

Package ‘llogistic’

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Title The L-Logistic Distribution

Version 1.0.3

Description Density, distribution function, quantile function and random generation for the L-Logistic distribution with parameters m and ϕ . The parameter m is the median of the distribution.

Imports stats

Depends R ($\geq 3.3.0$)

License GPL-3

Encoding UTF-8

LazyData true

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NeedsCompilation no

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llogistic	<i>The L-Logistic Distribution</i>
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Description

Density, distribution function, quantile function and random generation for the L-Logistic distribution with parameters m and ϕ .

Usage

```

dllogistic(x, m, phi, log = FALSE)

pllogistic(q, m, phi, lower.tail = TRUE, log.p = FALSE)

qllogistic(p, m, phi, lower.tail = TRUE, log.p = FALSE)

rllogistic(n, m, phi)

```

Arguments

<code>x, q</code>	vector of quantiles.
<code>m, phi</code>	parameters of the L-Logistic distribution. The parameter <code>m</code> lies in the interval (0,1) and <code>phi</code> is positive.
<code>log, log.p</code>	logical; if TRUE, probabilities <code>p</code> are given as $\log(p)$.
<code>lower.tail</code>	logical; if TRUE (default), probabilities are $P[X \leq x]$, otherwise, $P[X > x]$.
<code>p</code>	vector of probabilities.
<code>n</code>	number of observations.

Details

The llogistic distribution has density

$$f(x) = \text{phi}(1 - m)^{\text{phi}} m^{\text{phi}} x^{\text{phi}} (1 - x)^{\text{phi}} (\text{phi} - 1) / ((1 - m)^{\text{phi}} x^{\text{phi}} + m^{\text{phi}} (1 - x)^{\text{phi}})^2,$$

for $0 < x < 1$, where `m` is a median of the distribution and `phi` is a shape parameter.

Value

`dllogistic(x,m,phi)` gives the density function, `rllogistic(n,m,phi)` gives `n` random variates and `qllogistic(p,m,phi)` gives the quantile.

Source

The L-Logistic distribution was introduced by Tadikamalla and Johnson (1982), which refer to this distribution as Logit-Logistic distribution. Here, we have a new parameterization of the Logit-Logistic with the median as a parameter.

References

Paz, R.F., Balakrishnan, N and Bazán, Jorge L. (2016). L-Logistic Distribution: Properties, Inference and an Application to Study Poverty and Inequality in Brazil. São Carlos: Universidade Federal de São Carlos. Technical-Scientific Report No. 261, Theory and Method. Sponsored by the Department of Statistical, <URL:<http://www.pipges.ufscar.br/publicacoes/relatorios-tecnicos/arquivos-1/rt261.pdf>>.

TADIKAMALLA, P. R.; JOHNSON, N. L. (1982). Systems of frequency curves generated by transformations of logistic variables. *Biometrika*, v. 69, n. 2, p. 461.

Examples

```
dllogistic(0.3, 0.5, 2)
pllogistic(0.7, 0.5, 2)
qllogistic(0.2, 0.5, 2)
rllogistic(10, 0.5, 2)
```

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