

Package ‘orders’

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Type Package

Title Sampling from k-th Order Statistics of New Families of Distributions

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Description Set of tools to generate samples of order statistics and others quantities of interest from new families of distributions.

The main references for this package are: Gentle, J. (2009), Computational Statistics, Springer-Verlag;

Naradajah, S. and Rocha, R. (2016), <DOI:10.18637/jss.v069.i10> and

Stasinopoulos, M. and Rigby, R. (2015), <DOI:10.1111/j.1467-9876.2005.00510.x>.

The families of distributions are: Marshall Olkin G distributions, exponentiated G distributions, beta G distributions, gamma G distributions, Kumaraswamy G distributions, generalized beta G distributions,

beta extended G distributions, gamma G distributions, gamma uniform G distributions, beta exponential G distributions, Weibull G distributions, log gamma G I distributions, log gamma G II distributions,

exponentiated generalized G distributions, exponentiated Kumaraswamy G distributions, geometric exponential Poisson G distributions, truncated-exponential skew-symmetric G distributions, modified beta G distributions,

and exponentiated exponential Poisson G distributions, Poisson-inverse gaussian distribution, Skew normal type 1 distributions, Skew student t distribution, Sinh-Arcsinh distribution, Sichel distribution and Zero inflated Poisson.

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order_beg	<i>Random Sampling of k-th Order Statistics from a Beta Extended G Distribution</i>
-----------	---

Description

order_beg is used to obtain a random sample of the k-th order statistic from a Beta Extended G distribution.

Usage

```
order_beg(size, spec, a, b, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
a	numeric, represents the first shape parameter. Default value is 1.

b	numeric, represents the second shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Beta Extended G Distribution, the value of its joint probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdistsn: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Beta Extended Exponential Distribution
order_beg(10, "exp", a=1, b=1, k=3, 50, alpha=0.02)
# A sample of size 10 of the 3-th order statistics from a Beta Extended Normal Distribution
order_beg(10, "norm", 1, 1, k=3, 50)
# A sample of size 10 of the 3-th order statistics from a Beta Extended Log-normal Distribution
order_beg(10, "lnorm", 1, 1, k=3, 50)
# A sample of size 10 of the 3-th order statistics from a Beta Extended Chis-square Distribution
order_beg(10, "chisq", 1, 1, k=3, 50, df=3)
```

order_betaexpG	<i>Random Sampling of k-th Order Statistics from a Beta Exponential G Distribution</i>
----------------	--

Description

order_betaexpG is used to obtain a random sample of the k-th order statistic from a Beta Exponential G Distribution.

Usage

```
order_betaexpG(size, spec, lambda, a, b, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
lambda	numeric, represents the first shape parameter. Default value is 1.
a	numeric, represents the second shape parameter. Default value is 1.
b	numeric, represents the third shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Beta Exponential G Distribution and the value of its join probability density function evaluated in the random sample.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdistsn: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from
# a Beta Exponential Exponential Distribution
order_betaexp(10,"exp",1,1,1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from
# a Beta Exponential Normal Distribution
order_betaexp(10,"norm",1,1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Beta Exponential Log-normal Distribution
order_betaexp(10,"lnorm",1,1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Beta Exponential Chi-square Distribution
order_betaexp(10,"chisq",1,1,1,k=3,50,df=3)
```

order_betag	<i>Random Sampling of k-th Order Statistics from a Beta G Distribution</i>
-------------	--

Description

order_betag is used to obtain a random sample of the k-th order statistic from a Beta G distribution.

Usage

```
order_betag(size, spec, a, b, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
a	numeric, represents the first shape parameter. Default value is 1.
b	numeric, represents the first shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Beta G Distribution, the value of its joint probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdists: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```

library(orders)
# A sample of size 10 of the 3-th order statistics from a Beta Exponential Distribution
order_betag(10,"exp",1,1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from a Beta Normal Distribution
order_betag(10,"norm",1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from a Beta Log-normal Distribution
order_betag(10,"lnorm",1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from a Beta Chis-square Distribution
order_betag(10,"chisq",1,1,k=3,50,df=3)

```

order_eepg	<i>Random Sampling of k-th Order Statistics from a Exponentiated Exponential Poisson G Distribution</i>
------------	---

Description

order_eepg is used to obtain a random sample of the k-th order statistic from a Exponentiated Exponential Poisson G Distribution.

