Package 'Pursuit'

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Type Package

Title Projection Pursuit

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Imports graphics, grDevices, MASS, stats

Description Projection pursuit (PP) with 17 methods and grand tour with 3 methods. Being that projection pursuit searches for low-dimensional linear projections in high-dimensional data structures, while grand tour is a technique used to explore multivariate statistical data through animation.

License GPL-3

Encoding UTF-8

NeedsCompilation yes

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Index **16**

GrandTour *Animation technique Grand Tour.*

Description

Performs the exploration of the data through the technique of animation Grand Tour.

Usage

```
GrandTour(data, method = "Interpolation", title = NA, xlabel = NA,
          ylabel = NA, size = 1.1, grid = TRUE, color = TRUE, linlab = NA,
          class = NA, classcolor = NA, posleg = 2, boxleg = TRUE,
          axesvar = TRUE, axes = TRUE, numrot = 200, choicerot = NA,
          savptc = FALSE, width = 3236, height = 2000, res = 300)
```

Arguments

data	Numerical data set.
method	Method used for rotations: "Interpolation" - Interpolation method (default), "Torus" - Torus method, "Pseudo" - Pseudo Grand Tour method.
title	Titles of the graphics, if not set, assumes the default text.
xlabel	Names the X axis, if not set, assumes the default text.
ylabel	Names the Y axis, if not set, assumes the default text.
size	Size of the points in the graphs.
grid	Put grid on graphs (default = TRUE).
color	Colored graphics (default = TRUE).
linlab	Vector with the labels for the observations.
class	Vector with names of data classes.
classcolor	Vector with the colors of the classes.
posleg	0 with no caption, 1 for caption in the left upper corner, 2 for caption in the right upper corner (default), 3 for caption in the right lower corner, 4 for caption in the left lower corner.
boxleg	Puts the frame in the caption (default = TRUE).
axesvar	Puts axes of rotation of the variables (default = TRUE).
axes	Plots the X and Y axes (default = TRUE).
numrot	Number of rotations (default = 200). If method = "Interpolation", numrot represents the angle of rotation.

choicerot	Choose specific rotation and display on the screen, or save the image if savptc = TRUE.
savptc	Saves graphics images to files (default = FALSE).
width	Graphics images width when savptc = TRUE (defaul = 3236).
height	Graphics images height when savptc = TRUE (default = 2000).
res	Nominal resolution in ppi of the graphics images when savptc = TRUE (default = 300).

Value

Graphs with rotations.

proj.data	Projected data.
vector.opt	Vector projection.
method	method used on Grand Tour.

Author(s)

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References

ASIMOV, D. The Grand Tour: A Tool for Viewing Multidimensional data. *SIAM Journal of Scientific and Statistical Computing*, 6(1), 128-143, 1985.

ASIMOV, D.; BUJA, A. The grand tour via geodesic interpolation of 2-frames. in Visual data Exploration and Analysis. *Symposium on Electronic Imaging Science and Technology*, IS&T/SPIE. 1994.

BUJA, A. ; ASIMOV, D. Grand tour methods: An outline. *Computer Science and Statistics*, 17:63-67. 1986.

BUJA, A.; COOK, D.; ASIMOV, D.; HURLEY, C. Computational methods for High-Dimensional Rotations in data Visualization, in C. R. Rao, E. J. Wegman & J. L. Solka, eds, *"Handbook of Statistics: data Mining and Visualization"*, Elsevier/North Holland, http://www.elsevier.com, pp. 391-413. 2005.

HURLEY, C.; BUJA, A. Analyzing high-dimensional data with motion graphics, *SIAM Journal of Scientific and Statistical Computing*, 11 (6), 1193-1211. 1990.

MARTINEZ, W. L., MARTINEZ, A. R., SOLKA, J.; *Exploratory data Analysis with MATLAB*, 2th. ed. New York: Chapman & Hall/CRC, 2010. 499 p.

YOUNG, F. W.; RHEINGANS P. Visualizing structure in high-dimensional multivariate data, *IBM Journal of Research and Development*, 35:97-107, 1991.

YOUNG, F. W.; FALDOWSKI R. A.; McFARLANE M. M. *Multivariate statistical visualization, in Handbook of Statistics*, Vol 9, C. R. Rao (ed.), The Netherlands: Elsevier Science Publishers, 959-998, 1993.

