Package ‘belg’
December 15, 2022

Title Boltzmann Entropy of a Landscape Gradient
Version 1.5.3
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>) and by Gao, P. and Li, Z., 2019 (<doi:10.1007/s10980-019-00854-3>). It also extends the original ideas by allowing calculations on data with missing values.
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Encoding UTF-8
ByteCompile true
RoxygenNote 7.2.2
Depends R (>= 3.3.0)
LinkingTo Rcpp, RcppArmadillo
Imports Rcpp
Suggests testthat, sp, raster, covr, knitr, rmarkdown, ggplot2, rasterVis, stars, terra
URL https://r-spatialecology.github.io/belg/
BugReports https://github.com/r-spatialecology/belg/issues
VignetteBuilder knitr
NeedsCompilation yes
Author Jakub Nowosad [aut, cre] (<https://orcid.org/0000-0002-1057-3721>), Space Informatics Lab [cph]
Maintainer Jakub Nowosad <nowosad.jakub@gmail.com>
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get_boltzmann

Boltzmann entropy of a landscape gradient

Description

Calculates the Boltzmann entropy of a landscape gradient

Usage

get_boltzmann(
  x,
  method = "aggregation",
  na_adjust = TRUE,
  base = "log10",
  relative = FALSE
)

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

## S3 method for class 'matrix'
get_boltzmann(
  x,
  method = "aggregation",
  na_adjust = TRUE,
  base = "log10",
  relative = FALSE
)

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

## S3 method for class 'RasterLayer'
get_boltzmann(
  x,
get_boltzmann

method = "aggregation",
na_adjust = TRUE,
base = "log10",
relative = FALSE
)

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

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

## S3 method for class 'stars'
get_boltzmann(
  x,
  method = "aggregation",
  na_adjust = TRUE,
  base = "log10",
  relative = FALSE
)

## S3 method for class 'SpatRaster'
get_boltzmann(
  x,
  method = "aggregation",
  na_adjust = TRUE,
  base = "log10",
  relative = FALSE
)

Arguments

x SpatRaster, stars, RasterLayer, RasterStack, RasterBrick, matrix, or array.

method A method used. Either "hierarchy" for the hierarchy-based method (Gao et al., 2017) or "aggregation" (default) for the aggregation-based method (Gao et al., 2019).
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na_adjust Should the output value be adjusted to the proportion of not missing cells? Either TRUE (default) or FALSE

base A logarithm base ("log", "log2" or "log10").

relative Should a relative or absolute entropy be calculated? TRUE or FALSE (default).

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

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)
g = get_boltzmann(lg, relative = FALSE, method = "hierarchy", base = "log10")
g = get_boltzmann(lg, relative = TRUE, method = "hierarchy", base = "log2")
g = get_boltzmann(lg, relative = TRUE, method = "hierarchy", base = "log")
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