Package 'LREP'

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Type Package

Title Estimate and Test Exponential vs. Pareto Distributions

Version 0.1.1

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Description The programs were developed for estimation of parameters and testing exponential versus Pareto distribution during our work on hydrologic extremes. See Kozubowski, T.J., A.K. Panorska, F. Qeadan, and A. Gershunov (2007) <doi:10.1080/03610910802439121>, and Panorska, A.K., A. Gershunov, and T.J. Kozubowski (2007) <doi:10.1007/978-0-387-34918-3_26>.

BugReports https://github.com/jiqiaingwu/LREP/issues

License GPL (>= 3)

Encoding UTF-8

Depends R (>= 4.0.0)

RoxygenNote 7.1.1

NeedsCompilation no

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Repository CRAN

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Contents

LREP-package   *LREP: Estimate and Test Exponential vs. Pareto Distributions*

Description

The programs were developed for estimation of parameters and testing exponential versus Pareto distribution during our work on hydrologic extremes. See Kozubowski, T.J., A.K. Panorska, F. Qeadan, and A. Gershunov (2007) <doi:10.1080/03610910802439121>, and Panorska, A.K., A. Gershunov, and T.J. Kozubowski (2007) <doi:10.1007/978-0-387-34918-3_26>.

Details

We consider the problem of maximum likelihood estimation of the parameters of the Pareto Type II (Lomax) distribution. We show that in certain parametrization and after modification of the parameter space to include exponential distribution as a special case, the MLEs of parameters always exist. Moreover, the MLEs have a non standard asymptotic distribution in the exponential case due to the lack of regularity. Further, we develop a likelihood ratio test for exponentiality versus Pareto II distribution.

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References

1. Kozubowski, T.J., A.K. Panorska, F. Qeadan, and A. Gershunov (2007). Testing exponentiality versus Pareto distribution via likelihood ratio, preprint in review.

2. Panorska, A.K., A. Gershunov, and T.J. Kozubowski (2007). From diversity to volatility: Probability of daily precipitation and extremes. Nonlinear Dynamics in Geosciences (A. Tsonis and J. Elsner, Eds.), Springer, New York, pp 465-484.

See Also

Useful links:

- Report bugs at https://github.com/jiqiaingwu/LREP/issues

expparetotest	*This program takes your data and the significance level as input and returns the critical number for the test, the value of the -2L (deviance) statistic and the decision (Pareto or exponential) as output.*

Description

This program takes your data and the significance level as input and returns the critical number for the test, the value of the -2L (deviance) statistic and the decision (Pareto or exponential) as output.

Usage

```
expparetotest(x, alpha)
```

Arguments

x	Import Raw data
alpha	Significance level. Note: this program works only for the following significance levels: 0.10, 0.075, 0.05, 0.025, 0.01 and 0.005.

Value

Output the critical number for the test, the value of the -2L (deviance) statistic and the decision (Pareto or exponential).

Fields

`critical` Critical value

`statistic` Deviance statistic

`info` Interpret the data is coming from an exponential distribution or Pareto distribution.

Examples

```
x<-rexp(1000,0.1)
print(expparetotest(x,0.05))
```

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sigmaalphaLREP   *The program will take your data as input and return three numbers as*
                                  output: estimate of s, estimate of alpha, and value of the statistic L.

Description

The program will take your data as input and return three numbers as output: estimate of s, estimate
of alpha, and value of the statistic L.

Usage

```
sigmaalphaLREP(x, tolerance)
```

Arguments

x   Import Raw data

tolerance   Tolerance quantity

Value

Output three estimates by using maximum likelihood method

Fields

s.hat Output estimate of s

a.hat estimate of alpha

log.like.ratio value of the statistic L

Examples

```
x<-rexp(1000,0.1)
print(sigmaalphaLREP(x,10^-12))
```

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