Package ‘LN0SCIs’

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Type Package

Title Simultaneous CIs for Ratios of Means of Log-Normal Populations with Zeros

Version 0.1.5

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Description Construct the simultaneous confidence intervals for ratios of means of Log-normal populations with zeros. It also has a Python module that do the same thing, and can be applied to multiple comparisons of parameters of any k mixture distributions. And we provide four methods, the method based on generalized pivotal quantity with order statistics and the quantity based on Wilson by Li et al. (2009) <doi:10.1016/j.spl.2009.03.004> (GPQW), and the methods based on generalized pivotal quantity with order statistics and the quantity based on Hannig (2009) <doi:10.1093/biomet/asp050> (GPQH). The other two methods are based on two-step MOVER intervals by Amany H, Abdel K (2015) <doi:10.1080/03610918.2013.767911>. We deduce Fiducial generalized pivotal two-step MOVER intervals based on Wilson quantity (FMW) and based on Hannig’s quantity (FMWH). All these approach you can find in the paper of us which it has been submitted.

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Encoding UTF-8

LazyData true

RoxygenNote 6.0.1

Suggests knitr, rmarkdown

VignetteBuilder knitr

NeedsCompilation no

Repository CRAN

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FMW

Description
A method based on the method based on two-step MOVER intervals (also see FMWH) to construct the simultaneous confidence intervals for Ratios of Means of Log-normal Populations with Zeros.

Usage

FMW(n, p, mu, sigma, N, C2=rbind(c(-1,1,0), c(-1,0,1), c(0,-1,1)), alpha=0.05)

Arguments

- n: The sample size of the mixture distributions, must be an integer vector.
- p: The zero probability of the mixture distribution, it has the same length to the n params.
- mu: The mean of the non-zero samples, which after log-transformation.
- sigma: The variance of the non-zero samples, which after log-transformation.
- N: The number of independent generated data sets.
- C2: Matrix C, You can refer to the paper of Xu et al. for specific forms.
- alpha: The confidence level, it always set alpha=0.5

Details
More information about FMW, you can read the paper: Simultaneous Confidence Intervals for Ratios of Means of Log-normal Populations with Zeros.

Value
The method will return the Simultaneous Confidence Intervals (SCIs) and the time consuming

Author(s)

Jing Xu, Xinmin Li, Hua Liang
Examples

```r
alpha <- 0.05
p <- c(0.1, 0.15, 0.1)
n <- c(30, 30, 30)
mu <- c(0, 0, 0)
sigma <- c(1, 1, 1)
N <- 500

FMWH(n, p, mu, sigma, N)
```

```r
## Not run:
p <- c(0.1, 0.15, 0.1, 0.6)
n <- c(30, 15, 10, 50)
mu <- c(1, 1.3, 2, 0)
sigma <- c(1, 1, 2)
C2 <- rbind(c(-1, 1, 0, 0), c(-1, 0, 1, 0), c(-1, 0, 0, 1), c(0, -1, 1, 0), c(0, -1, 0, 1), c(0, 0, -1, 1))
N <- 1000

FMWH(n, p, mu, sigma, N, C2 = C2)

## End(Not run)
```

---

**Description**

A method based on the method based on two-step MOVER intervals (also see `FMW`) to construct the simultaneous confidence intervals for Ratios of Means of Log-normal Populations with Zeros.

**Usage**

`FMWH(n, p, mu, sigma, N, C2=rbind(c(-1,1,0), c(-1,0,1), c(0,-1,1)), alpha=0.05)`

**Arguments**

- `n`: The sample size of the mixture distributions, must be an integer vector.
- `p`: The zero probability of the mixture distribution, it has the same length to the `n` params.
- `mu`: The mean of the non-zero samples, which after log-transformation.
- `sigma`: The variance of the non-zero samples, which after log-transformation.
- `N`: The number of independent generated data sets.
- `C2`: Matrix C, You can refer to the paper of Xu et al. for specific forms.
- `alpha`: The confidence level, it always set `alpha=0.5`
Details

More information about FMWH, you can read the paper: Simultaneous Confidence Intervals for Ratios of Means of Log-normal Populations with Zeros.

