Package ‘promethee123’

December 21, 2020

Type Package
Title PROMETHEE I, II, and III Methods
Version 0.1.0
Author Miguel Angelo Lellis Moreira [aut, cre],
Marcos dos Santos [aut],
Carlos Francisco Simoes Gomes [aut]
Maintainer Miguel Angelo Lellis Moreira <miguellellis@hotmail.com>
Description The PROMETHEE method is a multi-criteria decision-making method addressing with outranking problems.
The method establishes a preference structure between the alternatives, having a preference function for each criterion.
In this context, three variants of the method is carried out: PROMETHEE I (Partial Outranking),
PROMETHEE II (Total Outranking), and PROMETHEE III (Outranking by Intervals).
License GPL-3
Imports ggplot2, cowplot
Encoding UTF-8
LazyData true
NeedsCompilation no
Repository CRAN
Date/Publication 2020-12-21 10:30:03 UTC

R topics documented:

promethee123 ......................................................... 2

Index 4
The PROMETHEE method is a multi-criteria decision-making method addressing with outranking problems. The method establishes a preference structure between the alternatives, having a preference function for each criterion. In this context, three variants of the method are carried out: PROMETHEE I (Partial pre-ordering), PROMETHEE II (Total pre-ordering), and PROMETHEE III (pre-ordering by intervals).

**Usage**

```python
promethee123(alternatives, criteria, decision_matrix, min_max, normalization_function, q_indifference, p_preference, s_curve_change, criteria_weights)
```

**Arguments**

- `alternatives`: The names respective to set of alternatives in evaluation
- `criteria`: The names respective to set of criteria in evaluation
- `decision_matrix`: A matrix where rows correspond to the criteria and columns correspond to alternatives, there is inputed the performance of alternatives in each criterion
- `min_max`: A vector with objectives, minimize or maximize, to each criteria.
- `normalization_function`: Numerical description relative to each type of normalization function to each criterion
- `q_indifference`: Indifference threshold
- `p_preference`: Preference threshold
- `s_curve_change`: Threshold of changing in the curve
- `criteria_weights`: Numerical representation of the respective importance for each criterion

**Details**

- For normalization function we have six types: [1] for USUAL (0 or 1) — [2] for U-SHAPE (0 or 1) q [3] for V-SHAPE (x/p or 1) p [4] for LEVEL (0, 0.5 or 1) q, p [5] for V-SHAPE I (0, (x-q)/(p-q)) or 1) q, p [6] for GAUSSIAN (0 or 1-e^(-(x^2/2*s^2))) s — q = indifference parameter p = preference parameter s = parameter to indicate change in the preference curve
- The input of thresholds depends on the type of preference function used;
- The sum of weights must be 1;
Value
- Performance in each criterion;
- Global Index of Importance;
- Importance Flows (Positive, Negative, and Net);
- Preference relations in PROMETHEE I;
- Total Outranking in PROMETHEE II;
- Preference relations in PROMETHEE III;
- Graphical representations of PROMETHEE I, II, and III.

Author(s)
Miguel Angelo Lellis Moreira <miguellellis@hotmail.com>, Marcos dos Santos <marcosdossantos_doutorado_uff@yahoo.com.br>, Carlos Francisco Simoes Gomes <cfsg1@bol.com.br>

References

Examples
alternatives <- c("SARP", "ORAC", "TOTS", "MICRO", "IBRP")
decision_matrix <- matrix(c(15, 29, 38, 24, 25.5, 
7.5, 9, 8.5, 8, 7, 
1, 2, 4, 3, 3, 
50, 110, 90, 75, 85), 
ncol = length(alternatives), nrow = length(criteria), byrow = TRUE)

min_max <- c("min", "min", "max", "max")
normalization_function <- c(5, 5, 5, 5)
q_indifference <- c(2, 0.5, 1, 10)
p_preference <- c(5, 1, 2, 20)
s_curve_change <- c("", ",", ",", "")
criteria_weights <- c(0.2, 0.2, 0.3, 0.3)
promethee123(alternatives, criteria, decision_matrix, min_max, normalization_function, 
q_indifference, p_preference, s_curve_change, criteria_weights)
Index

promethee123, 2