

Package ‘orders’

July 22, 2025

Type Package

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

Version 0.1.8

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Description Set of tools to generate samples of k-th order statistics and others quantities of interest from new families of distributions. The main references for this package are: C. Kleiber and S. Kotz (2003) Statistical size distributions in economics and actuarial sciences; Gentle, J. (2009), Computational Statistics, Springer-Verlag; Naradajah, S. and Rocha, R. (2016), <[DOI:10.18637/jss.v069.i10](https://doi.org/10.18637/jss.v069.i10)> and Stasinopoulos, M. and Rigby, R. (2015), <[DOI:10.1111/j.1467-9876.2005.00510.x](https://doi.org/10.1111/j.1467-9876.2005.00510.x)>. The families of distributions are: Benini distributions, Burr distributions, Dagum distributions, Feller-Pareto distributions, Generalized Pareto distributions, Inverse Pareto distributions, The Inverse Paralogistic distributions, 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, exponentiated exponential Poisson G distributions, Poisson-inverse gaussian distributions, Skew normal type 1 distributions, Skew student t distributions, Singh-Maddala distributions, Sinh-Arcsinh distributions, Sichel distributions, Zero inflated Poisson distributions.

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Encoding UTF-8

RoxygenNote 7.2.3

Imports Newdistns, gamlss.dist, actuar, VGAM

NeedsCompilation no

Repository CRAN

Date/Publication 2023-11-14 01:23:20 UTC

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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, p = 0.5, 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 k-th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p 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 join probability density function evaluated in the random sample and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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, n=50, p=0.5, 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, n=50, p=0.5)
# 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, n=50, p=0.5)
# 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, n=50, p=0.5, df=3)
```

order_benini	<i>Random Sampling of k-th Order Statistics from a Benini Distribution</i>
--------------	--

Description

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

Usage

```
order_benini(size, k, shape1, scale, n, p = 0.5, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the K-th smallest value from a sample.
shape1	numeric, represents a first shape parameter value. Must be strictly positive.
scale	numeric, represents scale parameter values. Must be strictly positive.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of a Benini distribution.

Value

A list with a random sample of order statistics from a Benini Distribution, the value of its join probability density function evaluated in the random sample and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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.
 Kleiber, C. and Kotz, S. (2003). Statistical Size Distributions in Economics and Actuarial Sciences, Hoboken, NJ, USA: Wiley-Interscience.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Benini Distribution
order_benini(size=10,shape1=0.75,scale=1,k=3,n=50,p=0.5,alpha=0.02)
```

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, p = 0.5, 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 k-th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, p = 0.5.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population percentile p 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 and an approximate (1 - alpha) confidence interval for the population percentile p 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 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

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

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, p = 0.5, 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 k -th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k -th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p 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 join probability density function evaluated in the random sample and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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,n=50,p=0.5,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,n=50,p=0.5)
# 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,n=50,p=0.5)
# 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,n=50,p=0.5,df=3)
```

order_burr

Random Sampling of k -th Order Statistics from a Burr Distribution

Description

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

Usage

```
order_burr(size, k, shape1, shape2, scale, n, p = 0.5, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the k -th smallest value from a sample.
shape1	numeric, represents a first shape parameter value. Must be strictly positive.
shape2	numeric, represents a second shape parameter value. Must be strictly positive.
scale	numeric, represents scale parameter values. Must be strictly positive.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k -th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p of the distribution of the k -th order statistic. Default value is 0.05.
...	represents others parameters of a Burr distribution.

Value

A list with a random sample of order statistics from a Burr Distribution, the value of its join probability density function evaluated in the random sample and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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.

Klugman, S. A., Panjer, H. H. and Willmot, G. E. (2012), Loss Models, From Data to Decisions, Fourth Edition, Wiley.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Burr Distribution
order_burr(size=10,shape1=0.75,shape2=1,scale=0.5,k=3,n=50,p=0.5,alpha=0.02)
```

order_dagum

Random Sampling of k -th Order Statistics from a Dagum Distribution

Description

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

Usage

```
order_dagum(size, k, shape1, shape2, scale, n, p = 0.5, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the k -th smallest value from a sample.
shape1	numeric, represents a first shape parameter value. Must be strictly positive.
shape2	numeric, represents a second shape parameter value. Must be strictly positive.
scale	numeric, represents scale parameter values. Must be strictly positive.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the $100p$ percentile for the distribution of the k -th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p of the distribution of the k -th order statistic. Default value is 0.05.
...	represents others parameters of a Dagum distribution.

Value

A list with a random sample of order statistics from a Dagum Distribution, the value of its join probability density function evaluated in the random sample and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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.

Kleiber, C. and Kotz, S. (2003). Statistical Size Distributions in Economics and Actuarial Sciences, Hoboken, NJ, USA: Wiley-Interscience.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Dagum Distribution
order_dagum(size=10,shape1=1,shape2=2,scale=1,k=3,n=50,p=0.5,alpha=0.02)
```