Examples

```
data(iris) # database

res <- GrandTour(iris[,1:4], method = "Torus", title = NA, xlabel = NA, ylabel = NA,
                 color = TRUE, linlab = NA, class = NA, posleg = 2, boxleg = TRUE,
                 axesvar = TRUE, axes = FALSE, numrot = 10, choicerot = NA,
                 savptc = FALSE, width = 3236, height = 2000, res = 300)

print("Projected data:"); res$proj.data
print("Projection vectors:"); res$vector.opt
print("Grand Tour projection method:"); res$method


res <- GrandTour(iris[,1:4], method = "Interpolation", title = NA, xlabel = NA, ylabel = NA,
                 color = TRUE, linlab = NA, posleg = 2, boxleg = FALSE, axesvar = FALSE,
                 axes = FALSE, numrot = 10, choicerot = NA, class = iris[,5],
                 classcolor = c("goldenrod3","gray53","red"),savptc = FALSE,
                 width = 3236, height = 2000, res = 300)

print("Projected data:"); res$proj.data
print("Projection vectors:"); res$vector.opt
print("Grand Tour projection method:"); res$method
```

LocLab *Function for better position of the labels in the graphs.*

Description

Function for better position of the labels in the graphs.

Usage

```
LocLab(x, y = NULL, labels = seq(along = x), cex = 1,
       method = c("SANN", "GA"), allowSmallOverlap = FALSE,
       trace = FALSE, shadotext = FALSE,
       doPlot = TRUE, ...)
```

Arguments

x	Coordinate x
y	Coordinate y
labels	The labels
cex	cex
method	Not used
allowSmallOverlap	Boolean

trace	Boolean
shadotext	Boolean
doPlot	Boolean
...	Other arguments passed to or from other methods

Value

See the text of the function.

Plot.PP *Graphics of the Projection Pursuit (PP).*

Description

Graphics of the Projection Pursuit (PP).

Usage

```
Plot.PP(PP, titles = NA, xlabel = NA, ylabel = NA, posleg = 2, boxleg = TRUE,
        size = 1.1, grid = TRUE, color = TRUE, classcolor = NA, linlab = NA,
       axesvar = TRUE, axes = TRUE, savptc = FALSE, width = 3236, height = 2000,
        res = 300, casc = TRUE)
```

Arguments

PP	Data of the PP_Optimizer function.
titles	Titles of the graphics, if not set, assumes the default text.
xlabel	Names the X axis, if not set, assumes the default text.
ylabel	Names the Y axis, if not set, assumes the default text.
posleg	0 with no caption, 1 for caption in the left upper corner, 2 for caption in the right upper corner (default), 3 for caption in the right lower corner, 4 for caption in the left lower corner.
boxleg	Puts the frame in the caption (default = TRUE).
size	Size of the points in the graphs.
grid	Put grid on graphs (default = TRUE).
color	Colored graphics (default = TRUE).
classcolor	Vector with the colors of the classes.
linlab	Vector with the labels for the observations.
axesvar	Puts axes of rotation of the variables, only when dimproj > 1 (default = TRUE).
axes	Plots the X and Y axes (default = TRUE).

savptc	Saves graphics images to files (default = FALSE).
width	Graphics images width when savptc = TRUE (defaul = 3236).
height	Graphics images height when savptc = TRUE (default = 2000).
res	Nominal resolution in ppi of the graphics images when savptc = TRUE (default = 300).
casc	Cascade effect in the presentation of the graphics (default = TRUE).

Value

Graph of the evolution of the indices, and graphs whose data were reduced in two dimensions.

Author(s)

