Package 'moveEZ'

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Title Animated Biplots

Version 1.0.3

Description Create animated biplots that enables dynamic visualisation of temporal or sequential changes in multivariate data by animating a single biplot across the levels of a time variable. It builds on objects from the 'biplotEZ' package, Lubbe S, le Roux N, Nienkemper-Swanepoel J, Ganey R, Buys R, Adams Z, Manefeldt P (2024) <doi:10.32614/CRAN.package.biplotEZ>, allowing users to create animated biplots that reveal how both samples and variables evolve over time.

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Encoding UTF-8

RoxygenNote 7.3.2

VignetteBuilder knitr

Depends R (>= 4.1.0)

Imports dplyr, biplotEZ, gganimate, ggplot2, GPAbin

Suggests testthat, rmarkdown, knitr, tibble, scales

Config/Needs/website rmarkdown

NeedsCompilation no

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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

Africa_climate *Climate studies example dataset*

Description

Data extracted from ERA5 hourly data on single levels from 1940 to present

Format

A dataset with 960 observations and 9 variables.

Details

Year 8 years from 1950 to 2020

Month 12 calendar months

Region 10 IPCC climate reference regions

AccPrec Accumulated precipitation

DailyEva Daily evaporation

Temp Mean temperature

SoilMois Soil moisture

SPI6 6-month standardised precipitation index

wind Windspeed

Source

DOI: 10.24381/cds.adbb2d47 (Accessed on 11-02-2025)

Africa_climate_target *Climate studies target example dataset*

Description

Data extracted from ERA5 hourly data on single levels for 1989

Format

A dataset with 120 observations and 9 variables.

Details

Year 8 years from 1950 to 2020

Month 12 calendar months

Region 10 IPCC climate reference regions

AccPrec Accumulated precipitation

DailyEva Daily evaporation

Temp Mean temperature

SoilMois Soil moisture

SPI6 6-month standardised precipitation index

wind Windspeed

Source

DOI: 10.24381/cds.adbb2d47 (Accessed on 11-02-2025)

`axes_moveEZ` *Provide axes coordinates*

Description

Provide axes coordinates

Usage

```
axes_moveEZ(bp, which.var)
```

Arguments

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

Value

Axes coordinates

moveplot *Move plot*

Description

Create animated biplot on samples in a biplot

Usage

```
moveplot(bp, time.var, group.var, move = TRUE, hulls = TRUE, scale.var = 5)
```

Arguments

bp	biplot object from biplotEZ
time.var	time variable
group.var	group variable
move	whether to animate (TRUE) or facet (FALSE) samples, according to time.var
hulls	whether to display sample points or convex hulls
scale.var	scaling the vectors representing the variables

Value

An animated or a facet of biplots based on the fixed variable frame.

Examples

```
data(Africa_climate)
bp <- biplotEZ::biplot(Africa_climate, scaled = TRUE) |> biplotEZ::PCA()
bp |> moveplot(time.var = "Year", group.var = "Region", hulls = TRUE, move = FALSE)
bp |> moveplot(time.var = "Year", group.var = "Region", hulls = FALSE, move = FALSE)

if(interactive()) {
bp |> moveplot(time.var = "Year", group.var = "Region", hulls = TRUE, move = TRUE)}
```

moveplot2 *Move plot 2*

Description

Create animated biplot on samples and variables in a biplot

Usage

```
moveplot2(
  bp,
  time.var,
  group.var,
  move = TRUE,
  hulls = TRUE,
  scale.var = 5,
  align.time = NA,
  reflect = NA
)
```

Arguments

bp	biplot object from biplotEZ
time.var	time variable
group.var	group variable
move	whether to animate (TRUE) or facet (FALSE) samples and variables, according to time.var
hulls	whether to display sample points or convex hulls
scale.var	scaling the vectors representing the variables
align.time	a vector specifying the levels of time.var for which the biplots should be aligned. Only biplots corresponding to these time points will be used to compute the alignment transformation.
reflect	a character vector specifying the axis of reflection to apply at each corresponding time point in align.time. One of FALSE (default), "x" for reflection about the x-axis, "y" for reflection about the y-axis and "xy" for reflection about both axes.

Value

An animated or a facet of biplots based on the dynamic frame.

Examples

```
data(Africa_climate)
bp <- biplotEZ::biplot(Africa_climate, scaled = TRUE) |> biplotEZ::PCA()

if(interactive()) {
bp |> moveplot2(time.var = "Year", group.var = "Region", hulls = TRUE, move = TRUE)}
```

moveplot3 *Move plot 3*

Description

Create animated biplot on samples and variables in a biplot with a given target

Usage

```
moveplot3(
  bp,
  time.var,
  group.var,
  move = TRUE,
  hulls = TRUE,
  scale.var = 5,
  target = NULL
)
```

Arguments

bp	biplot object from biplotEZ
time.var	time variable
group.var	group variable
move	whether to animate (TRUE) or facet (FALSE) samples and variables, according to time.var
hulls	whether to display sample points or convex hulls
scale.var	scaling the vectors representing the variables
target	Target data set to which all biplots should be matched consisting of the the same dimensions. If not specified, the centroid of all available biplot sample coordinates from time.var will be used. Default NULL.

Value

An animated or a facet of biplots based on the dynamic frame.

Examples

```
data(Africa_climate)
data(Africa_climate_target)
bp <- biplotEZ::biplot(Africa_climate, scaled = TRUE) |> biplotEZ::PCA()
bp |> moveplot3(time.var = "Year", group.var = "Region", hulls = TRUE,
move = FALSE, target = NULL)

if(interactive()) {
bp |> moveplot3(time.var = "Year", group.var = "Region", hulls = TRUE,
```

```
move = TRUE, target = NULL)}
bp |> moveplot3(time.var = "Year", group.var = "Region", hulls = TRUE,
move = FALSE, target = Africa_climate_target)
```

`reflect_biplot` *Reflect the biplot about a chosen axis*

Description

This function provides the user with an option to reflect the biplot horizontally, vertically or diagonally.

Usage

```
reflect_biplot(bp, reflect.axis = c("FALSE", "x", "y", "xy"))
```

Arguments

`bp`	an object of class `biplot`
`reflect.axis`	a character string indicating which axis about to reflect. One of `FALSE` (default), "`x`" for reflection about the x-axis, "`y`" for reflection about the y-axis and "`xy`" for reflection about both axes.

Value

An object of class `biplot`

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