Package ‘HighestMedianRules’

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**Type** Package

**Title** Implementation of Voting Rules Electing the Candidate with
Highest Median Grade

**Version** 1.0

**Description** Computes the scores and ranks candidates according to voting rules electing the highest median grade.


Functions to plot the voting profiles can be found on github: <https://github.com/bixiou/highest_median/blob/master/packages_functions_data.R>.

**License** AGPL-3

**Encoding** UTF-8

**LazyData** true

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**R topics documented:**

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aggregate_scores

Description

Aggregator of scores: returns a vector with the score of each row (i.e. candidate) in a matrix (i.e. the voting profile). See function 'score'.

Usage

aggregate_scores(
  grades,
  rule = "mj",
  k = 0.5,
  scale = c(),
  names = row.names(grades),
  print = FALSE,
  return_text = FALSE,
  rounds = 3
)

Arguments

grades A voting profile, i.e. a matrix with the shares of grades of each candidate on each row, from the lowest grade to the highest.
rule The voting rule to be used. Default to 'mj'. Possible values: 'mj' (majority judgment), 'd' (difference), 's' (relative share), 'n' (normalized difference), 'mean' (range voting). For more details, see "Tie-Breaking the Highest Median", Fabre, Social Choice & Welfare (forthcoming).
k The quantile used to compute the gauge. Default to 0.5 (the median). For more details, see paragraph Extensions in 3.2.1 of "Tie-Breaking the Highest Median", Fabre, Social Choice & Welfare (forthcoming).
scale A numeric vector containing the values of the scale of grades. Default to c((floor(-length(grades)/2)+1):(length(grades)+floor(-length(grades)/2)))).
names String vector, each string to be printed along the gauges in case print = TRUE and return_text = FALSE. Defaults to "".
print Prints the gauges and the argument 'names'. Default to FALSE
return_text Prints the gauges. Defaults to FALSE.
rounds Number of rounding digits. Default to 3.

Value

A double vector or a character vector. The scores (double) if return_text = FALSE, the gauges (character) otherwise.


**Examples**

```
aggregate_scores(elec2012, rule='d', scale=-2:4)
```

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**Description**


**Usage**

```
elec2012
```

**Format**

An object of class `matrix` with 10 rows and 7 columns.

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**gauge**

**Gauge**

**Description**

This function returns a custom description of the grades of a candidate in terms of the shares of proponents (p), opponents (q), median grades (g), and the gauge (i.e. the median grade followed by + or -, a + corresponding to a larger share of proponents than opponents).

**Usage**

```
gauge(grades, k = 0.5, scale = c(), return = "qp")
```

**Arguments**

- **grades**: A numeric vector containing the shares of each grades of a candidate, from the lowest grade to the highest.
- **k**: The quantile used to compute the gauge. Default to 0.5 (the median). For more details, see paragraph Extensions in 3.2.1 of "Tie-Breaking the Highest Median", Fabre, Social Choice & Welfare (forthcoming).
- **scale**: A numeric vector containing the values of the scale of grades. Default to c((floor(-length(grades)/2)+1):(length(grades)+floor(-length(grades)/2))).
- **return**: A string containing the information to return. Default to 'qp' (shares of opponents and proponents). Possible values: 'g', 'p', 'q', 'pq', 'qp', 'qpg', 'pqg', 'gpq', 'gqp', 'text' (i.e. the gauge), 'all'. If the string does not match one of the above, 'all' is returned.
Describes gauges

Gauges

Description

Aggregator of 'gauge': returns the gauge of each row (i.e. candidate) from a matrix (i.e. the voting profile). See function 'gauge'.

Usage

gauges(grades, k = 0.5, scale = c(), return = "qp")

Arguments

grades A numeric vector containing the shares of each grades of a candidate, from the lowest grade to the highest.

k The quantile used to compute the gauge. Default to 0.5 (the median). For more details, see paragraph Extensions in 3.2.1 of "Tie-Breaking the Highest Median", Fabre, Social Choice & Welfare (forthcoming).

scale A numeric vector containing the values of the scale of grades. Default to c((floor(-length(grades)/2)+1):(length(grades)+floor(-length(grades)/2))).

return A string containing the information to return. Default to 'qp' (shares of opponents and proponents). Possible values: 'g', 'p', 'q', 'pq', 'qp', 'pqg', 'qpg', 'gpq', 'gqp', 'text' (i.e. the gauge), 'all'. If the string does not match one of the above, 'all' is returned.

