Package 'elfDistr'

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Title Kumaraswamy Complementary Weibull Geometric (Kw-CWG) Probability Distribution

Version 1.0.0

Description Density, distribution function, quantile function and random generation for the Kumaraswamy Complementary Weibull Geometric (Kw-CWG) lifetime probability distribution proposed in Afify, A.Z. et al (2017) <doi:10.1214/16-BJPS322>.

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Encoding UTF-8

LazyData true

URL https://github.com/matheushjs/elfDistr

BugReports https://github.com/matheushjs/elfDistr/issues

RoxygenNote 6.1.1

Depends R (>= 3.1.0)

LinkingTo Rcpp

Imports Rcpp

SystemRequirements C++11

NeedsCompilation yes

Suggests testthat

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R topics documented:

elfDistr *Kumaraswamy Complementary Weibull Geometric (Kw-CWG) Probability Distribution*

Description

Density, distribution function, quantile function and random generation for the Kumaraswamy Complementary Weibull Geometric probability distribution (Kw-CWG) lifetime distribution.

Details

This package follows naming convention that is consistent with base R, where density (or probability mass) functions, distribution functions, quantile functions and random generation functions names are followed by `d`, `p`, `q`, and `r` prefixes.

Behaviour of the functions is consistent with base R, where for not valid parameters values `NaN`'s are returned, while for values beyond function support `0`'s are returned (e.g. for non-integers in discrete distributions, or for negative values in functions with non-negative support).

All the functions vectorized and coded in C++ using **Rcpp**.

Kw-CWG *Kumaraswamy Complementary Weibull Geometric Probability Distribution*

Description

Density, distribution function, quantile function and random generation for the Kumaraswamy Complementary Weibull Geometric (Kw-CWG) probability distribution.

Usage

```
dkwcwg(x, alpha, beta, gamma, a, b, log = FALSE)

pkwcwg(q, alpha, beta, gamma, a, b, lower.tail = TRUE, log.p = FALSE)

qkwcwg(p, alpha, beta, gamma, a, b, lower.tail = TRUE, log.p = FALSE)

rkwcwg(n, alpha, beta, gamma, a, b)
```

Arguments

`x, q`	vector of quantiles.
`alpha, beta, gamma, a, b`	Parameters of the distribution. 0 < alpha < 1, and the other parameters mustb e positive.

`log, log.p`	logical; if TRUE, probabilities p are given as log(p).
`lower.tail`	logical; if TRUE (default), probabilities are $P[X \leq x]$ otherwise, $P[X > x]$.
`p`	vector of probabilities.
`n`	number of observations. If `length(n) > 1`, the length is taken to be the number required.

Details

Probability density function

$$f(x) = \alpha^a \beta\gamma ab(\gamma x)^{\beta-1} \exp[-(\gamma x)^\beta] \cdot \frac{\{1-\exp[-(\gamma x)^\beta]\}^{a-1}}{\{\alpha + (1-\alpha)\exp[-(\gamma x)^\beta]\}^{a+1}} \cdot$$

$$\cdot \left\{1 - \frac{\alpha^a [1-\exp[-(\gamma x)^\beta]]^a}{\{\alpha + (1-\alpha)\exp[-(\gamma x)^\beta]\}^a}\right\}$$

Cumulative density function

$$F(x) = 1 - \left\{1 - \left[\frac{\alpha(1-\exp[-(\gamma x)^\beta])}{\alpha + (1-\alpha)\exp[-(\gamma x)^\beta]}\right]^a\right\}^b$$

Quantile function

$$Q(u) = \gamma^{-1}\left\{\log\left[\frac{\alpha + (1-\alpha)\sqrt[a]{1-\sqrt[b]{1-u}}}{\alpha(1-\sqrt[a]{1-\sqrt[b]{1-u}})}\right]\right\}^{1/\beta}, 0 < u < 1$$

References

Afify, A.Z., Cordeiro, G.M., Butt, N.S., Ortega, E.M. and Suzuki, A.K. (2017). A new lifetime model with variable shapes for the hazard rate. Brazilian Journal of Probability and Statistics

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