Usage

```
order_eepg(size, spec, lambda, a, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
lambda	numeric, represents a scale parameter. Default value is 1.
a	numeric, represents the shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Exponentiated Exponential Poisson G Distribution, the value of its join probability density function evaluated in the random sample a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdistns: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from
# a Exponentiated Exponential Poisson Exponential Distribution
order_eepg(10,"exp",1,1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from
# a Exponentiated Exponential Poisson Normal Distribution
order_eepg(10,"norm",1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Exponentiated Exponential Poisson Log-normal Distribution
order_eepg(10,"lnorm",1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Exponentiated Exponential Poisson Chi-square Distribution
order_eepg(10,"chisq",1,1,k=3,50,df=3)
```

order_eg	<i>Random Sampling of k-th Order Statistics from a Exponentiated Generalized G Distribution</i>
----------	---

Description

order_eg is used to obtain a random sample of k-th order order statistic from a Exponentiated Generalized G Distribution.

Usage

```
order_eg(size, spec, a, b, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
a	numeric, represents the first shape parameter. Default value is 1.
b	numeric, represents the second shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Exponentiated Generalized G Distribution, the value of its join probability density function evaluated in the random sample a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdistsn: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from
# a Exponentiated Generalized Exponential Distribution
order_eg(10,"exp",1,1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from
# a Exponentiated Generalized Normal Distribution
order_eg(10,"norm",1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Exponentiated Generalized Log-normal Distribution
order_eg(10,"lnorm",1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Exponentiated Generalized Chi-square Distribution
order_eg(10,"chisq",1,1,k=3,50,df=3)
```

order_expg

Random Sampling of k-th Order Statistics from a Exponentiated G Distribution

Description

order_expg is used to obtain a random sample of the k-th order statistic from a Exponentiated G Distribution.

Usage

```
order_expg(size, spec, a, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
a	numeric, represents the first shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Exponentiated G Distribution, the value of its join probability density function evaluated in the random sample a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdistsn: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Exponentiated Exponential Distribution
order_expg(10,"exp",1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from a Exponentiated Normal Distribution
order_expg(10,"norm",1,k=3,50)
# A sample of size 10 of the 3-th order statistics from a Exponentiated Log-normal Distribution
order_expg(10,"lnorm",1,k=3,50)
# A sample of size 10 of the 3-th order statistics from a Exponentiated Chi-square Distribution
order_expg(10,"chisq",1,k=3,50,df=3)
```

order_expkmg	<i>Random Sampling of k-th Order Statistics from a Exponentiated Kumaraswamy G Distribution</i>
--------------	---

Description

order_expkmg is used to obtain a random sample of the k-th order statistic from a Exponentiated Kumaraswamy G distribution.

Usage

```
order_expkmg(size, spec, a, b, c, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
a	numeric, represents the first shape parameter. Default value is 1.
b	numeric, represents the second shape parameter. Default value is 1.
c	numeric, represents the third shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Exponentiated Kumaraswamy G Distribution, the value of its join probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.
 Naradajah, S. and Rocha, R. (2016) Newdistns: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```

library(orders)
# A sample of size 10 of the 3-th order statistics from
# a Exponentiated Kumaraswamy Exponential Distribution
order_expkumg(10,"exp",1,1,1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from
# a Exponentiated Kumaraswamy Normal Distribution
order_expkumg(10,"norm",1,1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Exponentiated Kumaraswamy Log-normal Distribution
order_expkumg(10,"lnorm",1,1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Exponentiated Kumaraswamy Chi-square Distribution
order_expkumg(10,"chisq",1,1,1,k=3,50,df=3)

```

order_gammag	<i>Random Sampling of k-th Order Statistics from a Gamma Uniform G Distribution</i>
--------------	---

Description

order_gammag is used to obtain a random sample of the k-th order statistic from a Gamma Uniform G distribution.

