Package ‘el.convex’

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Type Package

Title empirical likelihood ratio tests for means

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Description empirical likelihood ratio tests for means

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**dataset**

*dataset simulated using the procedure described in the reference*

**Description**

First column is covariates, second outcomes, third and forth instrumental variables

**Usage**

data(dataset)

**Format**

The format is: num [1:1000, 1:4] 0 1 1 0 1 1 0 0 0 ... - attr(*, "dimnames")=List of 2 ..$ : NULL ..$ : chr [1:4] "W" "Y" "" ""

**References**

A Study of Methods for Computing Empirical Likelihood

**Examples**

data(dataset)

dealer.bfgs

---

**el.test.bfgs**

*Empirical likelihood ratio test for the means using BFGS method for optimization*

**Description**

Compute the empirical likelihood ratio with the mean vector fixed at mu. The log empirical likelihood been maximized. el.test.bfgs uses BFGS method.

**Usage**

el.test.bfgs(x, mu, lam, maxit = 100, tol = 1e-07)

**Arguments**

- **x**
  - a matrix or vector containing the data, one row per observation.
- **mu**
  - a numeric vector (of length = ncol(x)) to be tested as the mean vector of x above, as H0
- **lam**
  - an optional vector of length = length(mu), the starting value of Lagrange multipliers, will use 0 if missing
- **maxit**
  - an optional integer to control iteration when solve constrained maximization
- **tol**
  - an optional real value for convergence test
el.test.damped

Details
If mu is in the interior of the convex hull of the observations x, then wts should sum to 1.

Value
-2LLR the -2 loglikelihood ratio; approximate chisq distribution under H0
Pval the observed P-value by chi-square approximation
lambda the final value of Lagrange multiplier
nits number of iteration performed
wts weights on the observations
mu the means that are achieved

Warning
el.convex has not been thoroughly tested. Please report bugs.

Author(s)
Dan Yang, Dylan Small

References
A Study of Methods for Computing Empirical Likelihood Numerical recipes in C

Examples
x <- matrix(c(rnorm(5,mean=1), rnorm(5,mean=2)), ncol=2,nrow=5)
el.test.newton(x, mu=c(1,2))
el.test.bfgs(x, mu=c(1,2))

---
el.test.damped \hspace{1cm} Empirical likelihood ratio test for the means using damped Newton method for optimization

Description
Compute the empirical likelihood ratio with the mean vector fixed at mu. The log empirical likelihood been maximized. El.test.damped uses damped Newton method.

Usage
el.test.damped(x, mu, lam, maxit = 200, tol = 1e-07)
el.test.damped

Arguments

- **x**: a matrix or vector containing the data, one row per observation.
- **mu**: a numeric vector (of length = ncol(x)) to be tested as the mean vector of x above, as H0
- **lam**: an optional vector of length = length(mu), the starting value of Lagrange multipliers, will use 0 if missing
- **maxit**: an optional integer to control iteration when solve constrained maximization
- **tol**: an optional real value for convergence test

Details

If mu is in the interior of the convex hull of the observations x, then wts should sum to 1

Value

- **-2LLR**: the -2 loglikelihood ratio; approximate chisq distribution under H0
- **Pval**: the observed P-value by chi-square approximation
- **lambda**: the final value of Lagrange multiplier
- **nits**: number of iteration performed
- **wts**: weights on the observations
- **mu**: the means that are achieved

Warning

el.convex has not been thoroughly tested. Please report bugs.

Author(s)

Dan Yang, Dylan Small

References

A Study of Methods for Computing Empirical Likelihood Numerical recipes in C

Examples

```r
x <- matrix(c(rnorm(50,mean=1), rnorm(50,mean=2)), ncol=2,nrow=50)
el.test.damped(x, mu=c(1,2))
```
**el.test.dfp**

*Empirical likelihood ratio test for the means using DFP method for optimization*

**Description**

Compute the empirical likelihood ratio with the mean vector fixed at `mu`. The log empirical likelihood been maximized `el.test.dfp` uses DFP method

**Usage**

```r
el.test.dfp(x, mu, lam, maxit = 100, tol = 1e-07)
```

**Arguments**

- `x` a matrix or vector containing the data, one row per observation.
- `mu` a numeric vector (of length = `ncol(x)`) to be tested as the mean vector of `x` above, as H0
- `lam` an optional vector of length = `length(mu)`, the starting value of Lagrange multipliers, will use 0 if missing
- `maxit` an optional integer to control iteration when solve constrained maximization
- `tol` an optional real value for convergence test

**Details**

If `mu` is in the interior of the convex hull of the observations `x`, then `wts` should sum to 1

**Value**

- `~2LLR` the -2 loglikelihood ratio; approximate chisq distribution under H0
- `Pval` the observed P-value by chi-square approximation
- `lambda` the final value of Lagrange multiplier
- `nits` number of iteration performed
- `wts` weights on the observations
- `mu` the means that are achieved

**Warning**

`el.convex` has not been thoroughly tested. Please report bugs.

