Package 'ollg'

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Type Package

Title Computes some Measures of OLL-G Family of Distributions

Version 1.0.0

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Description Computes the pdf, cdf, quantile function, hazard function and generating random numbers for Odd log-logistic family (OLL-G). This family have been developed by different authors in the recent years. See Alizadeh (2019) <doi:10.31801/cfsuasmas.542988> for example.

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URL https://github.com/dmazarei/ollg

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ANOLLG *A New Odd log-logistic family of distributions (ANOLL-G)*

Description

Computes the pdf, cdf, hdf, quantile and random numbers of the beta extended distribution due to Haghbin et al. (2017) specified by the pdf

$$f = \frac{\alpha\beta\, g\, \bar{G}^{\alpha\beta-1}[1-\bar{G}^{\alpha}]^{\beta-1}}{\{[1-\bar{G}^{\alpha}]^{\beta}+\bar{G}^{\alpha\beta}\}^2}$$

for G any valid continuous cdf , $\bar{G} = 1 - G$, g the corresponding pdf, $\alpha > 0$, the first shape parameter, and $\beta > 0$, the second shape parameter.

Usage

```
panollg(x, alpha = 1, beta = 1, G = pnorm, ...)

danollg(x, alpha = 1, beta = 1, G = pnorm, ...)

qanollg(q, alpha = 1, beta = 1, G = pnorm, ...)

ranollg(n, alpha = 1, beta = 1, G = pnorm, ...)

hanollg(x, alpha = 1, beta = 1, G = pnorm, ...)
```

Arguments

x	scaler or vector of values at which the pdf or cdf needs to be computed.
alpha	the value of the first shape parameter, must be positive, the default is 1.
beta	the value of the second shape parameter, must be positive, the default is 1.
G	A baseline continuous cdf.
...	The baseline cdf parameters.
q	scaler or vector of probabilities at which the quantile needs to be computed.
n	number of random numbers to be generated.

Value

panollg gives the distribution function, danollg gives the density, qanollg gives the quantile function, hanollg gives the hazard function and ranollg generates random variables from the A New Odd log-logistic family of distributions (ANOLL-G) for baseline cdf G.

References

Haghbin, Hossein, et al. "A new generalized odd log-logistic family of distributions." Communications in Statistics-Theory and Methods 46.20(2017): 9897-9920.

Examples

```
x <- seq(0, 1, length.out = 21)
panollg(x)
panollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
danollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(danollg, -3, 3)
qanollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
n <- 10
ranollg(n, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
hanollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(hanollg, -3, 3)
```

BOLLG *The beta Odd log-logistic family of distributions (BOLL-G)*

Description

Computes the pdf, cdf, hdf, quantile and random numbers of the beta extended distribution due to Cordeiro et al. (2016) specified by the pdf

$$f = \frac{\alpha\, g\, G^{a\,\alpha-1}\bar{G}^{b\,\alpha-1}}{B(a,b)[G^{\alpha}+\bar{G}^{\alpha}]^{a+b}}$$

for G any valid continuous cdf , $\bar{G} = 1 - G$, g the corresponding pdf, $B(a, b)$, the beta function, $a, b > 0$, the shape parameter, $\alpha > 0$, the first shape parameter.

Usage

```
pbollg(x, alpha = 1, a = 1, b = 1, G = pnorm, ...)

dbollg(x, alpha = 1, a = 1, b = 1, G = pnorm, ...)

qbollg(q, alpha = 1, a = 1, b = 1, G = pnorm, ...)

rbollg(n, alpha = 1, a = 1, b = 1, G = pnorm, ...)

hbollg(x, alpha = 1, a = 1, b = 1, G = pnorm, ...)
```

Arguments

x	scaler or vector of values at which the pdf or cdf needs to be computed.
alpha	the value of the first shape parameter, must be positive, the default is 1.
a	the value of the shape parameter, must be positive, the default is 1.
b	the value of the shape parameter, must be positive, the default is 1.
G	A baseline continuous cdf.
...	The baseline cdf parameters.
q	scaler or vector of probabilities at which the quantile needs to be computed.
n	number of random numbers to be generated.

