

Package ‘rjqpd’

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Type Package

Title The Johnson Quantile-Parameterised Distribution

Version 0.2.3

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Description Implementation of the Johnson Quantile-Parameterised Distribution in R.

The Johnson Quantile-Parameterised Distribution (J-QPD) is a flexible distribution system that is parameterised by a symmetric percentile triplet of quantile values (typically the 10th-50th-90th) along with known support bounds for the distribution.

The J-QPD system was developed by Hadlock and Bickel (2017) <doi:10.1287/deca.2016.0343>.

This package implements the density, quantile, CDF and random number generator functions.

Suggests devtools, knitr, rmarkdown, testthat

URL <https://github.com/bobbyingram/rjqpd>

BugReports <https://github.com/bobbyingram/rjqpd/issues>

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R topics documented:

djqpd	2
jqpd	2
jqpd_kurtosis	3
jqpd_mean	4
jqpd_sd	4
jqpd_skewness	5

jqpd_var	5
pjqpd	6
plot_jqpd	6
qjqpd	7
rjqpd	7

Index	9
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djqpd	<i>Density function of Johnson Quantile-Parameterised Distribution.</i>
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Description

Density function of Johnson Quantile-Parameterised Distribution.

Usage

```
djqpd(x, params)
```

Arguments

x	vector of quantiles
params	jqpd object created using jqpd()

Value

A numeric vector of density values corresponding to the x quantile vector

Examples

```
x <- c(0.32, 0.40, 0.60)
params <- jqpd(x, lower = 0, upper = 1, alpha = 0.1)
iles <- seq(0.01, 0.99, 0.01)
density <- dqpd(x = iles, params)
```

jqpd	<i>Calculates the parameters of the Johnson Quantile-Parameterised Distribution</i>
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Description

Calculates the parameters of the Johnson Quantile-Parameterised Distribution

Usage

```
jqpd(x, lower = 0, upper = Inf, alpha = 0.1)
```

Arguments

x	a length 3 numeric vector containing the symmetric percentile triplet values used to parameterise the distribution.
lower	a real number specifying the lower bound of the distribution. (default: 0)
upper	a real number specifying the upper bound of the distribution. A value of Inf indicates a semi-bounded distribution. (default: Inf)
alpha	a real number (between 0 and 0.5) used to describe the symmetric percentile triplet for which the quantile values provided in 'x' correspond. For instance, alpha = 0.1 (default value) indicates the percentiles used are [0.1, 0.5, 0.9].

Value

A jqpd object with elements

x	a length 3 numeric vector containing the symmetric percentile triplet values used to parameterise the distribution
alpha	a real number (between 0 and 0.5) used to describe the symmetric percentile triplet for which the quantile values provided in 'x' correspond
lower	a real number specifying the lower bound of the distribution
upper	a real number specifying the upper bound of the distribution
c	distribution parameter
n	distribution parameter
eta	distribution parameter
delta	distribution parameter
lambda	distribution parameter
k	distribution parameter

Examples

```
theta <- jqpd(c(0.32, 0.40, 0.6), 0, 1, alpha = 0.1)
```

jqpd_kurtosis	<i>Calculates the kurtosis of a Johnson Quantile-Parameterised Distribution.</i>
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Description

Calculates the kurtosis of a Johnson Quantile-Parameterised Distribution.

Usage

```
jqpd_kurtosis(params)
```

Arguments

params jqpd object created using jqpd()

Value

The kurtosis of the distribution as a length one numeric vector.

jqpd_mean	<i>Calculates the mean of a Johnson Quantile-Parameterised Distribution.</i>
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Description

Calculates the mean of a Johnson Quantile-Parameterised Distribution.

Usage

```
jqpd_mean(params)
```

Arguments

params jqpd object created using jqpd()

Value

The mean of the distribution as a length one numeric vector.

jqpd_sd	<i>Calculates the standard-deviation of a Johnson Quantile-Parameterised Distribution.</i>
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Description

Calculates the standard-deviation of a Johnson Quantile-Parameterised Distribution.

Usage

```
jqpd_sd(params)
```

Arguments

params jqpd object created using jqpd()

Value

The standard deviation of the distribution as a length one numeric vector.

jqpd_skewness	<i>Calculates the skewness of a Johnson Quantile-Parameterised Distribution.</i>
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Description

Calculates the skewness of a Johnson Quantile-Parameterised Distribution.

Usage

```
jqpd_skewness(params)
```

Arguments

params jqpd object created using jqpd()

Value

The skewness of the distribution as a length one numeric vector.

jqpd_var	<i>Calculates the variance of a Johnson Quantile-Parameterised Distribution.</i>
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Description

Calculates the variance of a Johnson Quantile-Parameterised Distribution.

Usage

```
jqpd_var(params)
```

Arguments

params jqpd object created using jqpd()

Value

The variance of the distribution as a length one numeric vector.

pjqpd *Cumulative distribution function of Johnson Quantile-Parameterised Distribution.*

Description

Cumulative distribution function of Johnson Quantile-Parameterised Distribution.

Usage

```
pjqpd(x, params)
```

Arguments

x vector of quantiles
params jqpd object created using jqpd()

Value

A numeric vector of probabilities corresponding to the x quantiles vector

Examples

```
x <- c(0.32, 0.40, 0.60)  
params <- jqpd(x, lower = 0, upper = 1, alpha = 0.1)  
iles <- seq(0.01, 0.99, 0.01)  
probs <- pjqpd(x = iles, params)
```

plot_jqpd *Plots the density, cumulative distribution function, quantile function and a set of 1000 random samples for a Johnson Quantile-Parameterised Distribution.*

Description

Plots the density, cumulative distribution function, quantile function and a set of 1000 random samples for a Johnson Quantile-Parameterised Distribution.

Usage

```
plot_jqpd(params)
```

Arguments

params jqpd object created using jqpd()

Value

no return value, called for side effects only

qjqpd	<i>Quantile function of Johnson Quantile-Parameterised Distribution.</i>
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Description

Quantile function of Johnson Quantile-Parameterised Distribution.

Usage

```
qjqpd(p, params)
```

Arguments

p	vector of probabilities
params	jqpd object created using jqpd()

Value

A numeric vector of quantiles corresponding to the p probability vector

Examples

```
x <- c(0.32, 0.40, 0.60)
params <- jqpd(x, lower = 0, upper = 1, alpha = 0.1)
probs <- seq(0.01, 0.99, 0.01)
quantiles <- qjqpd(p = probs, params)
```

rjqpd	<i>Generate random samples from a jqpd distribution object</i>
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Description

Generate random samples from a jqpd distribution object

Usage

```
rjqpd(n = 1, params)
```

Arguments

n	number of observations (default is 1)
params	jqpd object created using jqpd()

Value

A numeric vector of n random samples from the input distribution

Examples

```
x <- c(0.32, 0.40, 0.60)
params <- jqpd(x, lower = 0, upper = 1, alpha = 0.1)
samples <- rjqpd(n = 1000, params)
```


Index

[djqp](#), [2](#)

[jqd](#), [2](#)

[jqd_kurtosis](#), [3](#)

[jqd_mean](#), [4](#)

[jqd_sd](#), [4](#)

[jqd_skewness](#), [5](#)

[jqd_var](#), [5](#)

[pqd](#), [6](#)

[plot_jqd](#), [6](#)

[qjd](#), [7](#)

[rjd](#), [7](#)