Value

An array with as many columns as elements of grades, with the return of gauge in each column.

Examples

gauges(grades = elec2012, return = 'gqp')
**Description**

Returns a matrix with the scores of candidates sorted in decreasing order, for a given voting rule.

**Usage**

```r
ranking(
  grades,
  rule = "mj",
  k = 0.5,
  scale = c(),
  names = row.names(grades),
  print = FALSE
)
```

**Arguments**

- **grades**: A voting profile, i.e. a matrix with the shares of grades of each candidate on each row, from the lowest grade to the highest.
- **rule**: The voting rule to be used. Default to 'mj'. Possible values: 'mj' (majority judgment), 'd' (difference), 's' (relative share), 'n' (normalized difference), 'mean' (range voting). For more details, see "Tie-Breaking the Highest Median", Fabre, Social Choice & Welfare (forthcoming).
- **k**: The quantile used to compute the gauge. Default to 0.5 (the median). For more details, see paragraph Extensions in 3.2.1 of "Tie-Breaking the Highest Median", Fabre, Social Choice & Welfare (forthcoming).
- **scale**: A numeric vector containing the values of the scale of grades. Default to c((floor(-length(grades)/2)+1):(length(grades)+floor(-length(grades)/2))).
- **names**: String vector, each string to be printed in case print = TRUE. Defaults to c().
- **print**: Prints the argument 'names'. Default to FALSE

**Value**

A character matrix with as many rows as elements of grades, and with the name, gauge and score (according to rule) on each row.

**Examples**

```r
ranking(elec2012, rule='d', scale=-2:4)
```
Description

Returns a matrix with the scores of candidates sorted in decreasing order of score mj, for the five following voting rules (with k=0.5): mj, d, s, n, mean. See function 'score' for more details.

Usage

```r
rankings(
  grades,
  scale = c(),
  names = row.names(grades),
  return_distance = FALSE,
  rounds = TRUE
)
```

Arguments

- **grades**: A voting profile, i.e. a matrix with the shares of grades of each candidate on each row, from the lowest grade to the highest.
- **scale**: A numeric vector containing the values of the scale of grades. Default to c((floor(-length(grades)/2)+1):(length(grades)+floor(-length(grades)/2))).
- **names**: String vector, each string to be printed in case print = TRUE. Defaults to c().
- **return_distance**: If TRUE, returns the Kendall distance between the rules (using AllKendall) instead of the matrix of scores. Default to FALSE.
- **rounds**: If TRUE, rounds the scores (to 3 digits for highest median rules and 2 digits for range voting). Default to TRUE.

Value

A character matrix with as many rows as elements of grades, and with the name, gauge and scores (according to five different rules) on each row.

Examples

```r
rankings(elec2012, scale=-2:4)
```
**Description**

This function returns the score of a candidate, using a custom voting rule.

**Usage**

```r
score(
  rule = "mj",
  grades = elec2012["Hollande", ],
  k = 0.5,
  scale = c(),
  name = "",
  print = TRUE,
  return_text = FALSE
)
```

**Arguments**

- `rule` - The voting rule to be used. Default to ‘mj’. Possible values: ‘mj’ (majority judgment), ‘d’ (difference), ‘s’ (relative share), ‘n’ (normalized difference), ‘mean’ (range voting). For more details, see “Tie-Breaking the Highest Median”, Fabre, Social Choice & Welfare (forthcoming).
- `grades` - A numeric vector containing the shares of each grades of a candidate, from the lowest grade to the highest.
- `k` - The quantile used to compute the gauge. Default to 0.5 (the median). For more details, see paragraph Extensions in 3.2.1 of “Tie-Breaking the Highest Median”, Fabre, Social Choice & Welfare (forthcoming).
- `scale` - A numeric vector containing the values of the scale of grades. Default to `c((floor(-length(grades)/2)+1):(length(grades)+floor(-length(grades)/2)))`.
- `name` - Text to be printed along the gauge in case `print = TRUE` and `return_text = FALSE`. Defaults to "".
- `print` - Prints the gauge and the argument ‘name’. Default to TRUE.
- `return_text` - Prints the gauge. Defaults to FALSE. The gauge is less informative than the score, it is the median grade and + if there are grades higher than the median than lower, - otherwise.

**Value**

A double or a character. The score (a double) if `return_text = FALSE`, the gauge (a character) otherwise.

**Examples**

```r
score(rule='d', elec2012['Hollande',], scale=-2:4, name="Hollande")
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