Package 'LN0SCIs'

January 19, 2018

Type Package

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

Version 0.1.5

Author Jing Xu, Xinmin Li, Hua Liang

Maintainer Jing Xu <274762204@qq.com>

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

Date/Publication 2018-01-19 12:11:37 UTC

R topics documented:

FMW *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

```
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

FMW(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 <- 1000

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

## End(Not run)
```

FMWH *FMWH*

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

```
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(1,1.3,2,0)
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)
```

GPQH *GPQH*

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

```
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.
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 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

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

## End(Not run)
```

GPQW *GPQW*

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

```
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
```

```
GPQW(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(0,0,0,0)
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;
GPQW(n,p,mu,sigma,N,C2 = C2)


## End(Not run)
```

LN0SCIs *LN0SCIs*

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, 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 (GPQH and GPQW), and the method based on two-step MOVER intervals (FMW and FMWH).

Details

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

[1] Besag I, Green P, Higdon D, Mengersen K, 1995. Bayesian computation and Stochastic-systems.

[2] Hannig J, Abdel-Karim A, Iyer H, 2006. Simultaneous fiducial generalized confidence intervals for ratios of means of lognormal distribution.

[3] Hannig J, Lee T C M, 2009.Generalized fiducial inference for wavelet regression.

[4] Li X, Zhou X, Tian L, 2013. Interval estimation for the mean of lognormal data with excess zeros.

[5] Schaarschmidt F, 2013. Simultaneous confidence intervals for multiple comparisons among expected values of log-normal variables.

[6] Jing Xu, Xinmin Li, Hua Liang. Simultaneous Confidence Intervals for Ratios of Means of Log-normal Populations with Zeros.

Examples

```
## Not run:
#====================GPQW================



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

p <- c(0.1,0.15,0.1,0.6)
n <- c(30,15,10,50)
mu <- c(1,1.3,2,0)
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;
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(1,1.3,2)
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(1,1.3,2,0)
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;
GPQH(n,p,mu,sigma,N,C2 = C2)



#====================FMW=================
```

```
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

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

p <- c(0.1,0.15,0.1,0.6)
n <- c(30,15,10,50)
mu <- c(1,1.3,2,0)
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

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


#====================FMWH================


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(30,15,10,50)
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 <- 1000;
FMWH(n,p,mu,sigma,N,C2 = C2)

## End(Not run)
```

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