Package ‘elfDistr’

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

Version  1.0.0


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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 .......................................................... 2
Kw-CWG .......................................................... 2

Index  4
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.

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

\begin{verbatim}
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)
\end{verbatim}

Arguments

\begin{itemize}
  \item \texttt{x, q} \hspace{1cm} vector of quantiles.
  \item \texttt{alpha, beta, gamma, a, b} \hspace{1cm} Parameters of the distribution. 0 < alpha < 1, and the other parameters must be positive.
\end{itemize}
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

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

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

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

References

Index

*Topic distribution
  Kw-CWG, 2
*Topic models
  Kw-CWG, 2
*Topic survival
  Kw-CWG, 2
*Topic univar
  Kw-CWG, 2

dkwcwg (Kw-CWG), 2
elfDistr, 2
elfDistr-package (elfDistr), 2
Kw-CWG, 2
pkwcwg (Kw-CWG), 2
qkwcwg (Kw-CWG), 2
rkwcwg (Kw-CWG), 2