

Package ‘LRTeR’

August 5, 2022

Title Likelihood Ratio Tests

Version 0.2.1

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Description A collection of hypothesis tests and confidence intervals based on the likelihood ratio
<https://en.wikipedia.org/wiki/Likelihood-ratio_test>.

License GPL-3

Encoding UTF-8

Imports stats, rlang

RoxygenNote 7.1.1

Suggests covr, EnvStats, testthat

NeedsCompilation no

Repository CRAN

Date/Publication 2022-08-05 19:50:02 UTC

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beta_shape1_lr_test	<i>Test the shape1 parameter of a beta distribution using the likelihood ratio test.</i>
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Description

Test the shape1 parameter of a beta distribution using the likelihood ratio test.

Usage

```
beta_shape1_lr_test(x, shape1, alternative = "two.sided", conf.level = 0.95)
```

Arguments

x	a numeric vector of at least 50 data values.
shape1	a number indicating the tested value of the shape1 parameter.
alternative	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
conf.level	confidence level of the likelihood interval.

Value

An S3 class containing the test statistic, p value, likelihood based confidence interval, and alternative hypothesis.

Source

https://en.wikipedia.org/wiki/Likelihood-ratio_test

Examples

```
library(LRTesteR)

# Null is true
set.seed(1)
x <- rbeta(100, shape1 = 1, shape2 = 2)
beta_shape1_lr_test(x, 1, "two.sided")

# Null is false
set.seed(1)
x <- rbeta(100, shape1 = 3, shape2 = 2)
beta_shape1_lr_test(x, 1, "greater")
```

beta_shape2_lr_test	<i>Test the shape2 parameter of a beta distribution using the likelihood ratio test.</i>
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Description

Test the shape2 parameter of a beta distribution using the likelihood ratio test.

Usage

```
beta_shape2_lr_test(x, shape2, alternative = "two.sided", conf.level = 0.95)
```

Arguments

x	a numeric vector of at least 50 data values.
shape2	a number indicating the tested value of the shape2 parameter.
alternative	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
conf.level	confidence level of the likelihood interval.

Value

An S3 class containing the test statistic, p value, likelihood based confidence interval, and alternative hypothesis.

Source

https://en.wikipedia.org/wiki/Likelihood-ratio_test

Examples

```
library(LRTesteR)

# Null is true
set.seed(1)
x <- rbeta(100, shape1 = 1, shape2 = 1)
beta_shape2_lr_test(x, 1, "two.sided")

# Null is false
set.seed(1)
x <- rbeta(100, shape1 = 1, shape2 = 3)
beta_shape2_lr_test(x, 1, "greater")
```

binomial_p_lr_test *Test p of a binomial distribution using the likelihood ratio test.*

Description

Test p of a binomial distribution using the likelihood ratio test.

Usage

```
binomial_p_lr_test(x, n, p, alternative = "two.sided", conf.level = 0.95)
```

Arguments

x	Number of successes.
n	Number of trials.
p	Hypothesized probability of success.
alternative	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
conf.level	confidence level of the likelihood interval.

Value

An S3 class containing the test statistic, p value, likelihood based confidence interval, and alternative hypothesis.

Source

https://en.wikipedia.org/wiki/Likelihood-ratio_test

Examples

```
library(LRTesteR)

# Null is true. 52 successes. 100 trials
binomial_p_lr_test(52, 100, .50, "two.sided")

# Null is false. 75 successes. 100 trials
binomial_p_lr_test(75, 100, .50, "two.sided")
```

`cauchy_location_lr_test`

Test the location parameter of a cauchy distribution using the likelihood ratio test.

Description

Test the location parameter of a cauchy distribution using the likelihood ratio test.

Usage

```
cauchy_location_lr_test(  
  x,  
  location,  
  alternative = "two.sided",  
  conf.level = 0.95  
)
```

Arguments

<code>x</code>	a numeric vector of at least 50 data values.
<code>location</code>	a number indicating the tested value of the location parameter.
<code>alternative</code>	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
<code>conf.level</code>	confidence level of the likelihood interval.

Value

An S3 class containing the test statistic, p value, likelihood based confidence interval, and alternative hypothesis.

Source

https://en.wikipedia.org/wiki/Likelihood-ratio_test

Examples

```
library(LRTesteR)  
  
# Null is true  
set.seed(1)  
x <- rcauchy(n = 100, location = 1, scale = 2)  
cauchy_location_lr_test(x, 1, "two.sided")  
  
# Null is false  
set.seed(1)  
x <- rcauchy(n = 100, location = 3, scale = 2)  
cauchy_location_lr_test(x, 1, "greater")
```

cauchy_scale_lr_test *Test the scale parameter of a cauchy distribution using the likelihood ratio test.*

Description

Test the scale parameter of a cauchy distribution using the likelihood ratio test.