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, p = 0.5, 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 k -th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k -th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p 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 and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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 Poisson Exponential Distribution
order_eepg(10,"exp",1,1,k=3,n=50,p=0.5,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,n=50,p=0.5)
# 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,n=50,p=0.5)
# 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,n=50,p=0.5,df=3)
```

order_eg

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

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, p = 0.5, 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 k-th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p 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 and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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,n=50,p=0.5,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,n=50,p=0.5)
# 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,n=50,p=0.5)
# 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,n=50,p=0.5,df=3)
```

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

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, p = 0.5, 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.
p	numeric, represents the 100p percentile for the distribution of the K-th order statistic. Default value is population median, p = 0.5.
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 and an approximate (1 - alpha) confidence interval for the population percentile p 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 Distribution
order_expkmug(10,"exp",1,k=3,n=50,p=0.5,alpha=0.02)
# A sample of size 10 of the 3-th order statistics from a Exponentiated Normal Distribution
order_expkmug(10,"norm",1,k=3,n=50,p=0.5)
# A sample of size 10 of the 3-th order statistics from a Exponentiated Log-normal Distribution
order_expkmug(10,"lnorm",1,k=3,n=50,p=0.5)
# A sample of size 10 of the 3-th order statistics from a Exponentiated Chi-square Distribution
order_expkmug(10,"chisq",1,k=3,n=50,p=0.5,df=3)
```

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

Description

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

Usage

```
order_expkmug(size, spec, a, b, c, k, n, p = 0.5, 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 k-th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, p = 0.5.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population percentile p 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 an approximate (1 - alpha) confidence interval for the population percentile p 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 Kumaraswamy Exponential Distribution
order_expkumg(10,"exp",1,1,1,k=3,n=50,p=0.5,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,n=50,p=0.5)
# 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,n=50,p=0.5)
# 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,n=50,p=0.5,df=3)
```

order_fellerpareto	<i>Random Sampling of k-th Order Statistics from a Feller-Pareto Distribution</i>
--------------------	---

Description

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

Usage

```
order_fellerpareto(
  size,
  k,
  min,
  shape1,
  shape2,
  shape3,
  scale,
  n,
  p = 0.5,
  alpha = 0.05,
  ...
)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the k-th smallest value from a sample.
min	numeric, represents the lower bound of the support of the distribution.
shape1	numeric, represents a first shape parameter value. Must be strictly positive.
shape2	numeric, represents a second shape parameter value. Must be strictly positive.
shape3	numeric, represents a third shape parameter value. Must be strictly positive.
scale	numeric, represents scale parameter values. Must be strictly positive.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of a Feller-Pareto distribution.

Value

A list with a random sample of order statistics from a Feller-Pareto Distribution, the value of its join probability density function evaluated in the random sample and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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.

Klugman, S. A., Panjer, H. H. and Willmot, G. E. (2012), Loss Models, From Data to Decisions, Fourth Edition, Wiley.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Feller-Pareto Distribution
order_fellerpareto(size=10,
                    min=0.5, shape1=0.75, shape2=1, shape3=1.25, scale=0.5, k=3, n=50, p=0.5, alpha=0.02)
```

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, p = 0.5, 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.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, p = 0.5.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population percentile p 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 an approximate (1 - alpha) confidence interval for the population percentile p 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,n=50,p=0.5,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,n=50,p=0.5)
# 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,n=50,p=0.5)
# 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,n=50,p=0.5,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, p = 0.5, 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.
p	numeric, represents the 100p percentile for the distribution of the K-th order statistic. Default value is population median, p = 0.5.
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 join probability density function evaluated in the random sample and and an approximate (1 - alpha) confidence interval for the population percentile p 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 Gamma Exponential I Distribution
order_gammag1(10,"exp",1,k=3,n=50,p=0.5,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,n=50,p=0.5)
# 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,n=50,p=0.5)
# 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,n=50,p=0.5,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, p = 0.5, 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.
p	numeric, represents the 100p percentile for the distribution of the K-th order statistic. Default value is population median, p = 0.5.
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 an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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 Gamma Exponential II Distribution
order_gammag2(10,"exp",1,k=3,n=50,p=0.5,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,n=50,p=0.5)
# 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,n=50,p=0.5)
# 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,n=50,p=0.5,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, p = 0.5, 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 k-th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p 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 an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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 Generalized Beta Exponential Distribution
order_gbg(10,"exp",1,1,1,k=3,n=50,p=0.5,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,n=50,p=0.5)
# 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,n=50,p=0.5)
# 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,n=50,p=0.5,df=3)
```