Value

The method will return the Simultaneous Confidence Intervals(SCIs) and the time consuming

Author(s)

Jing Xu, Xinmin Li, Hua Liang

Examples

```r
alpha <- 0.05
p <- c(0.1,0.15,0.1)
n <- c(50,50,50)
mu <- c(0,0,0)
sigma <- c(1,1,1)
N <- 500
FMWH(n,p,mu,sigma,N)

## Not run:
p <- c(0.1,0.15,0.1,0.6)
n <- c(30,15,10,50)
mu <- c(1.3,2,0)
sigma <- c(1,1,1,2)
C2 <- rbind(c(-1,1,0,0),c(-1,0,1,0),c(-1,0,0,1),c(0,-1,1,0),c(0,-1,0,1),c(0,0,-1,1))
N <- 1000;
FMWH(n,p,mu,sigma,N,C2 = C2)

## End(Not run)
```

Description

A method based on generalized pivotal quantity with order statistics(also see GPQW) to construct the simultaneous confidence intervals for Ratios of Means of Log-normal Populations with Zeros.

Usage

```r
GPQH(n,p,mu,sigma,N,C2=rbind(c(-1,1,0),c(-1,0,1),c(0,-1,1)),alpha=0.05)
```
Arguments

\( p \)  
The zero probability of the mixture distribution, it has the same length to the \( n \) params.

\( N \)  
The number of independent generated data sets.

\( n \)  
The sample size of the mixture distributions, must be an integer vector.

\( \mu \)  
The mean of the non-zero samples, which after log-transformation.

\( \sigma \)  
The variance of the non-zero samples, which after log-transformation.

\( C_2 \)  
Matrix C, You can refer to the paper of Xu et al. for specific forms.

\( \alpha \)  
The confidence level, it always set \( \alpha = 0.5 \)

Details

More information about GPQH, you can read the paper: Simultaneous Confidence Intervals for Ratios of Means of Log-normal Populations with Zeros.

Value

The method will return the Simultaneous Confidence Intervals (SCIs) and the time consuming

Author(s)

Jing Xu, Xinmin Li, Hua Liang

Examples

```r
alpha <- 0.05

p <- c(0.1, 0.15, 0.1)
n <- c(30, 15, 50)
mu <- c(0, 0, 0)
sigma <- c(1, 1, 1)
N <- 100
GPQH(n, p, mu, sigma, N)

# Not run:
p <- c(0.1, 0.15, 0.1, 0.6)
n <- c(30, 15, 10, 50)
mu <- c(1, 1.3, 2, 0)
sigma <- c(1, 1, 1, 2)
C2 <- rbind(c(-1, 1, 0, 0), c(-1, 0, 1, 0), c(-1, 0, 0, 1), c(0, -1, 1, 0), c(0, -1, 0, 1), c(0, 0, -1, 1))

N <- 10000;
GPQH(n, p, mu, sigma, N, C2 = C2)

# End(Not run)
```
Description

A method based on generalized pivotal quantity with order statistics (also see GPQH) to construct the simultaneous confidence intervals for Ratios of Means of Log-normal Populations with Zeros.

Usage

GPQW(n, p, mu, sigma, N, C2=rbind(c(-1,1,0),c(-1,0,1),c(0,-1,1)), alpha=0.05)

Arguments

- n: The sample size of the mixture distributions, must be an integer vector.
- p: The zero probability of the mixture distribution, it has the same length to the n params.
- mu: The mean of the non-zero samples, which after log-transformation.
- sigma: The variance of the non-zero samples, which after log-transformation.
- N: The number of independent generated data sets.
- C2: Matrix C, You can refer to the paper of Xu et al. for specific forms.
- alpha: The confidence level, it always set alpha=0.5

Details

More information about GPQW, you can read the paper: Simultaneous Confidence Intervals for Ratios of Means of Log-normal Populations with Zeros.

