Package 'FRCI'

December 11, 2025

Type Package

Title Fuzzy & Randomized Confidence Intervals

Version 0.1.0

Description Contains the methods proposed by Geyer and Meeden (2005)<doi:10.1214/088342305000000340> and Trigo et al. (2025) <doi:10.47749/T/UNICAMP.2025.1500297> to construct fuzzy confidence intervals. Compute and plot the fuzzy membership functions of the methods, and the expected length compared with the infimum.

License GPL-3

Imports DescTools, calculus, ump, zipfR, graphics, stats

Encoding UTF-8

RoxygenNote 7.3.2

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

NeedsCompilation no

Author Carlos Henrique Trigo Nasser Felix [aut, cre],
Nancy Garcia [aut],
Alex Sousa [aut]

Maintainer Carlos Henrique Trigo Nasser Felix <c214344@dac.unicamp.br>

Repository CRAN

Date/Publication 2025-12-11 14:10:02 UTC

Contents

`plot.psi` *Plot for "psi" type objects.*

Description

Plot for "psi" type objects.

Usage

```
## S3 method for class 'psi'
plot(x, ..., psi2 = NULL, gamma = 0.95, xlim = NULL, ylim = NULL, type = "psi")
```

Arguments

`x`	A list containing the following information. **[[1**]] the membership function **[[2**]] the name of the sample distribution **[[3**]] sample size **[[4**]] the name of method **[[5**]] standard deviation (for the case of normal distribution). **[[6**]] the upper and lower bound function of the support of the membership function.
`...`	generic plot parameter.
`psi2`	Another list containing the following information. **[[1**]] the membership function **[[2**]] the name of the sample distribution **[[3**]] sample size **[[4**]] the name of method **[[5**]] standard deviation (for the case of normal distribution). **[[6**]] the upper and lower bound function of the support of the membership function.
`gamma`	the confidence level.
`xlim`	A vector containing the upper and lower values for the theta.
`ylim`	A vector containing the values of omega to be included in the plot.
`type`	The type of the plot, by default is the menbership function, and "length" for the expected length plot.

Value

No return value, called for side effects

Examples

```
x<-psi("GM",n=10)
plot(x)
plot(x,type="length")

x<-psi(0.5,n=10)
plot(x)
plot(x,type="length")
```

---

psi *Fuzzy & Randomized Confidence Intervals*

Description

Function to create "psi" type objects.

Usage

```
psi(method, distribution = "bernoulli", n = 1, sigma = 1)
```

Arguments

method	numeric value or name of the method that defines how obtain confidence intervals. • A numeric value utilizes the value as reference. • "GM" utilize the Gayer-Meeden method. • "AC" utilize the Agrest-Coull method (for the binomial distribution only). • "SC" utilizes the score method (for the poisson distribution only).
distribution	name of the distribution of the sample. • "normal" for the normal distribution. • "bernoulli" for the Bernoulli or binomial distribution. • "poisson" for the Poisson distribution.
n	sample size.
sigma	standard deviation (for the case of normal distribution).

Value

A list containing the following information.

[[1]] the membership function

[[2]] distribution

[[3]] n

[[4]] method

[[5]] sigma

[[6]] the upper and lower bound function of the support of the membership function.

References

FELIX, Carlos Henrique Trigo Nasser, Garcia, Nancy Lopes & Sousa, Alex Rodrigo dos Santos. (2025). Uma Nova Abordagem para Construção de Intervalos de Confiança Aleatorizados (Master's thesis, Universidade Estadual de Campinas, Campinas).

GEYER, C. J.; MEEDEN, G. D. Fuzzy and randomized confidence intervals and p-values. Statistical Science, v. 20, n. 4, p. 358–366, 2005. ISSN 08834237. Disponível em: http://www.jstor.org/stable/20061193.

Examples

```
x<-psi("GM",n=10)
x[[1]](0.3,2)
x[[2]]
x[[3]]
x[[4]]
x[[5]]
x[[6]](2)

x<-psi(0.5,n=10)
x[[1]](0.6,8)
x[[2]]
x[[3]]
x[[4]]
x[[5]]
x[[6]](8)
```

Index