Package: genfrn (via r-universe)

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Type Package

Title Generating Triangular and Trapezoidal Fuzzy Random Numbers via Uniform Distribution

Version 0.1.4

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Description Triangular and trapezoidal fuzzy numbers are used to study fuzzy logic, fuzzy reasoning and approximating, fuzzy regression models, etc. This package builds the generating function for triangular and trapezoidal fuzzy numbers based on Souliotis et al. (2022)<doi:10.3390/math10183350>. They proposed a method for the construction of fuzzy numbers via a cumulative distribution function based on the possibility theory.

License GPL-3

Language en-US

Encoding UTF-8

RoxygenNote 7.1.2

Imports graphics, stats

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

NeedsCompilation no

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Repository https://atchanut.r-universe.dev

RemoteUrl https://github.com/cran/genfrn

RemoteRef HEAD

RemoteSha a0f93c8e1e7bb37e9cb96644a197719f13a58843

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acuttfn   *Alpha-cut of triangular fuzzy number*

Description

This function for calculating alpha-cut of triangular fuzzy number. See detail in references.

Usage

```
acuttfn(left, middle, right, acut.level = seq(0, 1, by = 0.1))
```

Arguments

left	the left point of triangular fuzzy number
middle	the middle or mode point of triangular fuzzy number
right	the right point of triangular fuzzy number
acut.level	the alpha-cut level of triangular fuzzy number

Value

AL is alpha-cut level, XL.AL is a lower alpha-cut point of triangular fuzzy number, and XU.AL is a upper alpha-cut point of triangular fuzzy number.

References

Klir, G.J., Yuan, B., & H., S.C.U. (1997). Fuzzy set theory: Foundations and applications. Prentice Hall PTR.

Examples

```
acuttfn(1,2,3,acut.level = c(0,0.5,1))
acuttfn(1,2.5,3,acut.level = c(0.00,0.25,0.50,0.75,1.00))
```

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acuttrfn   *Alpha-cut of trapezoidal fuzzy number*

Description

This function for calculating alpha-cut of trapezoidal fuzzy number. See detail in references.

Usage

```
acuttrfn(left, lmid, rmid, right, acut.level = seq(0, 1, by = 0.1))
```

Arguments

left	the left point of trapezoidal fuzzy number
lmid	the left-middle point of trapezoidal fuzzy number
rmid	the right-middle point of trapezoidal fuzzy number
right	the right point of trapezoidal fuzzy number
acut.level	the alpha-cut level of trapezoidal fuzzy number

Value

AL is alpha-cut level, XL.AL is a lower alpha-cut point of trapezoidal fuzzy number, and XU.AL is a upper alpha-cut point of trapezoidal fuzzy number.

References

Klir, G.J., Yuan, B., & H., S.C.U. (1997). Fuzzy set theory: Foundations and applications. Prentice Hall PTR.

Examples

```
acuttrfn(1,2,3,5,acut.level = c(0,0.5,1))
acuttrfn(1,2.5,3.5,6,acut.level = c(0.00,0.25,0.50,0.75,1.00))
```

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rtfn   *A generating function of triangular fuzzy number via uniform distribution*

Description

A generating function of triangular fuzzy number via uniform distribution based on Souliotis et al. (2022). See detail in references.

Usage

```
rtfn(n, a, b)
```

Arguments

n	total number of random triangular fuzzy number
a	the left point of triangular fuzzy number
b	the right point of triangular fuzzy number

Value

A data frame with two variables, that is, x and mf

References

Souliotis, G., Alanazi, Y., & Papadopoulos, B. (2022). Construction of fuzzy numbers via cumulative distribution function. Mathematics, 10(18), 3350. https://doi.org/10.3390/math10183350

Examples

```
df <- rtfn(500,1,5)
head(df)
plot(df) # or plot(df,type='h')
```

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rtrfn	*A generating function of trapezoidal fuzzy number via uniform distribution*

Description

A generating function of trapezoidal fuzzy number via uniform distribution based on Souliotis et al. (2022). See detail in references.

Usage

```
rtrfn(n, a, c, r, b)
```

Arguments

n	total number of random trapezoidal fuzzy number
a	the left point of trapezoidal fuzzy number
c	the left-middle point of trapezoidal fuzzy number
r	the right-middle point of trapezoidal fuzzy number
b	the right point of trapezoidal fuzzy number

Value

A data frame with two variables, that is, x and mf

Note

In general, a< c< r < b for generating a trapezoidal fuzzy random number. If a=c=r=b, it will produce a crisp number. If a<c=r<b, it will produce a triangular fuzzy random number.

References

Souliotis, G., Alanazi, Y., & Papadopoulos, B. (2022). Construction of fuzzy numbers via cumulative distribution function. Mathematics, 10(18), 3350. https://doi.org/10.3390/math10183350

Examples

```
df2<- rtrfn(500,1,3,4,6)
head(df2)
plot(df2)  # or plot(df2,type='h')
```

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