Usage

```
order_gammag(size, spec, a, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
a	numeric, represents the first shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Gamma Uniform G Distribution, the value of its join probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdistns: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Gamma Uniform Exponential Distribution
order_gammag(10,"exp",1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from a Gamma Uniform Normal Distribution
order_gammag(10,"norm",1,k=3,50)
# A sample of size 10 of the 3-th order statistics from a Gamma Uniform Log-normal Distribution
order_gammag(10,"lnorm",1,k=3,50)
# A sample of size 10 of the 3-th order statistics from a Gamma Uniform Chi-square Distribution
order_gammag(10,"chisq",1,k=3,50,df=3)
```

order_gammag1	<i>Random Sampling of k-th Order Statistics from a Gamma G I Distribution</i>
---------------	---

Description

order_gammag1 is used to obtain a random sample of the k-th order statistic from a Gamma G I distribution and some associated quantities of interest.

Usage

```
order_gammag1(size, spec, a, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
a	numeric, represents the first shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Gamma G I Distribution, the value of its joint probability density function evaluated in the random sample and a $(1 - \alpha)$ confidence interval for the population median of the distribution of the k -th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdists: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Gamma Exponential I Distribution
order_gammag1(10,"exp",1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from a Gamma Normal I Distribution
order_gammag1(10,"norm",1,k=3,50)
# A sample of size 10 of the 3-th order statistics from a Gamma Log-normal I Distribution
order_gammag1(10,"lnorm",1,k=3,50)
# A sample of size 10 of the 3-th order statistics from a Gamma Chi-square I Distribution
order_gammag1(10,"chisq",1,k=3,50,df=3)
```

order_gammag2	<i>Random Sampling of k-th Order Statistics from a Gamma G II Distribution</i>
---------------	---

Description

order_gammag2 is used to obtain a random sample of the k -th order statistic from a Gamma G II Distribution and some associated quantities of interest.

Usage

```
order_gammag2(size, spec, a, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
a	numeric, represents the first shape parameter. Default value is 1.
k	numeric, represents the K th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.

alpha numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.

... represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Gamma G II Distribution, the value of its joint probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdistns: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Gamma Exponential II Distribution
order_gammag2(10,"exp",1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from a Gamma Normal II Distribution
order_gammag2(10,"norm",1,k=3,50)
# A sample of size 10 of the 3-th order statistics from a Gamma Log-normal II Distribution
order_gammag2(10,"lnorm",1,k=3,50)
# A sample of size 10 of the 3-th order statistics from a Gamma Chi-square II Distribution
order_gammag2(10,"chisq",1,k=3,50,df=3)
```

order_gbg	<i>Random Sampling of k-th Order Statistics from a Generalized Beta G Distribution</i>
-----------	--

Description

order_gbg is used to obtain a random sample of the k-th order statistic from a Generalized Beta G distribution and some associated quantities of interest.

Usage

```
order_gbg(size, spec, a, b, c, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
a	numeric, represents the first shape parameter. Default value is 1.
b	numeric, represents the second shape parameter. Default value is 1.
c	numeric, represents the third shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Generalized Beta G Distribution, the value of its join probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdistns: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from
# a Generalized Beta Exponential Distribution
order_gbg(10,"exp",1,1,1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from
# a Generalized Beta Normal Distribution
order_gbg(10,"norm",1,1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Generalized Beta Log-normal Distribution
order_gbg(10,"lnorm",1,1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Generalized Beta Chi-square Distribution
order_gbg(10,"chisq",1,1,1,k=3,50,df=3)
```

order_kumg	<i>Random Sampling of k-th Order Statistics from a Kumaraswamy G Distribution</i>
------------	---

Description

order_expkumg is used to obtain a random sample of the k-th order statistic from a Kumaraswamy G distribution.

Usage

```
order_kumg(size, spec, a, b, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
a	numeric, represents the first shape parameter. Default value is 1.
b	numeric, represents the second shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Kumaraswamy G Distribution, the value of its joint probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.
 Naradajah, S. and Rocha, R. (2016) Newdists: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```

library(orders)
# A sample of size 10 of the 3-th order statistics from
# a Kumaraswamy Exponential Distribution
order_kumg(10,"exp",1,1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from
# a Kumaraswamy Normal Distribution
order_kumg(10,"norm",1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Kumaraswamy Log-normal Distribution
order_kumg(10,"lnorm",1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Kumaraswamy Chi-square Distribution
order_kumg(10,"chisq",1,1,k=3,50,df=3)

```

order_loggammag1	<i>Random Sampling of k-th Order Statistics from a Log Gamma G I Distribution</i>
------------------	---

Description

order_loggammag1 is used to obtain a random sample of the k-th order statistic from a Log Gamma G I distribution and some associated quantities of interest.

