

Package: tlgarima (via r-universe)

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Type Package

Title The Topp–Leone Garima Distribution

Version 0.1.0

Description Density, distribution function, quantile function, and random generating function of the Topp–Leone Garima distribution based on Boonmeekham, A., Supapakorn, T., & Bodhisuwan, W. (2025)<[doi:10.1134/S1995080225608471](https://doi.org/10.1134/S1995080225608471)>. In addition, maximum likelihood estimation for the Topp–Leone Garima distribution is provided.

License GPL-3

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Suggests testthat (>= 3.0.0)

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`mleTLGa`*Maximum Likelihood Estimation*

Description

A maximum likelihood estimation function for the Topp–Leone Garima Distribution (TLGa distribution).

Usage

```
mleTLGa(x, param, method = "L-BFGS-B")
```

Arguments

<code>x</code>	data vector
<code>param</code>	parameter vector of the TLGa distribution.
<code>method</code>	a numerical optimization method, that is, the L-BFGS-B algorithm.

Value

a list of output(variables) as follows: `estalpha` is the estimated parameter alpha, `esttheta` is the estimated parameter theta, `negll_value` is the negative Loglikelihood function, `stderr_of_estalpha` is the standard error of the estimated parameter alpha. `stderr_of_esttheta` is the standard error of the estimated parameter theta.

References

Boonmeeham, A., Supapakorn, T., & Bodhisuwan, W. (2025). The Topp–Leone Garima Distribution: Properties and Application. *Lobachevskii Journal of Mathematics*, 46(7), 3510-3521. doi:10.1134/S1995080225608471.

Examples

```
x <- rTLGa(100,alpha = 1, theta = 2)
guess_params <- c(0.8, 1.5)
mleTLGa(x,param=guess_params)
```

TLGa *The Topp–Leone Garima Distribution (TLGa)*

Description

Density, distribution function, quantile function, and random generation function for TLGa distribution with two parameters (alpha and theta). The TLGa distribution is first presented by Arin Boonmeekham, Thidaporn Supapakorn, and Winai Bodhisuwan. See details in references.

Usage

```
dTLGa(x, alpha, theta, log = FALSE)
```

```
pTLGa(q, alpha, theta, lower.tail = TRUE, log.p = FALSE)
```

```
qTLGa(p, alpha, theta)
```

```
rTLGa(n, alpha, theta)
```

Arguments

x, q	vector of quantile.
alpha	shape parameter of the Topp–Leone generator of distributions, where $\alpha > 0$.
theta	shape parameter of the Garima distribution, where $\theta > 0$.
log, log.p	logical; (default = FALSE), if TRUE, then probabilities 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.

Value

dTLGa gives the density, pTLGa gives the distribution function, qTLGa gives the quantile function, rTLGa generates random samples.

References

Boonmeekham, A., Supapakorn, T., & Bodhisuwan, W. (2025). The Topp–Leone Garima Distribution: Properties and Application. *Lobachevskii Journal of Mathematics*, 46(7), 3510-3521. doi:10.1134/S1995080225608471.

Examples

NULL

```
x <- seq(1,10,by=0.1)
x
fx <- dTLGa(x,alpha = 1, theta = 2)
fx
logfx <- dTLGa(x,alpha = 1, theta = 2,log = TRUE)
logfx
```

```
x <- seq(1,10,by=0.1)
x
Fx <- pTLGa(q=x ,alpha = 1, theta = 0.8)
Fx      #P(X<x)
Sx <- pTLGa(q=x ,alpha = 1, theta = 0.8, lower.tail = FALSE) # Survival function
Sx      #P(X>x) or 1-Fx
```

```
require(lamW)
x <- rTLGa(20,alpha=1.5,theta=3)
x
p <- pTLGa(x,alpha = 1.5, theta = 3)
p
q <- qTLGa(p,alpha=1.5,theta = 3)
q      # The value of q is equal to x.
```

```
require(lamW)
x <- rTLGa(50,alpha=2,theta=1.5)
x
```

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