Package 'PivotalP'

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Type Package

Title Prediction for Future Data from Mixture Distributions Gamma, Beta, Weibull and Normal

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Author O. M. Khaled [aut],
K. S. Khalil [aut, cre],
M. H. Harby [aut]

Maintainer K. S. Khalil <kekox38@gmail.com>

Description Functions to get prediction intervals and prediction points of future observations from mixture distributions like gamma, beta, Weibull and normal.

License GPL (>= 2)

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Imports stats, zipfR

RoxygenNote 7.3.2

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Contents

bmixp *Prediction future points from mixture beta distribution*

Description

Construct a prediction point for future observations from mixture beta distribution. Generic method is `print`.

Usage

```
bmixp(data, s, n, a ,parameters, conf=0.95)

## S3 method for class 'bmixp'
print(x, ...)
```

Arguments

`data`	A numeric vector.
`s`	A numeric value the order of prediction point.
`n`	A numeric vector for the size of all data.
`a`	A numeric value of mixing proportion.
`parameters`	A numeric vector of the parameter of distributions
`conf`	Confidence level for the test.
`x`	An object of class `"bmixp"`.
`...`	Further argument to be passed to generic function

Details

Prediction of future observations if the data follows a mixture of two Beta distributions

Value

`bmixp` returns an object of class `"bmixp"`, a list with the following components:

`interval`	the prediction interval.
`lower`	the lower bound of the interval.
`upper`	the upper bound of the interval.
`r`	the length of the data.
`s`	the order of the next observation.
`n`	the length of all the data.
`parameters`	the parameter estimate.

Generic function:

`print` The print of a `"bmixp"` object shows the prediction point(s) for the future observation(s).

Author(s)

O. M. Khaled, K. S. Khalil and M. H. Harby.

References

H. M. Barakat, Magdy E. El-Adll, Amany E. Aly (2014), *Prediction intervals of future observations for a sample random size from any continuous distribution*. Mathematics and Computers in Simulation, volume 97, 1-13.

O. M. Khaled, K. S. Khalil and M. H. Harby (2023), *PREDICTING FUTURE DATA FROM GAMMA-MIXTURE AND BETA-MIXTURE DISTRIBUTIONS AND APPLICATION TO THE RECOVERY RATE OF COVID-19*. Advances and Applications in Statistics (AAIS), OCT, 2023.

See Also

`PredictionR`.

Examples

```
# prediction interval and point for the next observations based on mixture beta distribution
set.seed(123)
x1 <- 0.5*rbeta(7, 4, 2)+0.5*rbeta(7, 1, 3)
bmixp(x1,8,10,0.5,c(4,2,1,3),conf=0.95)
```

`gmixp` *Prediction future points from mixture gamma distribution*

Description

Construct a prediction point for future observations from mixture gamma distribution. Generic method is `print`.

Usage

```
gmixp(data, s, n, a ,parameters, conf=0.95)

## S3 method for class 'gmixp'
print(x, ...)
```

Arguments

`data`	A numeric vector.
`s`	A numeric value the order of prediction point.
`n`	A numeric vector for the size of all data.
`a`	A numeric value of mixing proportion.
`parameters`	A numeric vector of the parameter of distributions
`conf`	Confidence level for the test.
`x`	An object of class `"gmixp"`.
`...`	Further argument to be passed to generic function

Details

Prediction of future observations if the data follows a mixture of two gamma distributions

Value

`gmixp` returns an object of class `"gmixp"`, a list with the following components:

`interval`	the prediction interval.
`lower`	the lower bound of the interval.
`upper`	the upper bound of the interval.
`r`	the length of the data.
`s`	the order of the next observation.
`n`	the length of all the data.
`parameters`	the parameter estimate.

Generic function:

`print` The print of a `"gmixp"` object shows the prediction point(s) for the future observation(s).

Author(s)

O. M. Khaled, K. S. Khalil and M. H. Harby.

References

H. M. Barakat, Magdy E. El-Adll, Amany E. Aly (2014), *Prediction intervals of future observations for a sample random size from any continuous distribution*. Mathematics and Computers in Simulation, volume 97, 1-13.

O. M. Khaled, K. S. Khalil and M. H. Harby (2023), *PREDICTING FUTURE DATA FROM GAMMA-MIXTURE AND BETA-MIXTURE DISTRIBUTIONS AND APPLICATION TO THE RECOVERY RATE OF COVID-19*. Advances and Applications in Statistics (AAIS), OCT, 2023.