order_gpareto	<i>Random Sampling of k-th Order Statistics from a Generalized Pareto Distribution</i>
---------------	--

Description

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

Usage

```
order_gpareto(size, k, shape1, shape2, scale, n, p = 0.5, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the k-th smallest value from a sample.
shape1	numeric, represents a first shape parameter value. Must be strictly positive.
shape2	numeric, represents a second shape parameter value. Must be strictly positive.
scale	numeric, represents scale parameter values. Must be strictly positive.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of a Generalized Pareto distribution.

Value

A list with a random sample of order statistics from a Generalized Pareto Distribution, the value of its joint probability density function evaluated in the random sample and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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.

Klugman, S. A., Panjer, H. H. and Willmot, G. E. (2012), Loss Models, From Data to Decisions, Fourth Edition, Wiley.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Generalized Pareto Distribution
order_gpareto(size=10, shape1=0.75, shape2=1, scale=0.5, k=3, n=50, p=0.5, alpha=0.02)
```

order_invpareto	<i>Random Sampling of k-th Order Statistics from a Inverse Pareto Distribution</i>
-----------------	--

Description

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

Usage

```
order_invpareto(size, k, shape1, scale, n, p = 0.5, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the k-th smallest value from a sample.
shape1	numeric, represents a first shape parameter value. Must be strictly positive.
scale	numeric, represents scale parameter values. Must be strictly positive.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of a Inverse Pareto distribution.

Value

A list with a random sample of order statistics from a Inverse Pareto Distribution, the value of its join probability density function evaluated in the random sample and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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.
 Klugman, S. A., Panjer, H. H. and Willmot, G. E. (2012), Loss Models, From Data to Decisions, Fourth Edition, Wiley.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Inverse Pareto Distribution
order_invpareto(size=10,shape1=0.75,scale=0.5,k=3,n=50,p=0.5,alpha=0.02)
```

order_iparalogistic	<i>Random Sampling of k-th Order Statistics from a Inverse Paralogistic Distribution</i>
---------------------	--

Description

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

Usage

```
order_iparalogistic(size, k, shape, scale, n, p = 0.5, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the k-th smallest value from a sample.
shape	numeric, represents a first shape parameter value. Must be strictly positive.
scale	numeric, represents scale parameter values. Must be strictly positive.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p of the distribution of the k-th order statistic. Default value is 0.05.
...	represents others parameters of a Inverse Paralogistic distribution.

Value

A list with a random sample of order statistics from a Inverse Paralogistic Distribution, the value of its join probability density function evaluated in the random sample and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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.
 Klugman, S. A., Panjer, H. H. and Willmot, G. E. (2012), Loss Models, From Data to Decisions, Fourth Edition, Wiley.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Inverse Paralogistic Distribution
order_iparalogistic(size=10,shape=1.5,scale=0.5,k=3,n=50,p=0.5,alpha=0.02)
```

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

Description

order_expkmug 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, p = 0.5, 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 k-th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, p = 0.5.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population percentile p 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 an approximate (1 - alpha) confidence interval for the population percentile p 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) Newdistsns: 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,n=50,p=0.5,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,n=50,p=0.5)
# 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,n=50,p=0.5)
# 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,n=50,p=0.5,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, p = 0.5, 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 k-th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, p = 0.5.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population percentile p 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 an approximate (1 - alpha) confidence interval for the population percentile p 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,n=50,p=0.5,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,n=50,p=0.5,)
# 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,n=50,p=0.5,)
# 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,n=50,p=0.5,df=3)
```

order_loggammag2

Random Sampling of k-th Order Statistics from a Log Gamma G II Distribution

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, p = 0.5, 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 k-th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.

p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p 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 join probability density function evaluated in the random sample and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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 Log Gamma Exponential II Distribution
order_loggammag2(10,"exp",1,1,k=3,n=50,p=0.5,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,n=50,p=0.5)
# 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,n=50,p=0.5)
# 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,n=50,p=0.5,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, p = 0.5, 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 k-th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, p = 0.5.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population percentile p 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 join probability density function evaluated in the random sample and an approximate (1 - alpha) confidence interval for the population percentile p 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 Modified Beta Exponential Distribution
order_mbetag(10,"exp",1,1,1,k=3,n=50,p=0.5,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,n=50,p=0.5,)
# 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,n=50,p=0.5)
```

