Package ‘wINEQ’

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Title Inequality Measures for Weighted Data
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Description Computes inequality measures of a given variable taking into account weights. Bootstrap method provides distribution of inequality measures and several additional statistics.
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Description
Computes Allison and Foster inequality measure of a given variable taking into account weights.

Usage
\[ AF(X, W = \text{rep}(1, \text{length}(X))) \]

Arguments
- \( X \) is a data vector
- \( W \) is a vector of weights

Value
The value of Allison and Foster coefficient.

References

Examples
\[
X = c(1, 2, 3, 4, 5, 6, 7, 8, 9) \\
W = c(2, 5, 6, 7, 3, 4, 5, 2, 5) \\
AF(X, W)
\]

Description
Computes Atkinson inequality measure of a given variable taking into account weights.

Usage
\[ \text{Atkinson}(X, W = \text{rep}(1, \text{length}(X)), e = 1) \]
### Description

Computes CoefVar inequality measure of a given variable taking into account weights.

### Usage

```
CoefVar(X, W = rep(1, length(X)), square = FALSE, na.rm = TRUE)
```

### Arguments

- **X**: is a data vector
- **W**: is a vector of weights
- **square**: logical, argument of the function CoefVar, for details see below
- **na.rm**: logical, should missing values (NAs) be removed prior to computations? If set to FALSE the computations yield NA

### Value

The value of CoefVar coefficient.

### References

Examples

X=c(1,2,3,4,5,6,7,8,9)
W=c(2,5,6,7,3,4,5,2,5)
CoefVar(X,W)

Description

Computes Entropy inequality measure of a given variable taking into account weights.

Usage

Entropy(X, W = rep(1, length(X)), parameter = 0.5, na.rm = TRUE)

Arguments

X is a data vector
W is a vector of weights
parameter is a entropy parameter
na.rm logical, should missing values (NAs) be removed prior to computations? If set to FALSE the computations yield NA

Value

The value of Entropy coefficient.

References


Examples

X=c(1,2,3,4,5,6,7,8,9)
W=c(2,5,6,7,3,4,5,2,5)
Entropy(X,W)
Description
Computes Gini inequality measure of a given variable taking into account weights.

Usage
Gini(X, W = rep(1, length(X)))

Arguments
X is a data vector
W is a vector of weights

Value
The value of Gini coefficient.

References

Examples
X=c(1,2,3,4,5,6,7,8,9)
W=c(2,5,6,7,3,4,5,2,5)
Gini(X,W)

Description
Computes Hoover inequality measure of a given variable taking into account weights.

Usage
Hoover(X, W = rep(1, length(X)))

Arguments
X is a data vector
W is a vector of weights
Value
The value of Hoover coefficient.

References

Examples
X=c(1,2,3,4,5,6,7,8,9)
W=c(2,5,6,7,3,4,5,2,5)
Hoover(X,W)

Description
Calculates weighted mean and sum of X, and a set of inequality measures.

Usage
ineq.weighted(
  X,
  W = rep(1, length(X)),
  Atkinson.e = 1,
  Jenkins.alfa = 0.8,
  Entropy.e = 0.5,
  Kolm.p = 1
)

Arguments
X is a data vector
W is a vector of weights
Atkinson.e is a parameter for calculating the value of the Atkinson coefficient
Jenkins.alfa is the Jenkins coefficient parameter
Entropy.e is a entropy parameter
Kolm.p is a Kolm parameter

Value
The data frame with weighted mean and sum of X, and all inequality measures.
**ineq.weighted.boot**

**Examples**

```r
X=c(1,2,3,4,5,6,7,8,9)
W=c(2,5,6,7,3,4,5,2,5)
ineq.weighted(X,W)
```

**Description**

For weighted mean and weighted total of X as well as for each inequality measure, returns outputs from ineq.weighted and bootstrap outcomes: expected value, bias (in %), standard deviation, coefficient of variation, lower and upper bound of confidence interval.

**Usage**

```r
ineq.weighted.boot(
  X,  
  W = rep(1, length(X)),  
  B = 10,  
  Atkinson.e = 1,  
  Jenkins.alfa = 0.8,  
  Entropy.e = 0.5,  
  Kolm.p = 1,  
  keepSamples = FALSE,  
  keepMeasures = FALSE,  
  conf.alpha = 0.05,  
  calib.boot = FALSE,  
  Xs = rep(1, length(X)),  
  total = sum(W),  
  calib.method = "truncated"
)
```

**Arguments**

- **X** is a data vector
- **W** is a vector of weights
- **B** is number of bootstrap samples
- **Atkinson.e** is a parameter for calculating the value of the Atkinson coefficient
- **Jenkins.alfa** is the Jenkins coefficient parameter
- **Entropy.e** is an entropy parameter
- **Kolm.p** is a Kolm parameter
- **keepSamples** if TRUE, it returns bootstrap samples of data (Xb) and weights (Wb)
Jenkins

keepMeasures if TRUE, it returns values of all inequality measures for each bootstrap sample
conf.alpha significance level for confidence interval
calib.boot if FALSE, then naive bootstrap is performed, calibrated bootstrap elsewhere
Xs matrix of calibration variables
total vector of population totals
calib.method weights’ calibration method for function calib (sampling)

Value

By default this functions returns a data frame from ineq.weighted for weighted mean and weighted total of X as well as for each inequality measure extended with bootstrap results: expected value, bias (in %), standard deviation, coefficient of variation, lower and upper bound of confidence interval. If keepSamples=TRUE or keepMeasures==TRUE then the output becomes a list. If keepSamples=TRUE, the functions returns Xb and Wb, which are the samples of vector data and the samples of weights, respectively. If keepMeasures==TRUE, the functions returns Mb, which is a set of inequality measures from bootstrapping.

