

# Package ‘WtTopsis’

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**Title** Weighted Method for Multiple-Criteria Decision Making

**Version** 1.0

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**Description** Evaluation of alternatives based on multiple criteria using weighted technique for Order preference by similarity to an ideal solution method. Reference: Hwang CL. (1981, ISBN:978-3-540-10558-9).

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**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 7.1.2

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**Suggests** testthat (>= 3.0.0)

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data2max	<i>data2max Maximized the data.</i>
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## Description

data2max Maximized the data.

## Usage

```
data2max(data, mth, zmth, xbest, qlow, qup)
```

## Arguments

data	The Data that needs to be maximized.
mth	A vector describing the type of each indicator.
zmth	A vector describing the method from negative to positive, including DS: reciprocal method, it is not recommended to use when the data has 0, CZ: using the maximum subtraction method, other types of indicators are marked as NA.
xbest	An optimal value vector of intermediate numerical values, other types of indicators are marked as NA.
qlow	An interval lower bound vector with interval numeric value forward, other types of indicators are marked as NA.
qup	An interval upper bound vector of the interval value maximize, other types of indicators are marked as NA.

## Value

A maximized data set

## Examples

```
sampleData<-sampleData
mth<-c("ZH", "ZJ", "QJ", "ZH", "FU", "ZH", "QJ", "FU", "FU", "ZH")
zmth<-c(NA, NA, NA, NA, "CZ", NA, NA, "DS", "CZ", NA)
xbest<-c(NA, 4, NA, NA, NA, NA, NA, NA, NA, NA)
qup<-c(NA, NA, 5, NA, NA, NA, 5, NA, NA, NA)
qlow<-c(NA, NA, 3, NA, NA, NA, 3, NA, NA, NA)
data2max(sampleData, mth, zmth, xbest, qlow, qup)
```

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DataNormal	<i>DataNormal Normalize the maximized data set.</i>
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**Description**

DataNormal Normalize the maximized data set.

**Usage**

```
DataNormal(data)
```

**Arguments**

data	A maximized data set
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**Value**

A Normalized data set

**Examples**

```
## Not run:
sampleData<-sampleData
mth<-c("ZH", "ZJ", "QJ", "ZH", "FU", "ZH", "QJ", "FU", "FU", "ZH")
zmth<-c(NA, NA, NA, NA, "CZ", NA, NA, "DS", "CZ", NA)
xbest<-c(NA, 4, NA, NA, NA, NA, NA, NA, NA, NA)
qup<-c(NA, NA, 5, NA, NA, NA, 5, NA, NA, NA)
qlow<-c(NA, NA, 3, NA, NA, NA, 3, NA, NA, NA)
maxdata<-data2max(sampleData, mth, zmth, xbest, qlow, qup)
DataNormal(maxdata)

## End(Not run)
```

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DataNormalpre	<i>DataNormalpre Prepare the normalized data set.</i>
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**Description**

DataNormalpre Prepare the normalized data set.

**Usage**

```
DataNormalpre(data, i)
```

**Arguments**

data	A maximized data set
i	Index column

**Value**

Index column normalized

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Ejcaul	<i>Ejcaul Calculate Ej value.</i>
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**Description**

Ejcaul Calculate Ej value.

**Usage**

Ejcaul(data, i)

**Arguments**

data	A normalized data set.
i	Index column.

**Value**

Index column weight Ej

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Errmax	<i>Errmax Function on error.</i>
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**Description**

Errmax Function on error.

**Usage**

Errmax(x, i)

**Arguments**

x	The Data that needs to be maximized.
i	Index column.

**Value**

Index column maximized.

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GetWeight	<i>GetWeight Calculate weights on standardized data us the entropy method.</i>
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**Description**

GetWeight Calculate weights on standardized data us the entropy method.

**Usage**

```
GetWeight(data)
```

**Arguments**

data	A Normalized data set
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**Value**

WeightEij is Ej value of Index,weight is weight value of Index

**Examples**

```
sampleData<-sampleData
mth<-c("ZH", "ZJ", "QJ", "ZH", "FU", "ZH", "QJ", "FU", "FU", "ZH")
zmth<-c(NA, NA, NA, NA, "CZ", NA, NA, "DS", "CZ", NA)
xbest<-c(NA, 4, NA, NA, NA, NA, NA, NA, NA, NA)
qup<-c(NA, NA, 5, NA, NA, NA, 5, NA, NA, NA)
qlow<-c(NA, NA, 3, NA, NA, NA, 3, NA, NA, NA)
weightdata<-data2max(sampleData, mth, zmth, xbest, qlow, qup)
GetWeight(weightdata)
```

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max2max	<i>max2max positive Data conversion.</i>
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**Description**

max2max positive Data conversion.