Paulo Cesar Ossani

Marcelo Angelo Cirillo

See Also

PP_Optimizer and PP_Index

Examples

```
data(iris) # dataset

# Example 1 - Without the classes in the data
data <- iris[,1:4]

findex <- "kurtosismax" # index function

dim <- 1 # dimension of data projection

sphere <- TRUE # spherical data

res <- PP_Optimizer(data = data, class = NA, findex = findex,
                    optmethod = "GTSA", dimproj = dim, sphere = sphere,
                    weight = TRUE, lambda = 0.1, r = 1, cooling = 0.9,
                    eps = 1e-3, maxiter = 500, half = 30)

Plot.PP(res, titles = NA, posleg = 1, boxleg = FALSE, color = TRUE,
        linlab = NA, axesvar = TRUE, axes = TRUE, savptc = FALSE,
        width = 3236, height = 2000, res = 300, casc = FALSE)


# Example 2 - With the classes in the data
class <- iris[,5] # data class

res <- PP_Optimizer(data = data, class = class, findex = findex,
                    optmethod = "GTSA", dimproj = dim, sphere = sphere,
                    weight = TRUE, lambda = 0.1, r = 1, cooling = 0.9,
                    eps = 1e-3, maxiter = 500, half = 30)
```

```
tit <- c(NA,"Graph example") # titles for the graphics

Plot.PP(res, titles = tit, posleg = 1, boxleg = FALSE, color = TRUE,
        classcolor = c("blue3","red","goldenrod3"), linlab = NA,
        axesvar = TRUE, axes = TRUE, savptc = FALSE, width = 3236,
        height = 2000, res = 300, casc = FALSE)


# Example 3 - Without the classes in the data, but informing
#             the classes in the plot function
res <- PP_Optimizer(data = data, class = NA, findex = "Moment",
                    optmethod = "GTSA", dimproj = 2, sphere = sphere,
                    weight = TRUE, lambda = 0.1, r = 1, cooling = 0.9,
                    eps = 1e-3, maxiter = 500, half = 30)

lin <- c(rep("a",50),rep("b",50),rep("c",50)) # data class

Plot.PP(res, titles = NA, posleg = 1, boxleg = FALSE, color = TRUE,
        linlab = lin, axesvar = TRUE, axes = TRUE, savptc = FALSE,
        width = 3236, height = 2000, res = 300, casc = FALSE)


# Example 4 - With the classes in the data, but not informed in plot function
class <- iris[,5] # data class

dim <- 2 # dimension of data projection

findex <- "lda" # index function

res <- PP_Optimizer(data = data, class = class, findex = findex,
                    optmethod = "GTSA", dimproj = dim, sphere = sphere,
                    weight = TRUE, lambda = 0.1, r = 1, cooling = 0.9,
                    eps = 1e-3, maxiter = 500, half = 30)

tit <- c("",NA) # titles for the graphics

Plot.PP(res, titles = tit, posleg = 1, boxleg = FALSE, color = TRUE,
        linlab = NA, axesvar = TRUE, axes = TRUE, savptc = FALSE,
        width = 3236, height = 2000, res = 300, casc = FALSE)
```

PP_Index *Function to find the Projection Pursuit indexes (PP).*

Description

Function used to find Projection Pursuit indexes (PP).

Usage

```
PP_Index(data, class = NA, vector.proj = NA,
         findex = "HOLES", dimproj = 2, weight = TRUE,
         lambda = 0.1, r = 1, ck = NA)
```

Arguments

data	Numeric dataset without class information.
class	Vector with names of data classes.
vector.proj	Vector projection.
findex	Projection index function to be used: "lda" - LDA index, "pda" - PDA index, "lr" - Lr index, "holes" - Holes index (default), "cm" - Central Mass index, "pca" - PCA index, "friedmantukey" - Friedman Tukey index, "entropy" - Entropy index, "legendre" - Legendre index, "laguerrefourier" - Laguerre Fourier index, "hermite" - Hermite index, "naturalhermite" - Natural Hermite index, "kurtosismax" - Maximum kurtosis index, "kurtosismin" - Minimum kurtosis index, "moment" - Moment index, "mf" - MF index, "chi" - Chi-square index.
dimproj	Dimension of data projection (default = 2).
weight	Used in index LDA, PDA and Lr to weight the calculations for the number of elements in each class (default = TRUE).
lambda	Used in the PDA index (default = 0.1).
r	Used in the Lr index (default = 1).
ck	Internal use of the CHI index function.

Value

num.class	Number of classes.
class.names	Class names.
findex	Projection index function used.
vector.proj	Projection vectors found.
index	Projection index found in the process.

Author(s)

Paulo Cesar Ossani

Marcelo Angelo Cirillo

References

OSSANI, P. C.; FIGUEIRA, M. R.; CIRILLO, M. A. Proposition of a new index for projection pursuit in the multiple factor analysis. *Computational and Mathematical Methods*, v. 1, p. 1-18, 2020.

COOK, D., BUJA, A., CABRERA, J.. Projection pursuit indexes based on orthonormal function expansions. *Journal of Computational and Graphical Statistics*, 2(3):225-250, 1993.