See Also

`PredictionR`.

Examples

```
# prediction interval and point for the next observations based on mixture gamma distribution
#
set.seed(123)
x1 <- 0.5*rgamma(7, 4, 2)+0.5*rgamma(7, 1, 3)
gmixp(x1, 8, 10,0.5,c(4,2,1,3),conf=0.95)
```

nmixp *Prediction future points from mixture normal distribution*

Description

Construct a prediction point for future observations from mixture normal distribution. Generic method is `print`.

Usage

```
nmixp(data, s, n, a ,parameters, conf=0.95)

## S3 method for class 'nmixp'
print(x, ...)
```

Arguments

`data`	A numeric vector.
`s`	A numeric value the order of prediction point.
`n`	A numeric vector for the size of all data.
`a`	A numeric value of mixing proportion.
`parameters`	A numeric vector of the parameter of distributions
`conf`	Confidence level for the test.
`x`	An object of class `"nmixp"`.
`...`	Further argument to be passed to generic function

Details

Prediction of future observations if the data follows a mixture of two normal distributions

Value

`nmixp` returns an object of class `"nmixp"`, a list with the following components:

`interval`	the prediction interval.
`lower`	the lower bound of the interval.
`upper`	the upper bound of the interval.
`r`	the length of the data.
`s`	the order of the next observation.
`n`	the length of all the data.
`parameters`	the parameter estimate.

Generic function:

`print` The print of a `"nmixp"` object shows the prediction point(s) for the future observation(s).

Author(s)

O. M. Khaled, K. S. Khalil and M. H. Harby.

References

H. M. Barakat, Magdy E. El-Adll, Amany E. Aly (2014), *Prediction intervals of future observations for a sample random size from any continuous distribution*. Mathematics and Computers in Simulation, volume 97, 1-13.

O. M. Khaled, K. S. Khalil and M. H. Harby (2023), *PREDICTING FUTURE DATA FROM GAMMA-MIXTURE AND BETA-MIXTURE DISTRIBUTIONS AND APPLICATION TO THE RECOVERY RATE OF COVID-19*. Advances and Applications in Statistics (AAIS), OCT, 2023.

See Also

PredictionR.

Examples

```
# prediction interval and point for the next observations based on mixture normal distribution
#
set.seed(123)
x1 <- 0.5*rnorm(7, 4, 2)+0.5*rnorm(7, 1, 3)
nmixp(x1, 8, 10,0.5,c(4,2,1,3),conf=0.95)
```

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wmixp *Prediction future points from mixture weibull distribution*

Description

Construct a prediction point for future observations from mixture weibull distribution. Generic method is print.

Usage

```
wmixp(data, s, n, a ,parameters, conf=0.95)

## S3 method for class 'wmixp'
print(x, ...)
```

Arguments

data	A numeric vector.
s	A numeric value the order of prediction point.
n	A numeric vector for the size of all data.
a	A numeric value of mixing proportion.
parameters	A numeric vector of the parameter of distributions

conf	Confidence level for the test.
x	An object of class "wmixp".
...	Further argument to be passed to generic function

Details

Prediction of future observations if the data follows a mixture of two weibull distributions

Value

wmixp returns an object of class "wmixp", a list with the following components:

interval	the prediction interval.
lower	the lower bound of the interval.
upper	the upper bound of the interval.
r	the length of the data.
s	the order of the next observation.
n	the length of all the data.
parameters	the parameter estimate.

Generic function:

print The print of a "wmixp" object shows the prediction point(s) for the future observation(s).

Author(s)

O. M. Khaled, K. S. Khalil and M. H. Harby.

References

H. M. Barakat, Magdy E. El-Adll, Amany E. Aly (2014), *Prediction intervals of future observations for a sample random size from any continuous distribution*. Mathematics and Computers in Simulation, volume 97, 1-13.

O. M. Khaled, K. S. Khalil and M. H. Harby (2023), *PREDICTING FUTURE DATA FROM GAMMA-MIXTURE AND BETA-MIXTURE DISTRIBUTIONS AND APPLICATION TO THE RECOVERY RATE OF COVID-19*. Advances and Applications in Statistics (AAIS), OCT, 2023.

See Also

PredictionR.

Examples

```
# prediction interval and point for the next observations based on mixture weibull distribution
#
set.seed(123)
x1 <- 0.5*rweibull(7, 4, 2)+0.5*rweibull(7, 1, 3)
wmixp(x1, 8, 10,0.5,c(4,2,1,3),conf=0.95)
```

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