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, p = 0.5, 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 k-th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, p = 0.5.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population percentile p 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 join probability density function evaluated in the random sample and an approximate 100(1 - alpha) confidence interval for the population percentile p 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 Marshall Olkin Exponential Distribution
order_mog(10,"exp",p=0.5,1,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",p=0.5,1,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",p=0.5,1,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, p = 0.5, 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.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p 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 join probability density function evaluated in the random sample and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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,p=0.5,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, p = 0.5, 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.
nu	numeric, represents skewness parameter values
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, p = 0.5.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population percentile p 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 join probability density function evaluated in the random sample and an approximate (1 - alpha) confidence interval for the population percentile p 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,p=0.5,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, p = 0.5, 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.
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.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, p = 0.5.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population percentile p 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 an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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,p=0.5,alpha=0.02)
```

order_sm	<i>Random Sampling of k-th Order Statistics from a Singh-Maddala Distribution</i>
----------	--

Description

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

Usage

```
order_sm(size, k, shape1, shape2, scale, n, p = 0.5, alpha = 0.05, ...)
```

Arguments

size	numeric, represents the size of the sample.
k	numeric, represents the K -th smallest value from a sample.
shape1	numeric, represents a first shape parameter value. Must be strictly positive.
shape2	numeric, represents a second shape parameter value. Must be strictly positive.
scale	numeric, represents scale parameter values. Must be strictly positive.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the $100p$ percentile for the distribution of the k -th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p of the distribution of the k -th order statistic. Default value is 0.05.
...	represents others parameters of a Singh-Maddala distribution.

Value

A list with a random sample of order statistics from a Singh-Maddala Distribution, the value of its join probability density function evaluated in the random sample and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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.

Kleiber, C. and Kotz, S. (2003). Statistical Size Distributions in Economics and Actuarial Sciences, Hoboken, NJ, USA: Wiley-Interscience.

Examples

```
library(orders)
# A sample of size 10 of the 3-th order statistics from a Singh-Maddala Distribution
order_sm(size=10,shape1=1,shape2=2,scale=1,k=3,n=50,p=0.5,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, p = 0.5, 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.
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.
p	numeric, represents the 100p percentile for the distribution of the K -th order statistic. Default value is population median, $p = 0.5$.

alpha numeric, (1 - alpha) represents the confidence of an interval for the population percentile p 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 an approximate (1 - alpha) confidence interval for the population percentile p 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,p=0.5,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, p = 0.5, 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.

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.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p 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 join probability density function evaluated in the random sample and an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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,p=0.5,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, p = 0.5, 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 k-th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, $p = 0.5$.
alpha	numeric, $(1 - \alpha)$ represents the confidence of an interval for the population percentile p 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 an approximate $(1 - \alpha)$ confidence interval for the population percentile p 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 Truncated-Exponential Skew-Symmetric Exponential Distribution
order_tessg(10,"exp",1,k=3,n=50,p=0.5,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,n=50,p=0.5,)
# 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,n=50,p=0.5,)
# 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,n=50,p=0.5,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, p = 0.5, 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 k-th smallest value from a sample.
n	numeric, represents the size of the sample to compute the order statistic from.
p	numeric, represents the 100p percentile for the distribution of the k-th order statistic. Default value is population median, p = 0.5.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population percentile p 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 join probability density function evaluated in the random sample and an approximate (1 - alpha) confidence interval for the population percentile p 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,p=0.5,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,p=0.5)
# 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,p=0.5)
# 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,p=0.5,df=3)
```

order_zip	<i>Random Sampling of k-th Order Statistics from a Zero Inflated Poisson Distribution</i>
-----------	---

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, p = 0.5, 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.
p	numeric, represents the 100p percentile for the distribution of the K-th order statistic. Default value is population median, p = 0.5.
alpha	numeric, (1 - alpha) represents the confidence of an interval for the population percentile p 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 an approximate (1 - alpha) confidence interval for the population percentile p 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,p=0.5)
```


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