Usage

```
order_loggammag1(size, spec, a, b, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
a	numeric, represents the first shape parameter. Default value is 1.
b	numeric, represents the second shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Log Gamma G I Distribution, the value of its join probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdistns: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from
# a Log Gamma Exponential I Distribution
order_loggammag1(10,"exp",1,1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from
# a Log Gamma Normal I Distribution
order_loggammag1(10,"norm",1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Log Gamma Log-normal I Distribution
order_loggammag1(10,"lnorm",1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Log Gamma Chi-square I Distribution
order_loggammag1(10,"chisq",1,1,k=3,50,df=3)
```

order_loggammag2	<i>Random Sampling of k-th Order Statistics from a Log Gamma G II Distribution</i>
------------------	--

Description

order_loggammag2 is used to obtain a random sample of the k-th order statistic from a Log Gamma G II distribution.

Usage

```
order_loggammag2(size, spec, a, b, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
a	numeric, represents the first shape parameter. Default value is 1.
b	numeric, represents the second shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.

alpha numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
 ... represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Log Gamma G II Distribution, the value of its joint probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdists: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from
# a Log Gamma Exponential II Distribution
order_loggammag2(10,"exp",1,1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from
# a Log Gamma Normal II Distribution
order_loggammag2(10,"norm",1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Log Gamma Log-normal II Distribution
order_loggammag2(10,"lnorm",1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Log Gamma Chi-square II Distribution
order_loggammag2(10,"chisq",1,1,k=3,50,df=3)
```

order_mbetag	<i>Random Sampling of k-th Order Statistics from a Modified Beta G Distribution</i>
--------------	---

Description

order_mbetag is used to obtain a random sample of k-th order statistic from a Modified Beta G distribution.

Usage

```
order_mbetag(size, spec, beta, a, b, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
beta	numeric, represents the scale parameter. Default value is 1.
a	numeric, represents a shape parameter must be positive. Default value is 1.
b	numeric, represents a shape parameter must be positive. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Modified Beta G Distribution, the value of its joint probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdists: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from
# a Modified Beta Exponential Distribution
order_mbetag(10,"exp",1,1,1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from
# a Modified Beta Normal Distribution
order_mbetag(10,"norm",1,1,1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Modified Beta Log-normal Distribution
order_mbetag(10,"lnorm",1,1,1,k=3,50)
```

order_mog	<i>Random Sampling of k-th Order Statistics from a Marshall Olkin G Distribution</i>
-----------	--

Description

order_mog is used to obtain a random sample of k-th order statistic from a Marshall Olkin G distribution.

Usage

```
order_mog(size, spec, beta, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
beta	numeric, represents the scale parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Marshall Olkin G Distribution, the value of its joint probability density function evaluated in the random sample a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.
Naradajah, S. and Rocha, R. (2016) Newdists: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```

library(orders)
# A sample of size 10 of the 3-th order statistics from
# a Marshall Olkin Exponential Distribution
order_mog(10,"exp",1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from
# a Marshall Olkin Normal Distribution
order_mog(10,"norm",1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Marshall Olkin Log-normal Distribution
order_mog(10,"lnorm",1,k=3,50)

```

order_pig	<i>Random Sampling of k-th Order Statistics from a Poisson-inverse Gaussian Distribution</i>
-----------	--

Description

order_pig is used to obtain a random sample of the k-th order statistic from a Poisson-inverse Gaussian distribution and some associated quantities of interest.

Usage

```
order_pig(size, k, mu, sigma, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the Kth smallest value from a sample.
mu	numeric, represents the location parameter values.
sigma	numeric, represents scale parameter values.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of a Poisson-inverse Gaussian distribution.

Value

A list with a random sample of order statistics from a Poisson-inverse Gaussian Distribution, the value of its joint probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

- Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.
- Ribgy, R. and Stasinopoulos, M. (2005) Generalized Additive Models for Location Scale and Shape, Journal of the Royal Statistical Society. Applied Statistics, Series C.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Poisson-inverse Gaussian Distribution
# order_pig(size=20,k=5,mu=6,sigma=1,n=30,alpha=0.02)
```

order_sichel	<i>Random Sampling of k-th Order Statistics from a Sichel Distribution</i>
--------------	--

Description

order_sichel is used to obtain a random sample of the k-th order statistic from a Sichel distribution and some associated quantities of interest.