Value

pbollg gives the distribution function, dbollg gives the density, qbollg gives the quantile function, hbollg gives the hazard function and rbollg generates random variables from the The beta Odd log-logistic family of distributions (BOLL-G) for baseline cdf G.

References

Cordeiro, G. M., Alizadeh, M., Tahir, M. H., Mansoor, M., Bourguignon, M., Hamedani, G. G. (2016). The beta odd log-logistic generalized family of distributions. Hacettepe Journal of Mathematics and Statistics, 45(4), 1175-1202.

Examples

```
x <- seq(0, 1, length.out = 21)
pbollg(x)
pbollg(x, alpha = 2, a = 2, b = 2, G = pbeta, shape1 = 1, shape2 = 2)
dbollg(x, alpha = 2, a = 2, b = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(dbollg, -3, 3)
qbollg(x, alpha = 2, a = 2, b = 2, G = pbeta, shape1 = 1, shape2 = 2)
n <- 10
rbollg(n, alpha = 2, a = 2, b = 2, G = pbeta, shape1 = 1, shape2 = 2)
hbollg(x, alpha = 2, a = 2, b = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(hbollg, -3, 3)
```

EOLLG *Exponentiated Odd log-logistic family of distributions (EOLL-G)*

Description

Computes the pdf, cdf, hdf, quantile and random numbers of the beta extended distribution due to Alizadeh et al. (2020) specified by the pdf

$$f = \frac{\alpha\beta\, g\, G^{\alpha\beta-1}\bar{G}^{\alpha-1}}{[G^{\alpha}+\bar{G}^{\alpha}]^{\beta+1}}$$

for G any valid continuous cdf , $\bar{G} = 1 - G$, g the corresponding pdf, $\alpha > 0$, the first shape parameter, and $\beta > 0$, the second shape parameter.

Usage

```
peollg(x, alpha = 1, beta = 1, G = pnorm, ...)

deollg(x, alpha = 1, beta = 1, G = pnorm, ...)

qeollg(q, alpha = 1, beta = 1, G = pnorm, ...)

reollg(n, alpha = 1, beta = 1, G = pnorm, ...)

heollg(x, alpha = 1, beta = 1, G = pnorm, ...)
```

Arguments

x	scaler or vector of values at which the pdf or cdf needs to be computed.
alpha	the value of the first shape parameter, must be positive, the default is 1.
beta	the value of the second shape parameter, must be positive, the default is 1.
G	A baseline continuous cdf.
...	The baseline cdf parameters.
q	scaler or vector of probabilities at which the quantile needs to be computed.
n	number of random numbers to be generated.

Value

peollg gives the distribution function, deollg gives the density, qeollg gives the quantile function, heollg gives the hazard function and reollg generates random variables from the Exponentiated Odd log-logistic family of distributions (EOLL-G) for baseline cdf G.

References

ALIZADEH, Morad; TAHMASEBI, Saeid; HAGHBIN, Hossein. The exponentiated odd log-logistic family of distributions: Properties and applications. Journal of Statistical Modelling: Theory and Applications, 2020, 1. Jg., Nr. 1, S. 29-52.

Examples

```
x <- seq(0, 1, length.out = 21)
peollg(x)
peollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
deollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(deollg, -3, 3)
qeollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
n <- 10
reollg(n, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
heollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(heollg, -3, 3)
```

GOLLG *Generalized Odd log-logistic family of distributions (GOLL-G)*

Description

Computes the pdf, cdf, hdf, quantile and random numbers of the beta extended distribution due to Cordeiro et al. (2017) specified by the pdf

$$f = \frac{\alpha\beta\, g\, G^{\alpha\beta-1}[1-G^{\alpha}]^{\beta-1}}{[G^{\alpha\beta}+[1-G^{\alpha}]^{\beta}]^2}$$

for G any valid continuous cdf , $\bar{G} = 1 - G$, g the corresponding pdf, $\alpha > 0$, the first shape parameter, and $\beta > 0$, the second shape parameter.