Usage

```
cauchy_scale_lr_test(x, scale, alternative = "two.sided", conf.level = 0.95)
```

Arguments

x	a numeric vector of at least 50 data values.
scale	a number indicating the tested value of the scale parameter.
alternative	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
conf.level	confidence level of the likelihood interval.

Value

An S3 class containing the test statistic, p value, likelihood based confidence interval, and alternative hypothesis.

Source

https://en.wikipedia.org/wiki/Likelihood-ratio_test

Examples

```
library(LRTesteR)

# Null is true
set.seed(1)
x <- rcauchy(n = 100, location = 1, scale = 2)
cauchy_scale_lr_test(x, 2, "two.sided")

# Null is false
set.seed(1)
x <- rcauchy(n = 100, location = 3, scale = 2)
cauchy_scale_lr_test(x, 1, "greater")
```

`exponentail_rate_lr_test`

Test the rate of a exponential distribution using the likelihood ratio test.

Description

Test the rate of a exponential distribution using the likelihood ratio test.

Usage

```
exponentail_rate_lr_test(x, rate, alternative = "two.sided", conf.level = 0.95)
```

Arguments

<code>x</code>	a numeric vector of at least 50 data values.
<code>rate</code>	a number indicating the tested value of rate.
<code>alternative</code>	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
<code>conf.level</code>	confidence level of the likelihood interval.

Value

An S3 class containing the test statistic, p value, likelihood based confidence interval, and alternative hypothesis.

Source

https://en.wikipedia.org/wiki/Likelihood-ratio_test

Examples

```
library(LRTesteR)

# Null is true
set.seed(1)
x <- rexp(100, 1)
exponentail_rate_lr_test(x, 1, "two.sided")

# Null is false
set.seed(1)
x <- rexp(100, 3)
exponentail_rate_lr_test(x, 1, "greater")
```

gamma_rate_lr_test	<i>Test the rate parameter of a gamma distribution using the likelihood ratio test.</i>
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Description

Test the rate parameter of a gamma distribution using the likelihood ratio test.

Usage

```
gamma_rate_lr_test(x, rate, alternative = "two.sided", conf.level = 0.95)
```

Arguments

x	a numeric vector of at least 50 data values.
rate	a number indicating the tested value of the rate parameter.
alternative	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
conf.level	confidence level of the likelihood interval.

Value

An S3 class containing the test statistic, p value, likelihood based confidence interval, and alternative hypothesis.

Source

https://en.wikipedia.org/wiki/Likelihood-ratio_test

Examples

```
library(LRTesteR)

# Null is true
set.seed(1)
x <- rgamma(100, shape = 1, rate = 1)
gamma_rate_lr_test(x, 1, "two.sided")

# Null is false
set.seed(1)
x <- rgamma(100, shape = 1, rate = 2)
gamma_rate_lr_test(x, 1, "greater")
```

gamma_scale_lr_test	<i>Test the scale parameter of a gamma distribution using the likelihood ratio test.</i>
---------------------	--

Description

Test the scale parameter of a gamma distribution using the likelihood ratio test.

Usage

```
gamma_scale_lr_test(x, scale, alternative = "two.sided", conf.level = 0.95)
```

Arguments

x	a numeric vector of at least 50 data values.
scale	a number indicating the tested value of the scale parameter.
alternative	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
conf.level	confidence level of the likelihood interval.

Value

An S3 class containing the test statistic, p value, likelihood based confidence interval, and alternative hypothesis.

Source

https://en.wikipedia.org/wiki/Likelihood-ratio_test

Examples

```
library(LRTesteR)

# Null is true
set.seed(1)
x <- rgamma(100, shape = 1, scale = 2)
gamma_scale_lr_test(x, 2, "two.sided")

# Null is false
set.seed(1)
x <- rgamma(100, shape = 1, scale = 2)
gamma_scale_lr_test(x, 1, "greater")
```

gamma_shape_lr_test	<i>Test the shape parameter of a gamma distribution using the likelihood ratio test.</i>
---------------------	--

Description

Test the shape parameter of a gamma distribution using the likelihood ratio test.

Usage

```
gamma_shape_lr_test(x, shape, alternative = "two.sided", conf.level = 0.95)
```

Arguments

x	a numeric vector of at least 50 data values.
shape	a number indicating the tested value of the shape parameter.
alternative	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
conf.level	confidence level of the likelihood interval.

Value

An S3 class containing the test statistic, p value, likelihood based confidence interval, and alternative hypothesis.