**Usage**

```
max2max(x, i)
```

**Arguments**

x	The Data that needs to be maximized.
i	Index column.

**Value**

Index column maximized

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min2maxC	<i>min2maxC negative Data conversion use Maximum subtraction method</i>
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**Description**

min2maxC negative Data conversion use Maximum subtraction method

**Usage**

min2maxC(x, i)

**Arguments**

x	The Data that needs to be maximized.
i	Index column.

**Value**

Index column maximized

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min2maxD	<i>min2maxD negative Data conversion use reciprocal method</i>
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**Description**

min2maxD negative Data conversion use reciprocal method

**Usage**

min2maxD(x, i)

**Arguments**

x	The Data that needs to be maximized.
i	Index column.

**Value**

Index column maximized

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qj2max	<i>qj2max Interval Data conversion</i>
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**Description**

qj2max Interval Data conversion

**Usage**

qj2max(x, qlow, qup, i)

**Arguments**

x	The Data that needs to be maximized.
qlow	An interval lower bound vector with interval numeric value forward, other types of indicators are marked as NA.
qup	An interval upper bound vector of the interval value maximize, other types of indicators are marked as NA.
i	Index column.

**Value**

Index column maximized

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sampleData	<i>A example of multiple-criteria decision making data.</i>
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**Description**

A example of multiple-criteria decision making data.

**Usage**

sampleData

**Format**

A data fram with 21 rows and 11 variables.

**Source**

Randomly generated.

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WtTopsis	<i>WtTopsis Weighted TOPSIS method for multiple-criteria decision making (MCDM).</i>
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### Description

WtTopsis Weighted TOPSIS method for multiple-criteria decision making (MCDM).

### Usage

```
WtTopsis(data, mth, zmth, xbest, qlow, qup)
```

### Arguments

data	The Data that needs to be maximized.
mth	A vector describing the type of each indicator.
zmth	A vector describing the method from negative to positive, including DS: reciprocal method, it is not recommended to use when the data has 0, CZ: using the maximum subtraction method, other types of indicators are marked as NA.
xbest	An optimal value vector of intermediate numerical values, other types of indicators are marked as NA.
qlow	An interval lower bound vector with interval numeric value forward, other types of indicators are marked as NA.
qup	An interval upper bound vector of the interval value maximize, other types of indicators are marked as NA.

### Value

Data set containing D+, D- and C values

### Examples

```
sampleData<-sampleData
mth<-c("ZH", "ZJ", "QJ", "ZH", "FU", "ZH", "QJ", "FU", "FU", "ZH")
zmth<-c(NA, NA, NA, NA, "CZ", NA, NA, "DS", "CZ", NA)
xbest<-c(NA, 4, NA, NA, NA, NA, NA, NA, NA, NA)
qup<-c(NA, NA, 5, NA, NA, NA, 5, NA, NA, NA)
qlow<-c(NA, NA, 3, NA, NA, NA, 3, NA, NA, NA)
WtTopsis(sampleData, mth, zmth, xbest, qlow, qup)
```

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WtTopsisN	<i>WtTopsis Weighted TOPSIS method for multiple-criteria decision making (MCDM) us Normalized data.</i>
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**Description**

WtTopsis Weighted TOPSIS method for multiple-criteria decision making (MCDM) us Normalized data.

**Usage**

```
WtTopsisN(data)
```

**Arguments**

data                      Normalized data.

**Value**

Data set containing D+,D- and C values

**Examples**

```
sampleData<-sampleData
mth<-c("ZH","ZJ","QJ","ZH","FU","ZH","QJ","FU","FU","ZH")
zmth<-c(NA,NA,NA,NA,"CZ",NA,NA,"DS","CZ",NA)
xbest<-c(NA,4,NA,NA,NA,NA,NA,NA,NA,NA)
qup<-c(NA,NA,5,NA,NA,NA,5,NA,NA,NA)
qlow<-c(NA,NA,3,NA,NA,NA,3,NA,NA,NA)
maxdata<-data2max(sampleData,mth,zmth,xbest,qlow,qup)
normaldata<-DataNormal(maxdata)
WtTopsisN(normaldata)
```

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zj2max	<i>zj2max Intermediate Data conversion</i>
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**Description**

zj2max Intermediate Data conversion

**Usage**

```
zj2max(x, xbest, i)
```

**Arguments**

x	The Data that needs to be maximized.
xbest	An optimal value vector of intermediate numerical values, other types of indicators are marked as NA.
i	Index column.

**Value**

Index column maximized

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