**Author(s)**

Dan Yang, Dylan Small
References

A Study of Methods for Computing Empirical Likelihood Numerical recipes in C

Examples

```r
x <- matrix(c(rnorm(50,mean=1), rnorm(50,mean=2)), ncol=2,nrow=50)
el.test.dfp(x, mu=c(1,2))
```

---

**el.test.frpr**

*Empirical likelihood ratio test for the means using FRPR method for optimization*

---

**Description**

Compute the empirical likelihood ratio with the mean vector fixed at mu. The log empirical likelihood been maximized. el.test.frpr uses conjugate gradient method.

**Usage**

```r
el.test.frpr(x, mu, lam, maxit = 100, tol = 1e-07)
```

**Arguments**

- `x`: a matrix or vector containing the data, one row per observation.
- `mu`: a numeric vector (of length = ncol(x)) to be tested as the mean vector of x above, as H0
- `lam`: an optional vector of length = length(mu), the starting value of Lagrange multipliers, will use 0 if missing
- `maxit`: an optional integer to control iteration when solve constrained maximization
- `tol`: an optional real value for convergence test

**Details**

If mu is in the interior of the convex hull of the observations x, then wts should sum to 1

**Value**

- `~2LLR`: the -2 loglikelihood ratio; approximate chisq distribution under H0
- `Pval`: the observed P-value by chi-square approximation
- `lambda`: the final value of Lagrange multiplier
- `nits`: number of iteration performed
- `wts`: weights on the observations
- `mu`: the means that are achieved
el.test.newton

Warning
el.convex has not been thoroughly tested. Please report bugs.

Author(s)
Dan Yang, Dylan Small

References
A Study of Methods for Computing Empirical Likelihood Numerical recipes in C

Examples
x <- matrix(c(rnorm(50,mean=1), rnorm(50,mean=2)), ncol=2,nrow=50)
el.test.frpr(x, mu=c(1,2))

el.test.newton                Empirical likelihood ratio test for the means using Newton method for optimization

Description
Compute the empirical likelihood ratio with the mean vector fixed at mu. The log empirical likelihood been maximized. el.test.newton uses simple Newton method for optimization.

Usage
el.test.newton(x, mu, lam, maxit = 25, tol = 1e-07)

Arguments
x    a matrix or vector containing the data, one row per observation.
mu   a numeric vector (of length = ncol(x)) to be tested as the mean vector of x above, as H0
lam  an optional vector of length = length(mu), the starting value of Lagrange multipliers, will use 0 if missing
maxit an optional integer to control iteration when solve constrained maximization
tol   an optional real value for convergence test

Details
If mu is in the interior of the convex hull of the observations x, then wts should sum to 1
### Value
- **-2LR** the loglikelihood ratio; approximate chi-square distribution under H0
- **Pval** the observed P-value by chi-square approximation
- **lambda** the final value of Lagrange multiplier
- **nits** number of iteration performed
- **wts** weights on the observations
- **mu** the means that are achieved

### Warning
el.convex has not been thoroughly tested. Please report bugs.

### Author(s)
Dan Yang, Dylan Small

### References
A Study of Methods for Computing Empirical Likelihood Numerical recipes in C

### Examples
```r
x <- matrix(c(rnorm(5, mean=1), rnorm(5, mean=2)), ncol=2)
el.test.newton(x, mu=c(1,2))
```

---

### samp

#### sample from bootstrap

### Description
sample that is used in order to get the plot in the references

### Usage
data(samp)

### Format
The format is: num [1:1000] 765 588 840 695 522 961 796 546 547 721 ...

### References
A Study of Methods for Computing Empirical Likelihood

### Examples
data(samp)
vec

<table>
<thead>
<tr>
<th>vec</th>
<th>four constants</th>
</tr>
</thead>
</table>

Description

four constants that are used in order to get the plot in the reference

Usage

data(vec)

Format

The format is: Named num [1:4] 11.8699 11.8957 4.184 -0.0348 - attr(*, "names")= chr [1:4] "a1.temp" "a2.temp" "b1.temp" "d"

References

A Study of Methods for Computing Empirical Likelihood

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data(vec)
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