Usage

```
pgollg(x, alpha = 1, beta = 1, G = pnorm, ...)

dgollg(x, alpha = 1, beta = 1, G = pnorm, ...)

qgollg(q, alpha = 1, beta = 1, G = pnorm, ...)

rgollg(n, alpha = 1, beta = 1, G = pnorm, ...)

hgollg(x, alpha = 1, beta = 1, G = pnorm, ...)
```

Arguments

x	scaler or vector of values at which the pdf or cdf needs to be computed.
alpha	the value of the first shape parameter, must be positive, the default is 1.
beta	the value of the second shape parameter, must be positive, the default is 1.
G	A baseline continuous cdf.
...	The baseline cdf parameters.
q	scaler or vector of probabilities at which the quantile needs to be computed.
n	number of random numbers to be generated.

Value

pgollg gives the distribution function, dgollg gives the density, qgollg gives the quantile function, hgollg gives the hazard function and rgollg generates random variables from the Generalized Odd log-logistic family of distributions (GOLL-G) for baseline cdf G.

References

Cordeiro, G.M., Alizadeh, M., Ozel, G., Hosseini, B., Ortega, E.M.M., Altun, E. (2017). The generalized odd log-logistic family of distributions : properties, regression models and applications. Journal of Statistical Computation and Simulation ,87(5),908-932.

Examples

```
x <- seq(0, 1, length.out = 21)
pgollg(x)
pgollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
dgollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(dgollg, -3, 3)
qgollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
n <- 10
rgollg(n, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
hgollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(hgollg, -3, 3)
```

KwOLLG *Kumaraswamy Odd log-logistic family of distributions (KwOLL-G)*

Description

Computes the pdf, cdf, hdf, quantile and random numbers of the beta extended distribution due to Alizadeh et al. (2017) specified by the pdf

$$f = \frac{a\, b\, \alpha\, g\, G^{a\,\alpha-1} \bar{G}^{\alpha-1}}{[G^{\alpha} + \bar{G}^{\alpha}]^{a+1}} \times \{1 - [\frac{G^{\alpha}}{G^{\alpha} + \bar{G}^{\alpha}}]^{a}\}^{b-1}$$

for G any valid continuous cdf , $\bar{G} = 1 - G$, g the corresponding pdf, $a, b > 0$, the shape parameter, $\alpha > 0$, the first shape parameter.

Usage

```
pkwollg(x, alpha = 1, a = 1, b = 1, G = pnorm, ...)

dkwollg(x, alpha = 1, a = 1, b = 1, G = pnorm, ...)

qkwollg(q, alpha = 1, a = 1, b = 1, G = pnorm, ...)

rkwollg(n, alpha = 1, a = 1, b = 1, G = pnorm, ...)

hkwollg(x, alpha = 1, a = 1, b = 1, G = pnorm, ...)
```

Arguments

x	scaler or vector of values at which the pdf or cdf needs to be computed.
alpha	the value of the first shape parameter, must be positive, the default is 1.
a	the value of the shape parameter, must be positive, the default is 1.
b	the value of the shape parameter, must be positive, the default is 1.
G	A baseline continuous cdf.
...	The baseline cdf parameters.
q	scaler or vector of probabilities at which the quantile needs to be computed.
n	number of random numbers to be generated.

Value

pkwollg gives the distribution function, dkwollg gives the density, qkwollg gives the quantile function, hkwollg gives the hazard function and rkwollg generates random variables from the Kumaraswamy Odd log-logistic family of distributions (KwOLL-G) for baseline cdf G.

References

Alizadeh, M., Emadi, M., Doostparast, M., Cordeiro, G. M., Ortega, E. M., Pescim, R. R. (2015). A new family of distributions: the Kumaraswamy odd log-logistic, properties and applications. Hacettepe Journal of Mathematics and Statistics, 44(6), 1491-1512.

