Package 'ECDFniche'

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Type Package

Title Empirical Cumulative Distribution Function Niche Modeling Tools

Version 0.1.0

Description Simulate ecological niche models using Mahalanobis distance, transform distances to suitability with 1 - empirical cumulative distribution function and 1 - chi-squared, and generate comparison figures.

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Encoding UTF-8

RoxygenNote 7.3.3

Depends R (>= 4.0.0)

Imports ggplot2, lemon, MASS, stats

Suggests knitr, rmarkdown, roxyglobals, tictoc

VignetteBuilder knitr

Config/roxyglobals/filename globals.R

Config/roxyglobals/unique FALSE

NeedsCompilation no

Author Dayani Bailly [aut] (ORCID: <https://orcid.org/0000-0002-6954-9902>), Marcos R. Lima [aut] (ORCID: <https://orcid.org/0000-0002-5901-0911>), Reginaldo Ré [aut] (ORCID: <https://orcid.org/0000-0001-6452-3466>), Luíz Fernando Esser [aut, cre, cph] (ORCID: <https://orcid.org/0000-0003-2982-7223>)

Maintainer Luíz Fernando Esser <luizesser@gmail.com>

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Contents

create_distance_suitability_plot *Create distance–suitability plot*

Description

Create distance–suitability plot

Usage

```
create_distance_suitability_plot(analysis_results)
```

Arguments

analysis_results	List returned by `ecdf_niche()`.

Value

A ggplot object.

Examples

```
# Create ECDF-niche based on personalized options:
ecdf_niche <- ecdf_niche(n = 3,
                         n_population = 20000,
                         sample_sizes = seq(50, 1000, 50),
                         seed = 123)

# Plot analysis results
create_distance_suitability_plot(ecdf_niche)
```

ecdf_niche *Niche analysis using ECDF and chi-squared*

Description

Simulate niche suitability from Mahalanobis distance using both chi-squared and empirical CDF transformations, for a given number of predictor variables.

Usage

```
ecdf_niche(
  n,
  n_population = 10000L,
  sample_sizes = seq(20L, 500L, 20L),
  seed = NULL
)
```

Arguments

n	Integer; number of predictor variables (dimensions).
n_population	Integer; size of simulated environmental population.
sample_sizes	Integer vector of sample sizes to evaluate.
seed	Optional integer seed for reproducibility.

Value

A list with:

- corplot: ggplot object with correlation vs sample size.
- sample_data: matrix of simulated sample points.
- sample_niche: numeric vector of "true" niche suitability.
- chisq_suits: numeric vector, 1 - pchisq(Mahalanobis).
- ecdf_suits: numeric vector, 1 - ECDF(Mahalanobis).
- mahal_dists: numeric vector of Mahalanobis distances.

Examples

```
# Create ECDF-niche based on personalized options:
ecdf_niche <- ecdf_niche(n = 3,
                         n_population = 20000,
                         sample_sizes = seq(50, 1000, 50),
                         seed = 123)
```

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run_ecdf_mahal_analysis

Run full ECDF–Mahalanobis analysis

Description

Convenience function that reproduces the three figures from the original manuscript for 1–5 dimensions.

Usage

```
run_ecdf_mahal_analysis(dims = 1:5, seed = 3L)
```

Arguments

dims	Integer vector of dimensions (default 1:5).
seed	Optional seed for reproducibility.

Value

A list containing:

- analyses: list of ecdf_niche() outputs.
- figure1, figure2, figure3: grobs with arranged plots.

Examples

```
# Recreate original manuscript output:
set.seed(3)
full_res <- run_ecdf_mahal_analysis(dims = 1:5)
```

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