Usage

```
order_sichel(size, k, mu, sigma, nu, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the Kth smallest value from a sample.
mu	numeric, represents the location parameter values.
sigma	numeric, represents scale parameter values.
nu	numeric, represents skewness parameter values
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of a Sichel distribution.

Value

A list with a random sample of order statistics from a Sichel Distribution, the value of its joint probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

- Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.
- Ribgy, R. and Stasinopoulos, M. (2005) Generalized Additive Models for Location Scale and Shape, Journal of the Royal Statistical Society. Applied Statistics, Series C.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Sichel Distribution
# order_sichel(size=20,k=5,mu=5,sigma=1,nu=1,n=30,alpha=0.02)
```

order_sinharcsinh	<i>Random Sampling of k-th Order Statistics from a Sinh-Arcsinh Distribution</i>
-------------------	--

Description

order_sinharcsinh is used to obtain a random sample of the k-th order statistic from a Sinh-Arcsinh Distribution and some associated quantities of interest.

Usage

```
order_sinharcsinh(size, k, mu, sigma, nu, tau, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the Kth smallest value from a sample.
mu	numeric, represents the location parameter values.
sigma	numeric, represents scale parameter values.
nu	numeric, represents skewness parameter values
tau	numeric, represents kurtosis tau parameter values.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of a Sinh-Arcsinh distribution.

Value

A list with a random sample of order statistics from a Sinh-Arcsinh Distribution, the value of its joint probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

- Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.
- Ribgy, R. and Stasinopoulos, M. (2005) Generalized Additive Models for Location Scale and Shape, Journal of the Royal Statistical Society. Applied Statistics, Series C.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Sinh-Arcsinh Distribution
order_sinharcsinh(size=10,k=3,mu=0,sigma=1,nu=1,tau=2,n=30,alpha=0.02)
```

order_snormal1	<i>Random Sampling of k-th Order Statistics from a Skew normal type 1 Distribution</i>
----------------	--

Description

order_snormal1 is used to obtain a random sample of the k-th order statistic from a Skew normal type 1 distribution and some associated quantities of interest.

Usage

```
order_snormal1(size, k, mu, sigma, nu, tau, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the Kth smallest value from a sample.
mu	numeric, represents the location parameter values.
sigma	numeric, represents scale parameter values.
nu	numeric, represents skewness parameter values
tau	numeric, represents kurtosis tau parameter values.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of a Skew normal type 1 distribution.

Value

A list with a random sample of order statistics from a Skew normal type 1 Distribution, the value of its join probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

- Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.
- Ribgy, R. and Stasinopoulos, M. (2005) Generalized Additive Models for Location Scale and Shape, Journal of the Royal Statistical Society. Applied Statistics, Series C.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Skew normal type 1 Distribution
order_snormal1(size=10,mu=0,sigma=1,nu=0,tau=2,k=3,n=50,alpha=0.02)
```

order_sstudentt	<i>Random Sampling of k-th Order Statistics from a Skew student t Distribution</i>
-----------------	--

Description

order_sstudentt is used to obtain a random sample of the k-th order statistic from a Skew student t distribution and some associated quantities of interest.

Usage

```
order_sstudentt(size, k, mu, sigma, nu, tau, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the Kth smallest value from a sample.
mu	numeric, represents the location parameter values.
sigma	numeric, represents scale parameter values.
nu	numeric, represents skewness parameter values
tau	numeric, represents kurtosis tau parameter values.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of a Skew student t Distribution.
...	represents others parameters of a Skew student t distribution.

Value

A list with a random sample of order statistics from a Skew student t Distribution, the value of its joint probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Ribgy, R. and Stasinopoulos, M. (2005) Generalized Additive Models for Location Scale and Shape, Journal of the Royal Statistical Society: Applied Statistics.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Skew student t Distribution
order_sstudentt(size=10,k=3,mu=0,sigma=1,nu=0,tau=2,n=30,alpha=0.02)
```

order_tessg	<i>Random Sampling of k-th Order Statistics from a Truncated-Exponential Skew-Symmetric G Distribution</i>
-------------	--

Description

order_tessg is used to obtain a random sample of the k-th order statistic from a Truncated-Exponential Skew-Symmetric G distribution.