COOK, D., BUJA, A., CABRERA, J., HURLEY, C.. Grand tour and projection pursuit, *Journal of Computational and Graphical Statistics*, 4(3), 155-172, 1995.

COOK, D., SWAYNE, D. F.. Interactive and Dynamic Graphics for data Analysis: With R and GGobi. Springer. 2007.

ESPEZUA, S., VILLANUEVA, E., MACIEL, C.D., CARVALHO, A.. A projection pursuit framework for supervised dimension reduction of high dimensional small sample datasets. *Neurocomputing*, 149, 767-776, 2015.

FRIEDMAN, J. H., TUKEY, J. W. A projection pursuit algorithm for exploratory data analysis. *IEEE Transaction on Computers*, 23(9):881-890, 1974.

HASTIE, T., BUJA, A., TIBSHIRANI, R.: Penalized discriminant analysis. *The Annals of Statistics*. 23(1), 73-102 . 1995.

HUBER, P. J.. Projection pursuit. *Annals of Statistics*, 13(2):435-475, 1985.

JONES, M. C., SIBSON, R.. What is projection pursuit, (with discussion), *Journal of the Royal Statistical Society*, Series A 150, 1-36, 1987.

LEE, E. K., COOK, D.. A projection pursuit index for large p small n data. *Statistics and Computing*, 20(3):381-392, 2010.

LEE, E., COOK, D., KLINKE, S., LUMLEY, T.. Projection pursuit for exploratory supervised classification. *Journal of Computational and Graphical Statistics*, 14(4):831-846, 2005.

MARTINEZ, W. L., MARTINEZ, A. R.; *Computational Statistics Handbook with MATLAB*, 2th. ed. New York: Chapman & Hall/CRC, 2007. 794 p.

MARTINEZ, W. L., MARTINEZ, A. R., SOLKA, J.; *Exploratory data Analysis with MATLAB*, 2th. ed. New York: Chapman & Hall/CRC, 2010. 499 p.

PENA, D., PRIETO, F.. Cluster identification using projections. *Journal of the American Statistical Association*, 96(456):1433-1445, 2001.

POSSE, C.. Projection pursuit exploratory data analysis, *Computational Statistics and data Analysis*, 29:669-687, 1995a.

POSSE, C.. Tools for two-dimensional exploratory projection pursuit, *Journal of Computational and Graphical Statistics*, 4:83-100, 1995b.

See Also

`PP_Optimizer` and `Plot.PP`

Examples

```
data(iris) # data set

data <- iris[,1:4]

# Example 1 - Without the classes in the data
ind <- PP_Index(data = data, class = NA, vector.proj = NA,
                findex = "moment", dimproj = 2, weight = TRUE,
                lambda = 0.1, r = 1)

print("Number of classes:"); ind$num.class
print("class Names:"); ind$class.names
print("Projection index function:"); ind$findex
print("Projection vectors:"); ind$vector.proj
print("Projection index:"); ind$index


# Example 2 - With the classes in the data
class <- iris[,5] # data class

findex <- "pda" # index function

sphere <- TRUE # spherical data

res <- PP_Optimizer(data = data, class = class, findex = findex,
                    optmethod = "SA", dimproj = 2, sphere = sphere,
                    weight = TRUE, lambda = 0.1, r = 1, cooling = 0.9,
                    eps = 1e-3, maxiter = 1000, half = 30)

# Comparing the result obtained
if (match(toupper(findex),c("LDA", "PDA", "LR"), nomatch = 0) > 0) {
  if (sphere) {
     data <- apply(predict(prcomp(data)), 2, scale) # spherical data
  }
} else data <- as.matrix(res$proj.data[,1:Dim])

ind <- PP_Index(data = data, class = class, vector.proj = res$vector.opt,
                findex = findex, dimproj = 2, weight = TRUE, lambda = 0.1,
                r = 1)

print("Number of classes:"); ind$num.class
print("class Names:"); ind$class.names
print("Projection index function:"); ind$findex
print("Projection vectors:"); ind$vector.proj
print("Projection index:"); ind$index
print("Optimized Projection index:"); res$index[length(res$index)]
```

`PP_Optimizer` *Optimization function of the Projection Pursuit index (PP).*

Description

Optimization function of the Projection Pursuit index (PP).

