# Package 'wINEQ'

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**Title** Inequality Measures for Weighted Data

**Version** 1.0.1

**Description** Computes inequality measures of a given variable taking into account weights. Bootstrap method provides distribution of inequality measures and several additional statistics.

**License** GPL-3

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## R topics documented:

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AF *Allison and Foster*

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## Description

Computes Allison and Foster inequality measure of a given variable taking into account weights.

## Usage

```
AF(X, W = rep(1, length(X)))
```

## Arguments

| | |
|---|---|
| X | is a data vector |
| W | is a vector of weights |

## Value

The value of Allison and Foster coefficient.

## References

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9

## 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)
```

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Atkinson *Atkinson*

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## Description

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

## Usage

```
Atkinson(X, W = rep(1, length(X)), e = 1)
```

### Arguments

| | |
|---|---|
| X | is a data vector |
| W | is a vector of weights |
| e | is a parameter for calculating the value of the Atkinson coefficient |

### Value

The value of Atkinson coefficient.

### References

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9

### Examples

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

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## CoefVar *CoefVar*

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### 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

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9

## 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)
```

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`Entropy` *Entropy*

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## 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

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9

## 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)
```

`Gini` *Gini*

## 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

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9

## 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)
```

`Hoover` *Hoover*

## 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

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9

## 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)
```

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`ineq.weighted` *ineq.weighted*

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## 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.

## 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(X,W)
```

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`ineq.weighted.boot` *ineq.weighted.boot*

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## 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

```
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` | numer 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 a entropy parameter |
| `Kolm.p` | is a Kolm parameter |
| `keepSamples` | if TRUE, it returns bootstrap samples of data (Xb) and weights (Wb) |

| | |
|---|---|
| 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)
```

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# Jenkins *Jenkins and Cowell_and_Flachaire*

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## 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

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9 F A Cowell: Measurement of Inequality, 2000, in A B Atkinson / F Bourguignon (Eds): Handbook of Income Distribution, Amsterdam

## 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)
```

---

`Kolm` *Kolm*

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## 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

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9

## 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 *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

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9

### Examples

```
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 *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

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9 Putting the Gini Back in the Bottle? 'The Palma' as a Policy-Relevant Measure of Inequality

## Examples

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

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# Prop20_20 *Prop20:20*

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## Description

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

## Usage

```
Prop20_20(X, W = rep(1, length(X)))
```

## Arguments

| | |
|---|---|
| X | is a data vector |
| W | is a vector of weights |

## Value

The value of 20:20 ratio coefficient.

## References

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9 Panel Data Econometrics: Theoretical Contributions And Empirical Applications edited by Badi Hani Baltag Notes on Statistical Sources and Methods - The Equality Trust.

## Examples

```
X=c(1,2,3,4,5,6,7,8,9)
W=c(2,5,6,7,3,4,5,2,5)
Prop20_20(X,W)
```

## RicciSchutz *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

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9

### 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 *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

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9 A. Serebrenik, M. van den Brand. Theil index for aggregation of software metrics values. 26th IEEE International Conference on Software Maintenance. IEEE Computer Society.

### Examples

```
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 *Theil T*

---

### Description

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

### Usage

```
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

Philip B. Coulter: (1989) Measuring Inequality ISBN 0-8133-7726-9 A. Serebrenik, M. van den Brand. Theil index for aggregation of software metrics values. 26th IEEE International Conference on Software Maintenance. IEEE Computer Society.

## Examples

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

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