Usage

```
order_tessg(size, spec, lambda, k, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
lambda	numeric, represents the skewness parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Truncated-Exponential Skew-Symmetric G Distribution, the value of its join probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the distribution of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdistns: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from
# a Truncated-Exponential Skew-Symmetric Exponential Distribution
order_tessg(10,"exp",1,k=3,50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from
# a Truncated-Exponential Skew-Symmetric Normal Distribution
order_tessg(10,"norm",1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Truncated-Exponential Skew-Symmetric Log-normal Distribution
order_tessg(10,"lnorm",1,k=3,50)
# A sample of size 10 of the 3-th order statistics from
# a Truncated-Exponential Skew-Symmetric Chi-square Distribution
order_tessg(10,"chisq",1,k=3,50,df=3)
```

order_weibullg	<i>Random Sampling of k-th Order Statistics from a Weibull G Distribution</i>
----------------	---

Description

order_weibullg is used to obtain a random sample of the k-th order statistic from a Weibull G distribution.

Usage

```
order_weibullg(size, spec, beta, c, k, n, alpha = 0.02, ...)
```

Arguments

size	numeric, represents the size of the sample.
spec	character, represents an specific G distribution. Possible values "norm", "exp", "lnorm", "chisq".
beta	numeric, represents the scale parameter. Default value is 1.
c	numeric, represents the shape parameter. Default value is 1.
k	numeric, represents the Kth smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of the G distribution.

Value

A list with a random sample of order statistics from a Weibull G Distribution, the value of its joint probability density function evaluated in the random sample and a $(1 - \alpha)$ confidence interval for the population median of the distribution of the k -th order statistic..

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Naradajah, S. and Rocha, R. (2016) Newdistns: An R Package for New Families of Distributions, Journal of Statistical Software.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Weibull Exponential Distribution
order_weibullg(10,"exp",beta=1,c=1,k=3,n=50,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from a Weibull Normal Distribution
order_weibullg(10,"norm",beta=1,c=1,k=3,n=50)
# A sample of size 10 of the 3-th order statistics from a Weibull Log-normal Distribution
order_weibullg(10,"lnorm",beta=1,c=1,k=3,n=50)
# A sample of size 10 of the 3-th order statistics from a Weibull Chi-square Distribution
order_weibullg(10,"chisq",beta=1,c=1,k=3,n=50,df=3)
```

order_zip

Random Sampling of k -th Order Statistics from a Zero Inflated Poisson Distribution

Description

order_zip is used to obtain a random sample of the k -th order statistic from a Zero Inflated Poisson distribution and some associated quantities of interest.

Usage

```
order_zip(size, k, mu, sigma, n, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the K th smallest value from a sample.
mu	numeric, represents the location parameter values.
sigma	numeric, represents scale parameter values.
n	numeric, represents the size of the sample to compute the order statistic from.

alpha numeric, (1 - alpha) represents the confidence of an interval for the population median of the distribution of the k-th order statistic. Default value is 0.05.
... represents others parameters of a Zero Inflated Poisson distribution.

Value

A list with a random sample of order statistics from a Zero Inflated Poisson Distribution, the value of its join probability density function evaluated in the random sample and a (1 - alpha) confidence interval for the population median of the k-th order statistic.

Author(s)

Carlos Alberto Cardozo Delgado <cardozorpackages@gmail.com>.

References

Gentle, J, Computational Statistics, First Edition. Springer - Verlag, 2009.

Ribgy, R. and Stasinopoulos, M. (2005) Generalized Additive Models for Location Scale and Shape, Journal of the Royal Statistical Society. Applied Statistics, Series C.

Examples

```
library(orders)
# A sample of size 20 of the 5-th order statistics from a Zero Inflated Poisson Distribution
#order_zip(size=10,k=5,mu=5,sigma=0.1,n=30)
```

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