Usage

```
PP_Optimizer(data, class = NA, findex = "HOLES",
             dimproj = 2, sphere = TRUE, optmethod = "GTSA",
             weight = TRUE, lambda = 0.1, r = 1, cooling = 0.9,
             eps = 1e-3, maxiter = 3000, half = 30)
```

Arguments

data	Numeric dataset without class information.
class	Vector with names of data classes.
findex	Projection index function to be used: "lda" - LDA index, "pda" - PDA index, "lr" - Lr index, "holes" - Holes index (default), "cm" - Central Mass index, "pca" - PCA index, "friedmantukey" - Friedman Tukey index, "entropy" - Entropy index, "legendre" - Legendre index, "laguerrefourier" - Laguerre Fourier index, "hermite" - Hermite index, "naturalhermite" - Natural Hermite index, "kurtosismax" - Maximum kurtosis index, "kurtosismin" - Minimum kurtosis index, "moment" - Moment index, "mf" - MF index, "chi" - Chi-square index.
dimproj	Dimension of the data projection (default = 2).
sphere	Spherical data (default = TRUE).
optmethod	Optimization method GTSA - Grand Tour Simulated Annealing or SA - Simulated Annealing (default = "GTSA").
weight	Used in index LDA, PDA and Lr to weight the calculations for the number of elements in each class (default = TRUE).
lambda	Used in the PDA index (default = 0.1).
r	Used in the Lr index (default = 1).
cooling	Cooling rate (default = 0.9).
eps	Approximation accuracy for cooling (default = 1e-3).
maxiter	Maximum number of iterations of the algorithm (default = 3000).
half	Number of steps without incrementing the index, then decreasing the cooling value (default = 30).

Value

num.class	Number of classes.
class.names	Class names.
proj.data	Projected data.
vector.opt	Projection vectors found.
index	Vector with the projection indices found in the process, converging to the maximum, or the minimum.
findex	Projection index function used.

Author(s)

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References

COOK, D., LEE, E. K., BUJA, A., WICKHAM, H.. Grand tours, projection pursuit guided tours and manual controls. In Chen, Chunhouh, Hardle, Wolfgang, Unwin, e Antony (Eds.), *Handbook of data Visualization*, Springer Handbooks of Computational Statistics, chapter III.2, p. 295-314. Springer, 2008.

LEE, E., COOK, D., KLINKE, S., LUMLEY, T.. Projection pursuit for exploratory supervised classification. *Journal of Computational and Graphical Statistics*, 14(4):831-846, 2005.

See Also

Plot.PP and PP_Index

Examples

```
data(iris) # data set

# Example 1 - Without the classes in the data
data <- iris[,1:4]

class <- NA # data class

findex <- "kurtosismax" # index function

dim <- 1 # dimension of data projection

sphere <- TRUE # spherical data

res <- PP_Optimizer(data = data, class = class, findex = findex,
                    optmethod = "GTSA", dimproj = dim, sphere = sphere,
                    weight = TRUE, lambda = 0.1, r = 1, cooling = 0.9,
                    eps = 1e-3, maxiter = 1000, half = 30)

print("Number of classes:"); res$num.class
```

```
print("class Names:"); res$class.names
print("Projection index function:"); res$findex
print("Projected data:"); res$proj.data
print("Projection vectors:"); res$vector.opt
print("Projection index:"); res$index


# Example 2 - With the classes in the data
class <- iris[,5] # classe dos dados

res <- PP_Optimizer(data = data, class = class, findex = findex,
                    optmethod = "GTSA", dimproj = dim, sphere = sphere,
                    weight = TRUE, lambda = 0.1, r = 1, cooling = 0.9,
                    eps = 1e-3, maxiter = 1000, half = 30)

print("Number of classes:"); res$num.class
print("class Names:"); res$class.names
print("Projection index function:"); res$findex
print("Projected data:"); res$proj.data
print("Projection vectors:"); res$vector.opt
print("Projection index:"); res$index
```

`Pursuit` *Projection Pursuit*

Description

Projection pursuit (PP) with 17 methods and grand tour with 3 methods. Being that projection pursuit searches for low-dimensional linear projections in high-dimensional data structures, while grand tour is a technique used to explore multivariate statistical data through animation.

Details

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References

ASIMOV, D. The Grand Tour: A Tool for Viewing Multidimensional Data. *SIAM Journal of Scientific and Statistical Computing*, 6(1), 128-143, 1985.

