Package 'SPRT'

September 15, 2025

Version 1.1.0

Title Sequential Probability Ratio Test (SPRT) Method

Description Provides functions to perform the Sequential Probability Ratio Test (SPRT)
for hypothesis testing in Binomial, Poisson and Normal distributions.
The package allows users to specify Type I and Type II error probabilities,
decision thresholds, and compare null and alternative hypotheses sequentially
as data accumulate. It includes visualization tools for plotting the likelihood
ratio path and decision boundaries, making it easier to interpret results.
The methods are based on Wald (1945) <doi:10.1214/aoms/1177731118>,
who introduced the SPRT as one of the earliest and most powerful sequential
analysis techniques. This package is useful in quality control, clinical trials,
and other applications requiring early decision-
making.The term 'SPRT' is an abbreviation and used intentionally.

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Encoding UTF-8

RoxygenNote 7.3.2

Suggests knitr, rmarkdown

VignetteBuilder knitr

Imports stats, ggplot2, rlang

NeedsCompilation no

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Repository CRAN

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sprt	*Sequential Probability Ratio Test (SPRT)*

Description

Performs the SPRT for Bernoulli, Normal, or Poisson data.

Usage

```
sprt(
  x,
  alpha = 0.05,
  beta = 0.05,
  p0,
  p1,
  dist = c("bernoulli", "poisson", "normal"),
  sigma = 1
)
```

Arguments

x	Vector of observed values.
alpha	Type I error rate.
beta	Type II error rate.
p0	Null hypothesis parameter (probability or mean).
p1	Alternative hypothesis parameter (probability or mean).
dist	Distribution: "bernoulli", "normal", or "poisson".
sigma	Standard deviation (for normal distribution only).

Value

A list with elements:

decision	"Accept H0", "Reject H0", or "Continue sampling"
n_decision	Step at which decision was made (NA if continue)
logL	Cumulative log-likelihood ratios for each step
A	Upper threshold (log scale)
B	Lower threshold (log scale)

Examples

```
x <- c(0,0,1,0,1,1,1,0,0,1,0,0)
res <- sprt(x, alpha = 0.05, beta = 0.1, p0 = 0.1, p1 = 0.3)
print(res)
x1 <- c(52, 55, 58, 63, 66, 70, 74)
result1 <-sprt(x1, alpha = 0.05, beta = 0.1, p0 = 50, p1 = 65, dist = "normal", sigma = 10)
result1
```

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sprt_plot   *Plot SPRT results*

Description

Plot SPRT results

Usage

```
sprt_plot(res)
```

Arguments

res   A list returned by `sprt()`.

Value

A ggplot object showing the SPRT path with thresholds and decision point.

Examples

```
x <- c(0,0,1,0,1,1,1,0,0,1,0,0)
res <- sprt(x, alpha = 0.05, beta = 0.1, p0 = 0.1, p1 = 0.3)
print(res)
sprt_plot(res)

x1 <- c(52, 55, 58, 63, 66, 70, 74)
result1 <- sprt(x1, alpha = 0.05, beta = 0.1, p0 = 50, p1 = 65, dist = "normal", sigma = 10)
result1
sprt_plot(result1)
```

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