Package ‘neftest’

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Type Package

Title Goodness of fit tests based on zero regression characterizations of Tweedie, Bar-Lev and Enis class of distributions

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Description Provide test statistics for the goodness of fit tests based on zero regression characterizations of Tweedie, Bar-Lev and Enis class of distributions, and p-value of test statistic according to several specified distributions, which is based on the proposed method.

Depends R (>= 3.2.0)

LazyData true

NeedsCompilation yes

Repository CRAN

URL https://github.com/xliusufe/neftest

Encoding UTF-8

R topics documented:

neftest-package	*Goodness of fit tests based on zero regression characterizations of Tweedie, Bar-Lev and Enis class of distributions*

Description

Provide test statistics for the goodness of fit tests based on zero regression characterizations of Tweedie, Bar-Lev and Enis class of distributions, and p-value of test statistic according to several specified distributions, which is based on the proposed method.

Details

Package:	neftest
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References

Authors (2021). Goodness of fit tests based on zero regression characterizations of Tweedie, Bar-Lev and Enis class of distributions. Manuscript.

pvals	*The p-value of the test based on the test statistic* Tnw

Description

Compute the p-value of the test based on the test statistic T_{nw}.

Usage

```
pvals(x, distr="Poisson", bootstrap = FALSE, B = 1000, signif = 0.05,
                weight="normal", a = 1.0, max.iter = 100, tol = 1e-8)
```

Arguments

`x`	A length n vector of input data.
`distr`	The true distribution including Poisson distribution `distr = "Poisson"`, Gamma distribution `distr = "Gamma"` and Inverse Gaussian distribution `distr = "Inverse Gaussian"`. Default is `distr = "Poisson"`.
`bootstrap`	logical. Bootstrap method is used to compute the p-value if FALSE (default), and the maximum likelihood method otherwise.
`B`	Number of bootstrap samples. Default is 1000.

`signif`	The significance level of the test. Default is 0.05.
`weight`	The weight functions including normal distribution `weight = "normal"` and Laplace distribution `weight = "laplace"`. Default is `weight = "normal"`.
`a`	The parameter of the weight function. Default is 1.0. See details in the paper
`max.iter`	The maximum number of iterations in Newton method. Default is 100.
`tol`	The precision of the Newton method. Default is `1e-8`.

Value

`pval`	The p-value of the test.

References

Authors (2021). Goodness of fit tests based on zero regression characterizations of Tweedie, Bar-Lev and Enis class of distributions. Manuscript.

Examples

```
# Poisson
n   <- 100
NS  <- 500
distr <- "Poisson"
x     <- rpois(n,lambda = 1)
pval  = pvals(x, distr, signif = 0.05)

pval


# Poisson with Bootstrap
n   <- 100
NS  <- 500
B   <- 500
distr <- "Poisson"
x     <- rpois(n,lambda = 1)
pval  = pvals(x, distr, bootstrap = TRUE, B = B, signif = 0.05)

pval



# Gamma
n     <- 100
NS    <- 500
distr <- "Gamma"
x     <- rgamma(n, shape = 1, rate = 1)
pval  = pvals(x, distr, signif = 0.05)

pval


# Gamma with Bootstrap
n     <- 100
NS    <- 500
B     <- 500
distr <- "Gamma"
```

```
x     <- rgamma(n, shape = 1, rate = 1)
pval  = pvals(x, distr, bootstrap = TRUE, B = B, signif = 0.05)

pval



# Inverse Gaussian
n     <- 100
NS    <- 500
distr <- "Inverse Gaussian"
x     <- rIGauss(n, mu = 1, lambda = 1)
pval  = pvals(x, distr, signif = 0.05)

pval



# Inverse Gaussian with Bootstrap
n     <- 100
NS    <- 500
B     <- 500
distr <- "Inverse Gaussian"
x     <- rIGauss(n, mu = 1, lambda = 1)
pval  = pvals(x, distr, bootstrap = TRUE, B = B, signif = 0.05)

pval
```

`rIGauss` *Generates random numbers from Inverse Gaussian distribution.*

Description

Generates random numbers from Inverse Gaussian distribution.

Usage

```
rIGauss(n, mu = 1.0, lambda = 1.0)
```

Arguments

`n`	Number of random numbers to be generated.
`mu`	shape parameters μ. Default is 1.
`lambda`	scale parameters λ. Default is 1.

Details

The probability density function:

$f(x;\mu,\lambda) = \sqrt{\frac{\lambda}{2\pi x^3}} \exp\left(-\frac{\lambda(x-\mu)^2}{2\mu^2 x}\right), x > 0.$

Value

`x`	The random numbers from Inverse Gaussian distribution.

Examples

```
x = rIGauss(n = 10, mu = 1.0, lambda = 1.0)
x
```

Tnw *The test statistic for testing if a distribution is a TBE(γ0)*

Description

Compute the test statistic T_{nw}.

Usage

```
Tnw(x, gamma0 = 1, weight = "normal", a = 1.0)
```

Arguments

x	A length n vector of input data.
gamma0	The power parameter in TBE(γ_0). Default is 1.
weight	The weight functions including normal distribution `weight = "normal"` and Laplace distribution `weight = "laplace"` . Default is `weight = "normal"`.
a	The parameter of the weight function. Default is 1.0.

Value

Tn	The test statistic T_{nw}.

References

Authors (2021). Goodness of fit tests based on zero regression characterizations of Tweedie, Bar-Lev and Enis class of distributions. Manuscript.

Examples

```
# Poisson
n   <- 100
x   <- rpois(n,lambda = 1)
B   <- 1000
Tn  <- Tnw(x, gamma0 = 1, weight = "normal", a = 1.0)
Tb  = rep(NA, B)
lambdahat  = mean(x)
for(b in 1:B){
  xb  <- rpois(n, lambda = lambdahat)
  Tb[b] <- Tnw(xb, gamma0 = 1, weight = "normal", a = 1.0)
}
pval = mean(quantile(Tb, probs = 1-0.05) > Tn)

# Gamma
n   <- 100
x   <- rgamma(n, shape = 1, rate = 1)
Tn  <- Tnw(x, gamma0 = 1, weight = "normal", a = 1.0)
```

```
# Inverse Gaussian
n   <- 100
x   <- rIGauss(n, mu = 1, lambda = 1)
B   <- 1000
Tn  <- Tnw(x, gamma0 = 1, weight = "normal", a = 1.0)
Tb  = rep(NA, B)
nuhat  = mean(x)
lambdahat = (mean(1/x)-nuhat^(-1))^(-1)
for(b in 1:B){
  xb  <- rIGauss(n, mu = nuhat, lambda = lambdahat)
  Tb[b] <- Tnw(xb, gamma0 = 1, weight = "normal", a = 1.0)
}
pval = mean(quantile(Tb, probs = 1-0.05) > Tn)
```

Index