Examples

```
x <- seq(0, 1, length.out = 21)
pkwollg(x)
pkwollg(x, alpha = 2, a = 2, b = 2, G = pbeta, shape1 = 1, shape2 = 2)
dkwollg(x, alpha = 2, a = 2, b = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(dkwollg, -3, 3)
qkwollg(x, alpha = 2, a = 2, b = 2, G = pbeta, shape1 = 1, shape2 = 2)
n <- 10
rkwollg(n, alpha = 2, a = 2, b = 2, G = pbeta, shape1 = 1, shape2 = 2)
hkwollg(x, alpha = 2, a = 2, b = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(hkwollg, -3, 3)
```

MOOLLG *Marshal-Olkin Odd log-logistic family of distributions (MOOLL-G)*

Description

Computes the pdf, cdf, hdf, quantile and random numbers of the beta extended distribution due to Gleaton et al. (2010) specified by the pdf

$$f = \frac{\alpha\beta\, g\, G^{\alpha-1}\bar{G}^{\alpha-1}}{[G^{\alpha} + \beta\, \bar{G}^{\alpha}]^2}$$

for G any valid continuous cdf , $\bar{G} = 1 - G$, g the corresponding pdf, $\alpha > 0$, the first shape parameter, and $\beta > 0$, the second shape parameter.

Usage

```
pmoollg(x, alpha = 1, beta = 1, G = pnorm, ...)

dmoollg(x, alpha = 1, beta = 1, G = pnorm, ...)

qmoollg(q, alpha = 1, beta = 1, G = pnorm, ...)

rmoollg(n, alpha = 1, beta = 1, G = pnorm, ...)

hmoollg(x, alpha = 1, beta = 1, G = pnorm, ...)
```

Arguments

x	scaler or vector of values at which the pdf or cdf needs to be computed.
alpha	the value of the first shape parameter, must be positive, the default is 1.
beta	the value of the second shape parameter, must be positive, the default is 1.
G	A baseline continuous cdf.
...	The baseline cdf parameters.
q	scaler or vector of probabilities at which the quantile needs to be computed.
n	number of random numbers to be generated.

Value

pmoollg gives the distribution function, dmoollg gives the density, qmoollg gives the quantile function, hmoollg gives the hazard function and rmoollg generates random variables from the Marshal-Olkin Odd log-logistic family of distributions (MOOLL-G) for baseline cdf G.

References

Gleaton, J. U., Lynch, J. D. (2010). Extended generalized loglogistic families of lifetime distributions with an application. J. Probab. Stat.Sci, 8(1), 1-17.

Examples

```
x <- seq(0, 1, length.out = 21)
pmoollg(x)
pmoollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
dmoollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(dmoollg, -3, 3)
qmoollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
n <- 10
rmoollg(n, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
hmoollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(hmoollg, -3, 3)
```

NOLLG *New Odd log-logistic family of distributions (NOLL-G)*

Description

Computes the pdf, cdf, hdf, quantile and random numbers of the beta extended distribution due to Alizadeh et al. (2019) specified by the pdf

$$f = \frac{g\, G^{\alpha-1}\bar{G}^{\beta-1}[\alpha + (\beta-\alpha)G]}{[G^{\alpha} + \bar{G}^{\beta}]^2}$$

for G any valid continuous cdf , $\bar{G} = 1 - G$, g the corresponding pdf, $\alpha > 0$, the first shape parameter, and $\beta > 0$, the second shape parameter.

Usage

```
pnollg(x, alpha = 1, beta = 1, G = pnorm, ...)

dnollg(x, alpha = 1, beta = 1, G = pnorm, ...)

qnollg(q, alpha = 1, beta = 1, G = pnorm, ...)

rnollg(n, alpha = 1, beta = 1, G = pnorm, ...)

hnollg(x, alpha = 1, beta = 1, G = pnorm, ...)
```

Arguments

x	scaler or vector of values at which the pdf or cdf needs to be computed.
alpha	the value of the first shape parameter, must be positive, the default is 1.
beta	the value of the second shape parameter, must be positive, the default is 1.
G	A baseline continuous cdf.
...	The baseline cdf parameters.
q	scaler or vector of probabilities at which the quantile needs to be computed.
n	number of random numbers to be generated.

Value

pnollg gives the distribution function, dnollg gives the density, qnollg gives the quantile function, hnollg gives the hazard function and rnollg generates random variables from the New Odd log-logistic family of distributions (NOLL-G) for baseline cdf G.