Value

The method will return the Simultaneous Confidence Intervals (SCIs) and the time consuming

Author(s)

Jing Xu, Xinmin Li, Hua Liang

Examples

```r
alpha <- 0.05

p <- c(0.1,0.15,0.1)
n <- c(30,15,50)
mu <- c(0,0,0)
sigma <- c(1,1,1)
N <- 100
```
Construct the simultaneous confidence intervals for ratios of means of Log-normal populations with zeros. It also has a Python module that do the same thing, it can be applied to multiple comparisons of parameters of any k mixture distribution. And it provide four methods, the method based on generalized pivotal quantity with order statistics (\texttt{GPQH} and \texttt{GPQW}), and the method based on two-step MOVER intervals (\texttt{FMW} and \texttt{FMWH}).

At present, these four function perform better than other methods that can be used to calculate the simultaneous confidence interval of log-normal populations with excess zeros.

**Author(s)**

Jing Xu, Xinmin Li, Hua Liang

**See Also**

Examples

```r
## Not run:
### GPQW

alpha <- 0.05
p <- c(0.1, 0.15, 0.1)
n <- c(30, 15, 10)
mu <- c(1, 1, 2)
sigma <- c(1, 1, 1)
N <- 1000
GPQW(n, p, mu, sigma, N)

p <- c(0.1, 0.15, 0.1, 0.6)
n <- c(30, 15, 10, 50)
mu <- c(1, 1, 3, 2)
sigma <- c(1, 1, 1, 2)
C2 <- rbind(c(-1, 1, 0, 0), c(-1, 0, 1, 0), c(-1, 0, 0, 1), c(0, -1, 1, 0), c(0, -1, 0, 1), c(0, 0, -1, 1))

N <- 1000;
GPQW(n, p, mu, sigma, N, C2 = C2)

### GPQH

alpha <- 0.05
p <- c(0.1, 0.15, 0.1)
n <- c(30, 15, 10)
mu <- c(1, 1, 2)
sigma <- c(1, 1, 1)
N <- 1000
GPQH(n, p, mu, sigma, N)
p <- c(0.1, 0.15, 0.1, 0.6)
n <- c(30, 15, 10, 50)
mu <- c(1, 1, 3, 2)
sigma <- c(1, 1, 1, 2)
C2 <- rbind(c(-1, 1, 0, 0), c(-1, 0, 1, 0), c(-1, 0, 0, 1), c(0, -1, 1, 0), c(0, -1, 0, 1), c(0, 0, -1, 1))

N <- 1000;
GPQH(n, p, mu, sigma, N, C2 = C2)
```

alpha <- 0.05

p <- c(0.1, 0.15, 0.1)
n <- c(30, 15, 10)
mu <- c(1, 1.3, 2)
sigma <- c(1, 1, 1)
N <- 1000

FMWH(n,p,mu,sigma,N)

p <- c(0.1, 0.15, 0.1, 0.4)
n <- c(30, 15, 10, 10)
mu <- c(1, 1.3, 2)
sigma <- c(1, 1, 1, 2)
C2 <- rbind(c(-1, 0, 0), c(-1, 0, 1, 0), c(-1, 0, 0, 1), c(0, -1, 0, 1), c(0, -1, 0, 1), c(0, 0, -1, 1))
N <- 1000

FMWH(n,p,mu,sigma,N,C2 = C2)

alpha <- 0.05

p <- c(0.1, 0.15, 0.1)
n <- c(30, 15, 10)
mu <- c(1, 1.3, 2)
sigma <- c(1, 1, 1)
N <- 1000

FMWH(n,p,mu,sigma,N)

p <- c(0.1, 0.15, 0.1, 0.6)
n <- c(30, 15, 10, 10)
mu <- c(1, 1.3, 2)
sigma <- c(1, 1, 1, 2)
C2 <- rbind(c(-1, 1, 0, 0), c(-1, 0, 1, 0), c(-1, 0, 0, 1), c(0, -1, 1, 0), c(0, -1, 0, 1), c(0, 0, -1, 1))
N <- 1000;

FMWH(n,p,mu,sigma,N,C2 = C2)

## End(Not run)
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