Examples

X=c(1,2,3,4,5,6,7,8,9)
W=c(2,5,6,7,3,4,5,2,5)
ineq.weighted.boot(X,W)

Jenkins  Jenkins and Cowell_and_Flachaire

Description

Computes Jenkins and Cowell_and_Flachaire inequality measure of a given variable taking into account weights.

Usage

Jenkins(X, W = rep(1, length(X)), alfa = 0.8)

Arguments

X is a data vector
W is a vector of weights
alfa is the Jenkins coefficient parameter

Value

The value of Jenkins and Cowell_and_Flachaire coefficient.
References


Examples

X=c(1,2,3,4,5,6,7,8,9)
W=c(2,5,6,7,3,4,5,2,5)
Jenkins(X,W)

<table>
<thead>
<tr>
<th>Kolm</th>
<th>Kolm</th>
</tr>
</thead>
</table>

Description

Computes Kolm inequality measure of a given variable taking into account weights.

Usage

Kolm(X, W = rep(1, length(X)), parameter = 1, na.rm = TRUE)

Arguments

- X: is a data vector
- W: is a vector of weights
- parameter: is a Kolm parameter
- na.rm: logical, should missing values (NAs) be removed prior to computations? If set to FALSE the computations yield NA

Value

The value of Kolm coefficient.

References


Examples

X=c(1,2,3,4,5,6,7,8,9)
W=c(2,5,6,7,3,4,5,2,5)
Kolm(X,W)
Leti

Description

Computes Leti inequality measure of a given variable taking into account weights.

Usage

Leti(X, W = rep(1, length(X)))

Arguments

- **X**: is a data vector
- **W**: is a vector of weights

Value

The value of Leti coefficient.

References


Examples

```r
X=c(1,2,3,4,5,6,7,8,9)
W=c(2,5,6,7,3,4,5,2,5)
Leti(X,W)
```

Palma

Description

Palma proportion - the ratio of the total income of the 10% richest people to the 40% poorest people.

Usage

Palma(X, W = rep(1, length(X)))

Arguments

- **X**: is a data vector
- **W**: is a vector of weights
Value

The value of Palma coefficient.

References


Examples

\[ X = c(1, 2, 3, 4, 5, 6, 7, 8, 9) \]
\[ W = c(2, 5, 6, 7, 3, 4, 5, 2, 5) \]
\[ \text{Palma}(X, W) \]

Description

20:20 ratio - the ratio of the total income of the 20% richest people to the 20% poorest people.

Usage

\[ \text{Prop20_20}(X, W = \text{rep}(1, \text{length}(X))) \]

Arguments

- \text{X} is a data vector
- \text{W} is a vector of weights

Value

The value of 20:20 ratio coefficient.

References


Examples

\[ X = c(1, 2, 3, 4, 5, 6, 7, 8, 9) \]
\[ W = c(2, 5, 6, 7, 3, 4, 5, 2, 5) \]
\[ \text{Prop20_20}(X, W) \]
RicciSchutz

Description
Computes RicciSchutz inequality measure of a given variable taking into account weights.

Usage
RicciSchutz(X, W = rep(1, length(X)), na.rm = TRUE)

Arguments
- **X**: is a data vector
- **W**: is a vector of weights
- **na.rm**: logical, should missing values (NAs) be removed prior to computations? If set to FALSE the computations yield NA

Value
The value of RicciSchutz coefficient.

References

Examples
X=c(1,2,3,4,5,6,7,8,9)
W=c(2,5,6,7,3,4,5,2,5)
RicciSchutz(X,W)

Theil_L

Description
Computes Theil_L inequality measure of a given variable taking into account weights.

Usage
Theil_L(X, W = rep(1, length(X)))
Arguments

$X$ is a data vector
$W$ is a vector of weights

Value

The value of Theil_L coefficient.

References


Examples

```r
X=c(1,2,3,4,5,6,7,8,9)
W=c(2,5,6,7,3,4,5,2,5)
Theil_L(X,W)
```

Theil_T

Description

Computes Theil_T inequality measure of a given variable taking into account weights.

Usage

```r
Theil_T(X, W = rep(1, length(X)))
```

Arguments

$X$ is a data vector
$W$ is a vector of weights

Value

The value of Theil_T coefficient.

References

Examples

\[ X = \{1, 2, 3, 4, 5, 6, 7, 8, 9\} \]
\[ W = \{2, 5, 6, 7, 3, 4, 5, 2, 5\} \]
\[ \text{Theil}_T(X, W) \]
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