ASIMOV, D.; BUJA, A. The grand tour via geodesic interpolation of 2-frames. in Visual Data Exploration and Analysis. *Symposium on Electronic Imaging Science and Technology*, IS&T/SPIE. 1994.

BUJA, A.; ASIMOV, D. Grand tour methods: An outline. *Computer Science and Statistics*, 17:63-67. 1986.

BUJA, A.; COOK, D.; ASIMOV, D.; HURLEY, C. Computational Methods for High-Dimensional Rotations in Data Visualization, in C. R. Rao, E. J. Wegman & J. L. Solka, eds, *"Handbook of Statistics: Data Mining and Visualization"*, Elsevier/North Holland, http://www.elsevier.com, pp. 391-413. 2005.

COOK, D., LEE, E. K., BUJA, A., WICKHAM, H.. Grand tours, projection pursuit guided tours and manual controls. In Chen, Chunhouh, Hardle, Wolfgang, Unwin, e Antony (Eds.), *Handbook of Data Visualization*, Springer Handbooks of Computational Statistics, chapter III.2, p. 295-314. Springer, 2008.

COOK, D., BUJA, A., CABRERA, J.. Projection pursuit indexes based on orthonormal function expansions. *Journal of Computational and Graphical Statistics*, 2(3):225-250, 1993.

COOK, D., BUJA, A., CABRERA, J., HURLEY, C.. Grand tour and projection pursuit, *Journal of Computational and Graphical Statistics*, 4(3), 155-172, 1995.

COOK, D., SWAYNE, D. F.. Interactive and Dynamic Graphics for Data Analysis: With R and GGobi. Springer. 2007.

ESPEZUA, S., VILLANUEVA, E., MACIEL, C.D., CARVALHO, A.. A projection pursuit framework for supervised dimension reduction of high dimensional small sample datasets. *Neurocomputing*, 149, 767-776, 2015.

FRIEDMAN, J. H., TUKEY, J. W. A projection pursuit algorithm for exploratory data analysis. *IEEE Transaction on Computers*, 23(9):881-890, 1974.

HASTIE, T., BUJA, A., TIBSHIRANI, R.: Penalized discriminant analysis. *The Annals of Statistics*. 23(1), 73-102 . 1995.

HUBER, P. J.. Projection pursuit. *Annals of Statistics*, 13(2):435-475, 1985.

HURLEY, C.; BUJA, A. Analyzing high-dimensional data with motion graphics, *SIAM Journal of Scientific and Statistical Computing*, 11 (6), 1193-1211. 1990.

JONES, M. C., SIBSON, R.. What is projection pursuit, (with discussion), *Journal of the Royal Statistical Society*, Series A 150, 1-36, 1987.

LEE, E., COOK, D., KLINKE, S., LUMLEY, T.. Projection pursuit for exploratory supervised classification. *Journal of Computational and Graphical Statistics*, 14(4):831-846, 2005.

LEE, E. K., COOK, D.. A projection pursuit index for large p small n data. *Statistics and Computing*, 20(3):381-392, 2010.

MARTINEZ, W. L., MARTINEZ, A. R.; *Computational Statistics Handbook with MATLAB*, 2th. ed. New York: Chapman & Hall/CRC, 2007. 794 p.

MARTINEZ, W. L., MARTINEZ, A. R., SOLKA, J.; *Exploratory Data Analysis with MATLAB*, 2th. ed. New York: Chapman & Hall/CRC, 2010. 499 p.

PENA, D., PRIETO, F.. Cluster identification using projections. *Journal of the American Statistical Association*, 96(456):1433-1445, 2001.

POSSE, C.. Projection pursuit exploratory data analysis, *Computational Statistics and Data Analysis*, 29:669-687, 1995a.

POSSE, C.. Tools for two-dimensional exploratory projection pursuit, *Journal of Computational and Graphical Statistics*, 4:83-100, 1995b

YOUNG, F. W.; RHEINGANS P. Visualizing structure in high-dimensional multivariate data, *IBM Journal of Research and Development*, 35:97-107, 1991.

YOUNG, F. W.; FALDOWSKI R. A.; McFARLANE M. M. *Multivariate statistical visualization, in Handbook of Statistics*, Vol 9, C. R. Rao (ed.), The Netherlands: Elsevier Science Publishers, 959-998, 1993.

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