References

Alizadeh, M., Altun, E., Ozel, G., Afshari, M., Eftekharian, A. (2019). A new odd log-logistic lindley distribution with properties and applications. Sankhya A, 81(2), 323-346.

Examples

```
x <- seq(0, 1, length.out = 21)
pnollg(x)
pnollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
dnollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(dnollg, -3, 3)
qnollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
n <- 10
rnollg(n, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
hnollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(hnollg, -3, 3)
```

OBuG *Odd Burr generated family of distributions (OBu-G)*

Description

Computes the pdf, cdf, hdf, quantile and random numbers of the beta extended distribution due to Alizadeh et al. (2017) specified by the pdf

$$f = \frac{\alpha\beta\, g\, G^{\alpha-1}\bar{G}^{\alpha\,\beta-1}}{[G^{\alpha}+\bar{G}^{\alpha}]^{\beta+1}}$$

for G any valid continuous cdf , $\bar{G} = 1 - G$, g the corresponding pdf, $\alpha > 0$, the first shape parameter, and $\beta > 0$, the second shape parameter.

Usage

```
pobug(x, alpha = 1, beta = 1, G = pnorm, ...)

dobug(x, alpha = 1, beta = 1, G = pnorm, ...)

qobug(q, alpha = 1, beta = 1, G = pnorm, ...)

robug(n, alpha = 1, beta = 1, G = pnorm, ...)

hobug(x, alpha = 1, beta = 1, G = pnorm, ...)
```

Arguments

x	scaler or vector of values at which the pdf or cdf needs to be computed.
alpha	the value of the first shape parameter, must be positive, the default is 1.
beta	the value of the second shape parameter, must be positive, the default is 1.
G	A baseline continuous cdf.
...	The baseline cdf parameters.
q	scaler or vector of probabilities at which the quantile needs to be computed.
n	number of random numbers to be generated.

Value

pobug gives the distribution function, dobug gives the density, qobug gives the quantile function, hobug gives the hazard function and robug generates random variables from the Odd Burr generated family of distributions (OBu-G) for baseline cdf G.

References

Alizadeh, M., Cordeiro, G. M., Nascimento, A. D., Lima, M. D. C. S., Ortega, E. M. (2017). Odd-Burr generalized family of distributions with some applications. Journal of statistical computation and simulation, 87(2), 367-389.

Examples

```
x <- seq(0, 1, length.out = 21)
pobug(x)
pobug(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)

dobug(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(dobug, -3, 3)
qobug(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
n <- 10
robug(n, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
hobug(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(hobug, -3, 3)
```

OLLG *Odd log-logistic family of distributions (OLL-G)*

Description

Computes the pdf, cdf, hdf, quantile and random numbers of the beta extended distribution due to Gleaton et al. (2006) specified by the pdf

$$f = \frac{\alpha\, g\, G^{\alpha-1}\bar{G}^{\alpha-1}}{[G^{\alpha} + \bar{G}^{\alpha}]^2}$$

for G any valid continuous cdf , $\bar{G} = 1 - G$, g the corresponding pdf, $\alpha > 0$, the first shape parameter.

Usage

```
pollg(x, alpha = 1, G = pnorm, ...)

dollg(x, alpha = 1, G = pnorm, ...)

qollg(q, alpha = 1, G = pnorm, ...)

rollg(n, alpha = 1, G = pnorm, ...)

hollg(x, alpha = 1, G = pnorm, ...)
```

Arguments

x	scaler or vector of values at which the pdf or cdf needs to be computed.
alpha	the value of the first shape parameter, must be positive, the default is 1.
G	A baseline continuous cdf.
...	The baseline cdf parameters.
q	scaler or vector of probabilities at which the quantile needs to be computed.
n	number of random numbers to be generated.

Value

pollg gives the distribution function, dollg gives the density, qollg gives the quantile function, hollg gives the hazard function and rollg generates random variables from the Odd log-logistic family of distributions (OLL-G) for baseline cdf G.

References

Gleaton, J. U., Lynch, J. D. (2006). Properties of generalized log-logistic families of lifetime distributions. Journal of Probability and Statistical Science, 4(1), 51-64.

