

Package ‘DendSer’

May 7, 2026

Version 1.0.3

Date 2026-02-03

Title Dendrogram Seriation: Ordering for Visualisation

Description Re-arranges a dendrogram to optimize visualisation-based cost functions.

The methods implemented here are described in “Advances in Dendrogram Seriation for Application to Visualization”, Journal of Computational and Graphical Statistics (2015) D. Earle and C.B. Hurley <[doi:10.1080/10618600.2013.874295](https://doi.org/10.1080/10618600.2013.874295)>.

License GPL-2

Encoding UTF-8

RoxygenNote 7.3.3

Imports gclus, graphics, seriation, stats, utils

Suggests HSAUR2, Iyer517, RColorBrewer, mvtnorm, scagnostics, knitr, rmarkdown

VignetteBuilder knitr

NeedsCompilation yes

Author Catherine B. Hurley [aut],
Denise Earle [aut],
Catherine Hurley [cre]

Maintainer Catherine Hurley <catherine.hurley@mu.ie>

Repository CRAN

Date/Publication 2026-02-13 17:40:17 UTC

Contents

cost	2
crit2cost	3
DendSer	3
dser	5
plotAsColor	7

Index	9
--------------	----------

cost	<i>Cost functions for DendSer Each of these functions evaluates the cost of an ordering.</i>
------	--

Description

Cost functions for DendSer Each of these functions evaluates the cost of an ordering.

Usage

```
costLS(sw, o, target = seq_along(sw), ...)
```

```
costARc(sw, o, target = nrow(sw) - 1, ...)
```

```
costED(sw, o, node, se, ...)
```

```
costPL(sw, o, ...)
```

```
costLPL(sw, o, target = (nrow(sw) - 1):1, ...)
```

```
costBAR(sw, o, target = max(2, floor(nrow(sw)/5)), ...)
```

Arguments

sw	For cost=costLS, this is a vector of object weights. Otherwise is a symmetric matrix.
o	An ordering vector.
target	Parameter used by cost function.
...	Other args.
node	The node
se	Extra info

Value

Result of cost

Author(s)

Catherine Hurley & Denise Earle

crit2cost	<i>Cost function from seriation criterion</i>
-----------	---

Description

Returns a cost function from seriation criterion (package seriation)

Usage

```
crit2cost(crit)
```

Arguments

crit One of seriation::list_criterion_methods("dist")

Examples

```
d<- dist(iris[1:20,-5])
h <- hclust(d)
DendSer(h,d,cost=function(x,o,...) seriation::criterion(as.dist(x),o,method="AR_deviations"))
DendSer(h,d,cost=crit2cost("AR_deviations")) # short version of above
DendSer(h,d,cost=crit2cost("ME"))

# use DendSer methods via seriate
# seriation::get_order(seriate(d,method="Dendser", control=list(hclust=h,cost=costARc)))
DendSer(h,d, cost=costARc)
```

DendSer	<i>Implements dendrogram seriation</i>
---------	--

Description

Implements dendrogram seriation.

Usage

```
DendSer(
  h,
  ser_weight,
  cost = costBAR,
  node_op = NULL,
  costArg = NULL,
  maxloops = NULL,
  saveinfo = FALSE,
  direction = NULL,
  GW = NULL,
  ...
)
```

Arguments

h	An object of class hclust
ser_weight	Used by cost function to evaluate ordering. For cost=costLS, this is a vector of object weights. Otherwise is a dist or symmetric matrix.
cost	Function used to evaluate permutation. Current choices are costLS, costPL, costLPL, costED, costARc, costBAR.
node_op	Function used to reorder branches at a dendrogram node. DendSer picks default depending on cost function. NULL means use default depending on cost.
costArg	Other args for cost function.
maxloops	Maximum number of iterations allowed. NULL means use default depending on cost.
saveinfo	Logical, whether info associated with search is saved.
direction	Order of visiting nodes. Values are "up" or "down", for nodes in order of increasing or decreasing height. NULL means use default depending on cost.
GW	Logical, initial GW step or not. NULL means use default depending on cost.
...	Not used.

Details

costED uses the Gruvaeus and Wainer 1972 algorithm, as provided by package gclus.

Value

Numeric vector giving an optimal dendrogram order

Author(s)

Catherine Hurley & Denise Earle

References

Gruvaeus, G. & Wainer, H. (1972), "Two additions to hierarchical cluster analysis", *British Journal of Mathematical and Statistical Psychology*, 25, 200-206.

