

Package: likelihoodTools (via r-universe)

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Title Tools for Managing Results from Maximum Likelihood Estimation

Version 0.1.0

Description Tools for managing and exploring parameter estimation results derived from Maximum Likelihood Estimation (MLE) using the `likelihood` package.

License GPL (>= 3)

Encoding UTF-8

URL <https://github.com/ajpelu/likelihoodTools>,
<https://ajpelu.github.io/likelihoodTools/>

BugReports <https://github.com/ajpelu/likelihoodTools/issues/>

LazyData true

Depends R (>= 3.5.0)

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Imports dplyr, ggplot2, rlang

Suggests testthat (>= 3.0.0), likelihood, kableExtra, MASS, patchwork, spelling

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Language en-US

Repository <https://ajpelu.r-universe.dev>

RemoteUrl <https://github.com/ajpelu/likelihoodTools>

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Contents

mle_format	2
mle_plot_observed	3
mle_plot_residuals	4

mle_format	<i>Extract and format results from Simulated Annealing (Maximum Likelihood Estimation)</i>
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Description

Extract and format results from Simulated Annealing (Maximum Likelihood Estimation)

Usage

```
mle_format(x, yvar)
```

Arguments

x	List with the results of the simulated annealing algorithm for Maximum Likelihood Estimation. See likelihood::anneal()
yvar	The name of the column that contains the dependent variable (the “observed” value). This column must be present in the source_data of the x (results) list

Value

A dataframe with outputs from the results of the simulated annealing maximum parameter estimation. This dataframe contains the following columns (see help in [likelihood::anneal\(\)](#)):

- max_likeli The maximum likelihood value of the model
- n_params The number of the estimated parameters
- aic_corr The value of Akaike’s Information Criterion “corrected” for small sample size. See the "Simulated Annealing Algorithm" help page of the [likelihood](#) package for more information.
- aic The value of Akaike’s Information Criterion. See the "Simulated Annealing Algorithm" help page of the [likelihood](#) package for more information. slope Slope of observed values linearly regressed on those predicted by model, using the parameter maximum likelihood estimates. The intercept is forced at zero.
- R2 Proportion of variance explained by the model relative to that explained by the simple mean of the data.
- rmse Root Mean Square Error, *i.e.* the standard deviation of the residuals. It is computed as:

$$RMSE = \sqrt{\frac{\sum_{i=1}^N (obs_i - exp_i)^2}{n - 1}}$$

Examples

```
# Get the results of the maximum likelihood estimation from the example in
# the anneal function of the likelihood pkg.

library(likelihood)
data(crown_rad)
dataset <- crown_rad

# Create our model function
modelfun <- function (a, b, DBH) {a + b * DBH}

# Compute the MLE of the parameters
results <- anneal(model = modelfun,
  par = list(a = 0, b = 0),
  var = list(DBH = "DBH", x = "Radius", mean = "predicted",
    sd = 0.815585, log = TRUE),
  source_data = dataset,
  par_lo = list(a = 0, b = 0),
  par_hi = list(a = 50, b = 50),
  pdf = dnorm,
  dep_var = "Radius",
  max_iter = 20000,
  show_display = FALSE)

# Format the results
mle_format(results, yvar = "DBH")
```

mle_plot_observed *Plots Observed vs. Predicted MLE*

Description

Plots observed values vs. predicted values. The predicted values are obtained from the model with the parameters values estimated by maximum likelihood estimation using simulated annealing.

Usage

```
mle_plot_observed(
  x,
  yvar,
  annotate = TRUE,
  lab_x = "Observed",
  lab_y = "Predicted",
  ...
)
```

Arguments

x	List with the results of the simulated annealing algorithm for Maximum Likelihood Estimation. See <code>likelihood::anneal()</code>
yvar	The name of the column that contains the dependent variable (the “observed” value). This column must be present in the <code>source_data</code> of the x (results) list
annotate	logical (default to TRUE), display the values of R^2 and slope of the regression of the observed on predicted values. See <code>likelihood::Simulated Annealing Algorithm</code>
lab_x	The text for the x-axis lab
lab_y	The text for the y-axis lab
...	other ggplot2 parameters

Value

A ggplot object displaying the observed vs. predicted values, with optional annotations for R^2 and regression slope.

mle_plot_residuals *Plots Residuals vs. Predicted MLE*

Description

Plots residuals (observed - residuals) values vs. predicted values. The predicted values are obtained from the model with the parameters values estimated by maximum likelihood estimation using simulated annealing.

Usage

```
mle_plot_residuals(
  x,
  yvar,
  lab_residuals = "Residuals",
  lab_predicted = "Predicted",
  ...
)
```

Arguments

x	List with the results of the simulated annealing algorithm for Maximum Likelihood Estimation. See <code>likelihood::anneal()</code>
yvar	The name of the column that contains the dependent variable (the “observed” value). This column must be present in the <code>source_data</code> of the x (results) list
lab_residuals	The text for the residual axis lab (y-axis)
lab_predicted	The text for the predicted axis lab (x-axis)
...	other ggplot2 parameters

Value

A ggplot object displaying the residuals vs. predicted values, with a horizontal line at zero.

Index

`likelihood::anneal()`, 2, 4

`mle_format`, 2

`mle_plot_observed`, 3

`mle_plot_residuals`, 4