis. Annals of Statistics 36(3): 1324–1345.

`cikmeans` *The K–means algorithm with cluster indices computed*

Description

The K–means algorithm with cluster indices computed.

Usage

```
cikmeans(y, ncl = 10, trim = 0, max.iters = 50, nstart = 10, all = FALSE)
```

Arguments

y	A matrix with numerical data.
ncl	The maximum number of clusters to try. The minimum number of clusters is 2.
trim	A number in [0, 1). If trim = 0, then the classical K–means algorithm is performed. If you chose a number higher than 0 then the trimmed K–means of Garcia-Escudero et al. (2008) is performed.
max.iters	The maximum number of iterations allowed during the K–means algortihm.
nstart	How many random starts to perform?
all	If this is TRUE, then the clustering indices of each observation for each number of clusters will be returned.

Details

The K–means algorithm is performed and a series of cluster validity indices are computed.

Value

A list inclusing:

min_crit	A matrix with 9 columns and at least one row, where each column contains the value of a cluster validity index, whose minimal vlaue is preferred. Each row corresponds to a specific number of clusters, starting from 2 up to ncl.
best_min	The number of clusters selected based upon the minimal valued cluster validity indices.
max_crit	A matrix with 24 columns and at least one row, where each column contains the value of a cluster validity index, whose minimal vlaue is preferred. Each row corresponds to a specific number of clusters, starting from 2 up to ncl.
best_max	The number of clusters selected based upon the maximal valued cluster validity indices.
cluster	If the argument "all" is TRUE, then the clustering indices of each observation for each number of clusters will be returned in a matrix, where each column corresponds to the clustering of each number of clusters.

Author(s)

Michail Tsagris and Nikolaos Kontemeniotis.

R implementation and documentation: Michail Tsagris <mtsagris@uoc.gr> and Nikolaos Kontemeniotis <kontemeniotisn@gmail.com>.

References

Garcia-Escudero Luis A., Gordaliza Alfonso, Matran Carlos, Mayo-Iscar Agustin. (2008). A general trimming approach to robust cluster analysis. Annals of Statistics 36(3): 1324–1345.

See Also

clust.plot, index_min, index_max

Examples

```
y <- as.matrix(iris[, 1:4])
mod <- cikmeans(y, ncl = 5)
```

`clust.plot` *Visualization of the K–means algorithm results*

Description

Visualization of the K–means algorithm results.

Usage

```
clust.plot(y, mod)
```

Arguments

`y`	A matrix with the data.
`mod`	The output of the kmeans() function.

Details

The function performs PCA and plots the data onto the first two dimensions, constructs the convex hull of the groups and plots them with different colours.

Value

A plot.

Author(s)

Michail Tsagris and Nikolaos Kontemeniotis.

R implementation and documentation: Michail Tsagris <mtsagris@uoc.gr> and Nikolaos Kontemeniotis <kontemeniotisn@gmail.com>.

References

Tsagris M. and Kontemeniotis N. (2025). Simplicial clustering using the α–transformation. Lobachevskii Journal of Mathematics, 46: 6471–6482. https://arxiv.org/pdf/2509.05945.

Garcia-Escudero Luis A., Gordaliza Alfonso, Matran Carlos, Mayo-Iscar Agustin. (2008). A general trimming approach to robust cluster analysis. Annals of Statistics 36(3): 1324–1345.

See Also

`cikmeans`

Examples

```
y <- as.matrix(iris[, 1:4])
mod <- kmeans(y, 3)
clust.plot(y, mod)
```

`index_max` *Cluster indices (maximal valued) for the K–means algorithm*

Description

Cluster indices (maximal valued) for the K–means algorithm.

Usage

```
index_max(y, mod)
```

Arguments

`y`	A matrix with numerical data.
`mod`	An object with the result of the `kmeans` function.

Details

A series of cluster validity indices (maximal valued) are computed.

Value

A vector with 24 cluster validity indices.

Author(s)

Michail Tsagris.

R implementation and documentation: Michail Tsagris <mtsagris@uoc.gr>.

See Also

`index_min`, `cikmeans`

Examples

```
y <- as.matrix(iris[, 1:4])
mod <- kmeans(y, 3)
mod <- index_max(y, mod)
```

index_min *Cluster indices (minimial valued) for the K–means algorithm*

Description

Cluster indices (minimal valued) for the K–means algorithm.

Usage

```
index_min(y, mod)
```

Arguments

y	A matrix with numerical data.
mod	An object with the result of the kmeans function.

Details

A series of cluster validity indices (minimal valued) are computed.

Value

A vector with 9 cluster validity indices.

Author(s)

Michail Tsagris.

R implementation and documentation: Michail Tsagris <mtsagris@uoc.gr>.

See Also

index_max, cikmeans

Examples

```
y <- as.matrix(iris[, 1:4])
mod <- kmeans(y, 3)
mod <- index_min(y, mod)
```

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