See Also

[dser](#)

Examples

```
d<- dist(iris[,-5])
h <- hclust(d,method="average")
ob<- DendSer(h,d)
opl<- DendSer(h,d,cost=costPL)
plotAsColor(d,ob)

w <- rowSums(iris[,-5])
ow <- DendSer(h,w,cost=costLS) # arranges cases by size, within hclust
stars(iris[ow,-5],labels=NULL, col.stars=cutree(h,3)[ow]) # and color by cluster
#stars(iris[ow,-5],labels=NULL, col.stars=iris[ow,5]) # or by species
```

dser

Implements dendrogram seriation. Interface to DendSer.

Description

Implements dendrogram seriation. Interface to DendSer.

Usage

```
dser(x, ser_weight, cost = costBAR, ...)

## S3 method for class 'data.frame'
dser(x, ser_weight, cost = costBAR, ...)

## S3 method for class 'matrix'
dser(x, ser_weight, cost = costBAR, scale = TRUE, dmethod = "euclidean", ...)

## S3 method for class 'dist'
dser(x, ser_weight, cost = costBAR, hmethod = "average", ...)

## S3 method for class 'hclust'
dser(x, ser_weight, cost = costBAR, ...)
```

Arguments

<code>x</code>	Used to select method.
<code>ser_weight</code>	Serialiation weights. For <code>cost=costLS</code> , defaults to first column of matrix <code>x</code> , otherwise to symmetric matrix version of <code>dist d</code> .
<code>cost</code>	Current choices are <code>costLS</code> , <code>costPL</code> , <code>costLPL</code> , <code>costED</code> , <code>costARc</code> , <code>costBAR</code> .
<code>...</code>	Other args
<code>scale</code>	Logical value, controls whether matrix <code>x</code> should be scaled prior to forming <code>dist</code> .
<code>dmethod</code>	Method of <code>dist</code> calculation. See function <code>dist</code> .
<code>hmethod</code>	Method of <code>hclust</code> calculation. See function <code>hclust</code> .

Details

When `x` is a matrix or `data.drame`, forms a `dist` of rows using function `dist` with `method = dmethod`.
 When `x` is a `dist`, forms a `hclust` with `method = hmethod` which is then reordered.

Value

Numeric vector giving an optimal dendrogram order

Methods (by class)

- `dser(data.frame)`: `dser` method
- `dser(matrix)`: `dser` method
- `dser(dist)`: `dser` method
- `dser(hclust)`: `dser` method

Author(s)

Catherine Hurley & Denise Earle

Examples

```

iriss <- scale(iris[,-5])
plotAsColor(iriss,order.row=dser(iriss))

w <- prcomp(iris[,-5],scale=TRUE)$x[,1]
h<- hclust(dist(iriss))
h$order <- ow <- dser(h,w,cost=costLS) # arranges cases along first PC, within dendrogram

# compare re-ordered dendrogram to PC scores, w
dev.new(width=10,height=5)
par(mar=c(0,2,1,1))
layout(matrix(1:2, nrow = 2), heights = c(4,1.5) )

```

```

par(cex=.7)
plot(h,main="",xlab="",hang=-1,labels=FALSE)
u <- par("usr")
par(mar=c(1,2,0,1))

plot.new()
par(usr=c(u[1:2],min(w),max(w)))

x<- 1:length(w)
rect(x-.5,0,x+.5,w[ow],col=cutree(h,3)[ow]+1)

```

plotAsColor

Function that plots a matrix as a color image

Description

Function that plots a matrix as a color image, in matrix order.

Usage

```

plotAsColor(
  m,
  order = NULL,
  order.col = order,
  order.row = order,
  rank = FALSE,
  border.color = "grey70",
  labels = FALSE,
  x = 1:ncol(d),
  y = 1:nrow(d),
  ...
)

```

Arguments

m	Numeric matrix.
order	Default order used for rows and columns.
order.col	Column order.
order.row	Row order
rank	Logical, whether matrix m should be converted to ranks or not.
border.color	Color of border. Null for no border.
labels	If TRUE, add labels obtained from m.
x	X coordinates, passed to image.
y	Y coordinates, passed to image.
...	passed to image.

See Also

See Also as [image](#).

Examples

```
d<- dist(scale(iris[,-5]))
plotAsColor(d,dser(d,hmethod="average"))
```

Index

cost, [2](#)
costARc (cost), [2](#)
costBAR (cost), [2](#)
costED (cost), [2](#)
costLPL (cost), [2](#)
costLS (cost), [2](#)
costPL (cost), [2](#)
crit2cost, [3](#)

DendSer, [3](#)
dser, [5](#), [5](#)

image, [8](#)

plotAsColor, [7](#)