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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Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

NeedsCompilation no

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Repository CRAN

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R topics documented:

`djqpd` *Density function of Johnson Quantile-Parameterised Distribution.*

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 <- djqpd(x = iles, params)
```

`jqpd` *Calculates the parameters of the Johnson Quantile-Parameterised Distribution*

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)
```

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jqpd_kurtosis *Calculates the kurtosis of a Johnson Quantile-Parameterised Distribution.*

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.

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jqpd_mean *Calculates the mean of a Johnson Quantile-Parameterised Distribution.*

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.

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

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 — *Calculates the skewness of a Johnson Quantile-Parameterised Distribution.*

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 — *Calculates the variance of a Johnson Quantile-Parameterised Distribution.*

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` *Quantile function of Johnson Quantile-Parameterised Distribution.*

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` *Generate random samples from a jqpd distribution object*

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)
```

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