Package ‘sobir’

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Type Package

Title Significance of Boundaries

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Description Separates significant boundary constraints in a dataset from illusions. A modified permutation test is applied using the no-data zone areas above the top-left, top-right, bottom-right and bottom-left boundary lines as test statistics. The observed no-data zone areas are compared to the distribution of the random permutations to calculate a p-value for each boundary line. An article detailing the methodologies and rationale is currently in preparation.

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Encoding UTF-8

LazyData true

RoxygenNote 7.0.2

Depends R (>= 3.5.0)

Suggests testthat, knitr, rmarkdown

Imports ggplot2, raster, rlang, scales, sp, statmod, tidyr, dplyr, stringr, DescTools, devtools, usethis

VignetteBuilder knitr

NeedsCompilation no

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bpts_plot

**Description**

bpts_plot creates a ggplot2 scatterplot of your bpts object with the boundary lines and no-data zones identified.

**Usage**

```r
bpts_plot(
  bpts,
  xlab = "x",
  ylab = "y",
  export_name = "bpts plot.png",
  save_plot = FALSE,
  colour = TRUE,
  legend.position = "right"
)
```

**Arguments**

- `bpts`: your bpts object created by the extract_bpts() function.
- `xlab`: the x-axis label. Defaults to "".
- `ylab`: the y-axis label. Defaults to "".
- `export_name`: the filename of your plot if you choose to export it. Include .png suffix. Defaults to "bpts plot.png" if save_plot = TRUE.
- `save_plot`: TRUE or FALSE to save the plot. Defaults to FALSE.
- `colour`: TRUE or FALSE to plot using colour or in black and white. Defaults to TRUE.
- `legend.position`: Define the position of the ggplot legend, as per ggplot capability. Default to "right".

**Value**

- a ggplot2 scatterplot

**Examples**

```r
a = rnorm(100,0,1)
b = rnorm(100,0,1)
bptsExample = extract_bpts(a,b)
bpts_plot(bptsExample, "a", "b")
```
calc_area  

*Calculate the no-data zone areas*

**Description**

This function supports the other sobir functions by calculating the no-data zone areas.

**Usage**

```r
calc_area(xdat, ydat)
```

**Arguments**

- `xdat`: a vector of the independent data
- `ydat`: a vector of the dependent data

**Value**

a list of the no-data zone areas

**Examples**

```r
a = rnorm(100, 0, 1)
b = rnorm(100, 0, 1)
calc_area(a, b)
```

effect_bpts  

*Extract boundary points*

**Description**

`extract_bpts` identifies the boundary points to a scatterplot and labels the relevant data for further analysis in the sobir package.

**Usage**

```r
extract_bpts(xdat, ydat)
```

**Arguments**

- `xdat`: a vector of the independent data
- `ydat`: a vector of the dependent data

**Value**

a data frame of the two vectors with the boundary points and other relevant data labelled.
perm_area

Examples

```r
a = rnorm(100, 0, 1)
b = rnorm(100, 0, 1)
extract_bpts(a, b)
```

---

perm_area  
*Calculate the permuted area*

Description

perm_area calculates the no-data zone areas for each permutation of the data simulated nsim times.

Usage

```r
perm_area(xdat, ydat, nsim, boundary = "topl", method = "auto")
```

Arguments

- `xdat`: a vector of the independent data
- `ydat`: a vector of the dependent data
- `nsim`: the number of simulations to run
- `boundary`: character string indicating the boundary to test (default is "topl"). Possible values are "topl" (top-left), "topr" (top-right), "botl" (bottom-left), "botr" (bottom-right) or "all".
- `method`: character string indicating computation method (default is "auto"). Possible values are "exact", "approximate" or "auto".

Value

a perm table that can be plotted directly using perm_plot()

Examples

```r
a = rnorm(100, 0, 1)
b = rnorm(100, 0, 1)
perm_area(a, b, 10)
```
**perm_plot**

**Perm Plot**

Description

perm_plot calculates the significance of the observed no-data zones and plots them relative to the simulations.

Usage

perm_plot(perm, histogram = TRUE)

Arguments

perm
  a perm object generated by the perm_area() function.

histogram
  TRUE or FALSE. TRUE plots histograms while FALSE plots density plots.

Value

a ggplot2 histogram and p-value for each no-data zone

Examples

a = rnorm(100,0,1)
b = rnorm(100,0,1)
permExample = perm_area(a,b,10)
perm_plot(permExample, 100)

---

**WoodyAfrica**

**Woody cover in Africa**

Description

Woody cover percentage in Africa relative to mean annual precipitation (mm), as published by Sankaran et al. 2005 in Nature.

Usage

WoodyAfrica

Format

A data frame with 854 rows and 2 variables

Details

MAP = Mean annual precipitation, in mm Cover = Woody cover, in
Source
https://doi.org/10.1038/nature04070

References

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WoodyTowoomba Woody cover in Towoomba

Description
Tree abundance in Towoomba Agricultural Development Center, South Africa relative to four soil fertilisation treatments and 16 soil nutrient and element concentrations, as published by Mills et al. 2017 in PLoS ONE.

Usage
WoodyTowoomba

Format
A data frame with 60 rows and 18 variables

Details
Treatment = 12 treatments of a combination of superphosphate (SP0-SP2; 0, 233, 466 kg/ha/yr) and ammonium sulphate (AS0-AS3; 0, 146, 291, 583, 1166 kg/ha/yr) fertilisation applications. TreeNum = Number of trees present following three decades of fertilisation and three subsequent decades of passive protection. EC, pH, B, C, Na, Mg, P, S, N, K, Ca, Mn, Cu, Zn, N_NO3, N_NH4 = Soil nutrient and element concentration of the pedoderm (0-2 cm) in mg/kg, except for pH (unitless), EC (uS/cm) and C (}

Source
https://doi.org/10.1371/journal.pone.0179848

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