

Package ‘clusterindices’

June 10, 2026

Type Package

Title Cluster Validity Indices

Version 1.0

Date 2026-06-05

Author Michail Tsagris [aut, cre],
Nikolaos Kontemeniotis [aut]

Maintainer Michail Tsagris <mtsagris@uoc.gr>

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 CRAN

Date/Publication 2026-06-10 07:40:08 UTC

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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

<code>y</code>	A matrix with numerical data.
<code>ncl</code>	The maximum number of clusters to try. The minimum number of clusters is 2.
<code>trim</code>	A number in [0, 1). If <code>trim = 0</code> , 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.
<code>max.iter</code>	The maximum number of iterations allowed during the K -means algorithm.
<code>nstart</code>	How many random starts to perform?
<code>all</code>	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 including:

<code>min_crit</code>	A matrix with 9 columns and at least one row, where each column contains the value of a cluster validity index, whose minimal value is preferred. Each row corresponds to a specific number of clusters, starting from 2 up to <code>ncl</code> .
<code>best_min</code>	The number of clusters selected based upon the minimal valued cluster validity indices.
<code>max_crit</code>	A matrix with 24 columns and at least one row, where each column contains the value of a cluster validity index, whose minimal value is preferred. Each row corresponds to a specific number of clusters, starting from 2 up to <code>ncl</code> .
<code>best_max</code>	The number of clusters selected based upon the maximal valued cluster validity indices.
<code>cluster</code>	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 <kontemeniotis@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

<code>y</code>	A matrix with the data.
<code>mod</code>	The output of the <code>kmeans()</code> 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 (minimal valued) for the K-means algorithm*

Description

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

Usage

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

Arguments

<code>y</code>	A matrix with numerical data.
<code>mod</code>	An object with the result of the <code>kmeans</code> 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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