

Package ‘wideRhino’

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Title High-Dimensional Methods via Generalised Singular Decomposition

Version 1.3.0

Description Construct a Canonical Variate Analysis Biplot via the Generalised Singular Value Decomposition, for cases when the number of samples is less than the number of variables. For more information on these biplots, see Ganey, R., & Gardner-Lubbe, S. (2026) <[doi:10.1007/s10260-025-00831-y](https://doi.org/10.1007/s10260-025-00831-y)>.

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Encoding UTF-8

RoxygenNote 7.3.2

Depends R (>= 4.1.0)

Imports Matrix, MASS, ggplot2, dplyr

Suggests knitr, rmarkdown, testthat

Config/Needs/website rmarkdown

NeedsCompilation no

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Contents

.calibrate.axis	2
axes_coordinates	3
CVAbiplot	3
CVAgsvd	4
get.GSVD	4
sim_data	5

Index	6
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.calibrate.axis	<i>Calibrate axis</i>
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Description

Calibrate axis

Usage

```
.calibrate.axis(  
  j,  
  Xhat,  
  means,  
  sd,  
  axes.rows,  
  ax.which,  
  ax.tickvec,  
  ax.orthogxvec,  
  ax.orthogyvec  
)
```

Arguments

j	j
Xhat	Xhat
means	means
sd	sd
axes.rows	axes.rows
ax.which	ax.which
ax.tickvec	ax.tickvec
ax.orthogxvec	ax.orthogxvec
ax.orthogyvec	ax.orthogyvec

Value

Calibrated axes

axes_coordinates	<i>Provide axes coordinates</i>
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Description

Provide axes coordinates

Usage

```
axes_coordinates(bp, which.var = 1:bp$p)
```

Arguments

bp	Object
which.var	which variable(s) to find coordinates

Value

Axes coordinates

CVAbiplot	<i>Plot the CVA biplot</i>
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Description

Plot the CVA biplot

Usage

```
CVAbiplot(x, which.var = 1:x$p, var.label = TRUE, group.col = NULL)
```

Arguments

x	Object from CVAgsvd
which.var	which variable to display on the biplot
var.label	whether to display label for variable name
group.col	vector of colours for the groups in the data

Value

A CVA biplot based on the GSVD

Examples

```
data(sim_data)
CVAgsvd(X=sim_data[,2:301],group = sim_data[,1])|>
CVAbiplot(group.col=c("tan1","darkcyan","darkslateblue"),which.var = 1:10)
```

CVAgsvd

CVA using the GSVD

Description

Compute canonical variate analysis using the generalised singular value decomposition when number of variables (p) is larger than the number of samples (n).

Usage

```
CVAgsvd(X, group, tol = 1e-08)
```

Arguments

<code>X</code>	$n \times p$ data matrix
<code>group</code>	vector of size n showing the groups
<code>tol</code>	relative tolerance used when inverting the within-group covariance matrix W : eigenvalues of W below $\text{tol} * \max(\text{eigenvalues})$ are treated as numerically zero and excluded from the inverse square root, restricting it to the well-conditioned subspace of W .

Details

If $p < n$, then the solution defaults to the standard canonical variate analysis.

Value

An object with components of a CVA biplot

Examples

```
CVAgsvd(X=iris[,1:4],group = iris[,5]) |>
CVAbiplot(group.col = c("orange","red","pink"))
```

get.GSVD

Get GSVD Get the components of the GSVD decomposition

Description

Get GSVD Get the components of the GSVD decomposition

Usage

```
get.GSVD(A, B)
```

Arguments

- A Matrix A
- B Matrix B

Value

Returns components from the GSVD decomposition

sim_data	<i>Simulated Data</i>
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Description

- Class** Group variable: 0, 1, 2
- X1** Variable 1 ...
- X300** Variable 300

Format

A data set with 100 rows and 301 columns

Source

simulated data

Index

* **datasets**

- sim_data, [5](#)
- .calibrate.axis, [2](#)
- axes_coordinates, [3](#)
- CVAbiplot, [3](#)
- CVAgsvd, [4](#)
- get.GSVD, [4](#)
- sim_data, [5](#)