Examples

```
x <- seq(0, 1, length.out = 21)
pollg(x)
pollg(x, alpha = 2, G = pbeta, shape1 = 1, shape2 = 2)
dollg(x, alpha = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(dollg, -3, 3)
qollg(x, alpha = 2, G = pbeta, shape1 = 1, shape2 = 2)
n <- 10
rollg(n, alpha = 2, G = pbeta, shape1 = 1, shape2 = 2)
hollg(x, alpha = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(hollg, -3, 3)
```

OLLLG *Odd log-logistic logarithmic family of distributions (OLLL-G)*

Description

Computes the pdf, cdf, hdf, quantile and random numbers of the beta extended distribution due to Haghbin et al. (2017) specified by the pdf

$$f = \frac{\alpha\beta\, g\, G^{\alpha-1}\bar{G}^{\alpha-1}}{-[G^{\alpha}+\bar{G}^{\alpha}][(1-\beta)\, G^{\alpha}+\bar{G}^{\alpha}]\log(1-\beta)}$$

for G any valid continuous cdf , $\bar{G} = 1 - G$, g the corresponding pdf, $\alpha > 0$, the first shape parameter, and $0 < \beta < 1$, the second shape parameter.

Usage

```
polllg(x, alpha = 1, beta = 0.1, G = pnorm, ...)

dolllg(x, alpha = 1, beta = 0.1, G = pnorm, ...)

qolllg(q, alpha = 1, beta = 0.1, G = pnorm, ...)

rolllg(n, alpha = 1, beta = 0.1, G = pnorm, ...)

holllg(x, alpha = 1, beta = 0.1, G = pnorm, ...)
```

Arguments

x	scaler or vector of values at which the pdf or cdf needs to be computed.
alpha	the value of the first shape parameter, must be positive, the default is 1.
beta	the value of the second shape parameter, between 0 and 1, the default is 0.1.
G	A baseline continuous cdf.
...	The baseline cdf parameters.
q	scaler or vector of probabilities at which the quantile needs to be computed.
n	number of random numbers to be generated.

Value

`polllg` gives the distribution function, `dolllg` gives the density, `qolllg` gives the quantile function, `holllg` gives the hazard function and `rolllg` generates random variables from the Odd log-logistic logarithmic family of distributions (OLLL-G) for baseline cdf G.

References

Alizadeh, M., MirMostafee, S. M. T. K., Ortega, E. M., Ramires, T. G., Cordeiro, G. M. (2017). The odd log-logistic logarithmic generated family of distributions with applications in different areas. Journal of Statistical Distributions and Applications, 4(1), 1-25.

Examples

```
x <- seq(0, 1, length.out = 21)
polllg(x)
polllg(x, alpha = 2, beta = .2, G = pbeta, shape1 = 1, shape2 = 2)

dolllg(x, alpha = 2, beta = .2, G = pbeta, shape1 = 1, shape2 = 2)
curve(dolllg, -3, 3)
qolllg(x, alpha = 2, beta = .2, G = pbeta, shape1 = 1, shape2 = 2)
n <- 10
rolllg(n, alpha = 2, beta = .2, G = pbeta, shape1 = 1, shape2 = 2)
holllg(x, alpha = 2, G = pbeta, beta = .2, shape1 = 1, shape2 = 2)
curve(holllg, -3, 3)
```

RBOLLG — *The Ristic-Balakrishnan Odd log-logistic family of distributions (RBOLL-G)*

Description

Computes the pdf, cdf, hdf, quantile and random numbers of the beta extended distribution due to Esmaeili et al. (2020) specified by the pdf

$$f = \frac{\alpha\, g\, G^{\alpha-1}\bar{G}^{\alpha-1}}{\Gamma(\beta)[G^{\alpha}+\bar{G}^{\alpha}]^2}\,\{-\log[\frac{G^{\alpha}}{G^{\alpha}+\bar{G}^{\alpha}}]\}^{\beta-1}$$

for G any valid continuous cdf , $\bar{G} = 1 - G$, g the corresponding pdf, $\Gamma(\beta)$ the Gamma funcion, $\alpha > 0$, the first shape parameter, and $\beta > 0$, the second shape parameter.