Source

https://en.wikipedia.org/wiki/Likelihood-ratio_test

Examples

```
library(LRTesteR)

# Null is true
set.seed(1)
x <- rgamma(100, shape = 1, scale = 2)
gamma_shape_lr_test(x, 1, "two.sided")

# Null is false
set.seed(1)
x <- rgamma(100, shape = 3, scale = 2)
gamma_shape_lr_test(x, 1, "greater")
```

gaussian_mu_lr_test *Test the mean of a gaussian distribution using the likelihood ratio test.*

Description

Test the mean of a gaussian distribution using the likelihood ratio test.

Usage

```
gaussian_mu_lr_test(x, mu, alternative = "two.sided", conf.level = 0.95)
```

Arguments

x	a numeric vector of at least 50 data values.
mu	a number indicating the tested value of mu.
alternative	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
conf.level	confidence level of the likelihood interval.

Value

An S3 class containing the test statistic, p value, likelihood based confidence interval, and alternative hypothesis.

Source

https://en.wikipedia.org/wiki/Likelihood-ratio_test

Examples

```
library(LRTester)

# Null is true
set.seed(1)
x <- rnorm(100, 0, 1)
gaussian_mu_lr_test(x, 0, "two.sided")

# Null is false
set.seed(1)
x <- rnorm(100, 3, 1)
gaussian_mu_lr_test(x, 0, "greater")
```

`gaussian_variance_lr_test`

Test the variance of a gaussian distribution using the likelihood ratio test.

Description

Test the variance of a gaussian distribution using the likelihood ratio test.

Usage

```
gaussian_variance_lr_test(  
  x,  
  sigma.squared,  
  alternative = "two.sided",  
  conf.level = 0.95  
)
```

Arguments

<code>x</code>	a numeric vector of at least 50 data values.
<code>sigma.squared</code>	a number indicating the tested value of sigma squared.
<code>alternative</code>	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
<code>conf.level</code>	confidence level of the likelihood interval.

Value

An S3 class containing the test statistic, p value, likelihood based confidence interval, and alternative hypothesis.

Source

https://en.wikipedia.org/wiki/Likelihood-ratio_test

Examples

```
library(LRTesteR)  
  
# Null is true  
set.seed(1)  
x <- rnorm(100, 0, 1)  
gaussian_variance_lr_test(x, 1, "two.sided")  
  
# Null is false  
set.seed(1)  
x <- rnorm(100, 0, 2)  
gaussian_variance_lr_test(x, 1, "greater")
```

`negative_binomial_p_lr_test`

Test p of a negative binomial distribution using the likelihood ratio test.

Description

Test p of a negative binomial distribution using the likelihood ratio test.

Usage

```
negative_binomial_p_lr_test(  
  num_failures,  
  num_success,  
  p,  
  alternative = "two.sided",  
  conf.level = 0.95  
)
```

Arguments

<code>num_failures</code>	Number of failures.
<code>num_success</code>	Number of successes.
<code>p</code>	Hypothesized probability of success.
<code>alternative</code>	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
<code>conf.level</code>	confidence level of the likelihood interval.

Value

An S3 class containing the test statistic, p value, likelihood based confidence interval, and alternative hypothesis.

Source

https://en.wikipedia.org/wiki/Likelihood-ratio_test

Examples

```
library(LRTesteR)  
  
# Null is true. 48 failures before 52 successes.  
negative_binomial_p_lr_test(48, 52, .50, "two.sided")  
  
# Null is false. 25 failures before 75 successes.  
negative_binomial_p_lr_test(25, 75, .50, "two.sided")
```

`poisson_lambda_lr_test`*Test lambda of a poisson distribution using the likelihood ratio test.*

Description

Test lambda of a poisson distribution using the likelihood ratio test.

Usage

```
poisson_lambda_lr_test(x, lambda, alternative = "two.sided", conf.level = 0.95)
```

Arguments

<code>x</code>	a numeric vector of at least 50 data values.
<code>lambda</code>	a number indicating the tested value of lambda
<code>alternative</code>	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
<code>conf.level</code>	confidence level of the likelihood interval.

Value

An S3 class containing the test statistic, p value, likelihood based confidence interval, and alternative hypothesis.

Source

https://en.wikipedia.org/wiki/Likelihood-ratio_test

Examples

```
library(LRTesteR)

# Null is true
set.seed(1)
x <- rpois(100, 1)
poisson_lambda_lr_test(x, 1, "two.sided")

# Null is false
set.seed(1)
x <- rpois(100, 2)
poisson_lambda_lr_test(x, 1, "greater")
```

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