

# Package ‘PivotalP’

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**Type** Package

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

**Version** 0.1.2

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

**License** GPL (>= 2)

**Encoding** UTF-8

**Imports** stats, zipfR

**RoxygenNote** 7.3.2

**NeedsCompilation** no

**Repository** CRAN

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 bmixp

*Prediction future points from mixture beta distribution*


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**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**

<code>data</code>	A numeric vector.
<code>s</code>	A numeric value the order of prediction point.
<code>n</code>	A numeric vector for the size of all data.
<code>a</code>	A numeric value of mixing proportion.
<code>parameters</code>	A numeric vector of the parameter of distributions
<code>conf</code>	Confidence level for the test.
<code>x</code>	An object of class "bmixp".
<code>...</code>	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:

<code>interval</code>	the prediction interval.
<code>lower</code>	the lower bound of the interval.
<code>upper</code>	the upper bound of the interval.
<code>r</code>	the length of the data.
<code>s</code>	the order of the next observation.
<code>n</code>	the length of all the data.
<code>parameters</code>	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)
```

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gmixp

*Prediction future points from mixture gamma distribution*


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**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)
```

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nmixp	<i>Prediction future points from mixture normal distribution</i>
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**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*

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**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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