Usage

```
prbollg(x, alpha = 1, beta = 1, G = pnorm, ...)

drbollg(x, alpha = 1, beta = 1, G = pnorm, ...)

qrbollg(q, alpha = 1, beta = 1, G = pnorm, ...)

rrbollg(n, alpha = 1, beta = 1, G = pnorm, ...)

hrbollg(x, alpha = 1, beta = 1, G = pnorm, ...)
```

Arguments

x	scaler or vector of values at which the pdf or cdf needs to be computed.
alpha	the value of the first shape parameter, must be positive, the default is 1.
beta	the value of the second shape parameter, must be positive, the default is 1.
G	A baseline continuous cdf.
...	The baseline cdf parameters.
q	scaler or vector of probabilities at which the quantile needs to be computed.
n	number of random numbers to be generated.

Value

prbollg gives the distribution function, drbollg gives the density, qrbollg gives the quantile function, hrbollg gives the hazard function and rrbollg generates random variables from the The Ristic-Balakrishnan Odd log-logistic family of distributions (RBOLL-G) for baseline cdf G.

References

Esmaeili, H., Lak, F., Altun, E. (2020). The Ristic-Balakrishnan odd log-logistic family of distributions: Properties and Applications. Statistics, Optimization Information Computing, 8(1), 17-35.

Examples

```
x <- seq(0, 1, length.out = 21)
prbollg(x)
prbollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
drbollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(drbollg, -3, 3)
qrbollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)

n <- 10
rrbollg(n, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)

hrbollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(hrbollg, -3, 3)
```

ZBOLLG *The Zografos-Balakrishnan Odd log-logistic family of distributions (ZBOLL-G)*

Description

Computes the pdf, cdf, hdf, quantile and random numbers of the beta extended distribution due to Cordeiro et al. (2016) specified by the pdf

$$f = \frac{\alpha\, g\, G^{\alpha-1}\bar{G}^{\alpha-1}}{\Gamma(\beta)[G^{\alpha}+\bar{G}^{\alpha}]^2}\,\{-\log[1-\frac{G^{\alpha}}{G^{\alpha}+\bar{G}^{\alpha}}]\}^{\beta-1}$$

for G any valid continuous cdf , $\bar{G} = 1 - G$, g the corresponding pdf, $\Gamma(\beta)$ the Gamma funcion, $\alpha > 0$, the first shape parameter, and $\beta > 0$, the second shape parameter.

Usage

```
pzbollg(x, alpha = 1, beta = 1, G = pnorm, ...)

dzbollg(x, alpha = 1, beta = 1, G = pnorm, ...)

qzbollg(q, alpha = 1, beta = 1, G = pnorm, ...)

rzbollg(n, alpha = 1, beta = 1, G = pnorm, ...)

hzbollg(x, alpha = 1, beta = 1, G = pnorm, ...)
```

Arguments

x	scaler or vector of values at which the pdf or cdf needs to be computed.
alpha	the value of the first shape parameter, must be positive, the default is 1.
beta	the value of the second shape parameter, must be positive, the default is 1.
G	A baseline continuous cdf.
...	The baseline cdf parameters.
q	scaler or vector of probabilities at which the quantile needs to be computed.
n	number of random numbers to be generated.

Value

pzbollg gives the distribution function, dzbollg gives the density, qzbollg gives the quantile function, hzbollg gives the hazard function and rzbollg generates random variables from the The Zografos-Balakrishnan Odd log-logistic family of distributions (ZBOLL-G) for baseline cdf G.

References

Cordeiro, G. M., Alizadeh, M., Ortega, E. M., Serrano, L. H. V. (2016). The Zografos-Balakrishnan odd log-logistic family of distributions: Properties and Applications. Hacettepe Journal of Mathematics and Statistics, 45(6), 1781-1803. .

Examples

```
x <- seq(0, 1, length.out = 21)
pzbollg(x)
pzbollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
dzbollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(dzbollg, -3, 3)
qzbollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
n <- 10
rzbollg(n, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
hzbollg(x, alpha = 2, beta = 2, G = pbeta, shape1 = 1, shape2 = 2)
curve(hzbollg, -3, 3)
```

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