

Package ‘belg’

June 17, 2018

Title Boltzmann Entropy of a Landscape Gradient

Version 0.2.3

Description Calculates the Boltzmann entropy of a landscape gradient.

This package uses the analytical method created by Gao, P., Zhang, H. and Li, Z., 2018 (<doi:10.1111/tgis.12315>). It also extend the original idea by allowing calculations on data with missing values.

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Encoding UTF-8

LazyData true

ByteCompile true

RoxygenNote 6.0.1

Depends R (>= 3.3.0)

LinkingTo Rcpp, RcppArmadillo

Imports Rcpp

Suggests testthat, sp, raster, covr, knitr, rmarkdown, ggplot2, rasterVis

URL <https://github.com/Nowosad/belg>

BugReports <https://github.com/Nowosad/belg/issues>

VignetteBuilder knitr

NeedsCompilation yes

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complex_land	<i>Complex landscape</i>
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Description

A dataset containing artificial complex landscape

Usage

```
complex_land
```

Format

An object of class RasterLayer of dimension 3 x 8 x 1.

get_boltzmann	<i>Boltzmann entropy of a landscape gradient</i>
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Description

Calculates the Boltzmann entropy of a landscape gradient

Usage

```
get_boltzmann(x, base = "log10", relative = FALSE)

## Default S3 method:
get_boltzmann(x, base = "log10", relative = FALSE)

## S3 method for class 'array'
get_boltzmann(x, base = "log10", relative = FALSE)

## S3 method for class 'RasterLayer'
get_boltzmann(x, base = "log10", relative = FALSE)

## S3 method for class 'RasterStack'
get_boltzmann(x, base = "log10", relative = FALSE)

## S3 method for class 'RasterBrick'
get_boltzmann(x, base = "log10", relative = FALSE)
```

Arguments

x	RasterLayer, RasterStack, RasterBrick, matrix, or array
base	A logarithm base ("log", "log2" or "log10")
relative	TRUE/FALSE

Details

The method for computing the Boltzmann entropy of a landscape gradient works on integer values that are either positive or equals to zero. This function automatically rounds values to the nearest integer value (rounding halfway cases away from zero) and negative values are shifted to positive values.

Value

a numeric vector

References

Gao, Peichao, Hong Zhang, and Zhilin Li. "A hierarchy-based solution to calculate the configurational entropy of landscape gradients." *Landscape Ecology* 32.6 (2017): 1133-1146.

Gao, Peichao, Hong Zhang, and Zhilin Li. "An efficient analytical method for computing the Boltzmann entropy of a landscape gradient." *Transactions in GIS* (2018).

Examples

```
new_c = c(56, 86, 98, 50, 45, 56, 96, 25,
          15, 55, 85, 69, 12, 52, 25, 56,
          32, 25, 68, 98, 58, 66, 56, 58)

lg = matrix(new_c, nrow = 3, ncol = 8, byrow = TRUE)
get_boltzmann(lg, relative = FALSE, base = "log10")
get_boltzmann(lg, relative = TRUE, base = "log2")
get_boltzmann(lg, relative = TRUE, base = "log")
```

simple_land

Simple landscape

Description

A dataset containing artificial simple landscape

Usage

```
simple_land
```

Format

An object of class RasterLayer of dimension 3 x 8 x 1.

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