# Package 'wideRhino'

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**Title** High-Dimensional Methods via Generalised Singular Decomposition

**Version** 1.0.2

**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 biplots, see Gower JC, Lubbe SG, Le Roux NJ (2011) <doi:10.1002/9780470973196> and for more information on the generalised singular value decomposition, see Edelman A, Wang Y (2020) <doi:10.1137/18M1234412>.

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**Encoding** UTF-8

**RoxygenNote** 7.3.2

**Depends** R (>= 4.1.0)

**Imports** geigen, Matrix, MASS, ggplot2, dplyr

**Suggests** knitr, rmarkdown, testthat

**Config/Needs/website** rmarkdown

**NeedsCompilation** no

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**Repository** CRAN

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## Contents

`.calibrate.axis` *Calibrate axis*

## 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.orothogyvec |

## Value

Calibrated axes

## axes_coordinates *Provide axes coordinates*

### 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 *Plot the CVA biplot*

### Description

Plot the CVA biplot

### Usage

```
CVAbiplot(
  x,
  which.var = 1:x$p,
  var.label = FALSE,
  group.col = NULL,
  zoom.out = 50
)
```

### Arguments

| | |
|---|---|
| x | Object from CVA |
| 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 |
| zoom.out | percentage to zoom out of the plot |

## 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,zoom.out=80)
```

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`CVAgsvd` *CVA Biplot using the GSVD*

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## Description

Create a CVA biplot using the generalised singular value decomposition when number of variables (p) is larger than the number of samples (n).

## Usage

```
CVAgsvd(X, group)
```

## Arguments

| | |
|---|---|
| `X` | n x p data matrix |
| `group` | vector of size n showing the groups |

## Details

If p < n, then the solution defaults to the standard CVA biplot.

## 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` *Simulated Data*

## 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

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