Package 'DescriptiveRepresentationCalculator'

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Title Descriptive Representation Calculator from 'The Composition of Descriptive Representation'

Version 2.0

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Description Calculates descriptive representation measures for comparing the composition of a political body to the population it represents. Allows users to compute the expected degree of representation for a body under a random sampling model, the expected degree of representation variability, as well as representation scores from observed political bodies.

Depends R (>= 3.3.3)

License GPL-3

Encoding UTF-8

LazyData false

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Imports stats

RoxygenNote 7.2.3

R topics documented:

ExpectedRepresentation

Compute the expected degree of representation for any group in a political body

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Description

Finds the degree of expected representation for any group in a political body under a random sampling model as described in Gerring, Jerzak and Oncel (2023).

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Usage

```
ExpectedRepresentation(PopShares, BodyN, a = -0.5, b = 1)
```

Arguments

PopShares   A numeric vector containing the group-level population proportions.

BodyN   A positive integer denoting the size of the political body in question.

a, b   The a and b parameters control the affine transformation for how the representation measure is summarized. That is, a and b control how the expected L1 deviation of the population shares from the body shares is re-weighted. The expected L1 deviation is the average value of the absolute deviation of the population from body shares under a random sampling model. This expected L1 deviation is multiplied by a; b is as an additive re-scaling term: a*E[L1]+b. By default, a=-0.5 and b=1 so that the expected Rose Index of Proportionality is returned.

Value

The expected degree of representation (a scalar).

References

- John Gerring, Connor T. Jerzak, Erzen Oncel. (2023), The Composition of Descriptive Representation, *American Political Science Review*, p. 1-18. doi:10.1017/S0003055423000680

Examples

```
ExpectedRep <- ExpectedRepresentation(PopShares = c(1/3, 2/3, 1/3),
                                      BodyN = 50)

print( ExpectedRep )
```

ObservedRepresentation

Compute the observed degree of representation for any group in a political body

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Description

Finds the degree of observed representation for any group in a political body.

Usage

```
ObservedRepresentation(BodyMemberCharacteristics, PopShares, BodyShares, a = -0.5, b = 1)
```

Arguments

BodyMemberCharacteristics

A vector specifying the characteristics for members of a political body.

PopShares   A numeric vector specifying population shares of identities specified in `BodyMemberCharacteristic`
The names of the entries in `PopShares` should correspond to identities in `BodyMemberCharacteristi`
(see Example).

BodyShares   (optional) A numeric vector with same structure as `PopShares` specifying group
population shares of a given body. If specified, used by default instead of
`BodyMemberCharacteristics`.

a, b   Parameters controlling the affine transformation for how the representation mea-
sure is summarized. That is, a and b control how the L1 deviation of the popu-
lation shares from the body shares is re-weighted. This expected L1 deviation is
multiplied by a; b is as an additive re-scaling term: `a*L1+b`. By default, `a=-0.5`
and `b=1` so that the Rose Index of Proportionality is returned.

Value

The observed degree of representation (a scalar). By default, this quantity is the Rose Index of
Proportionality.

Examples

```
ObsRep <- ObservedRepresentation(
                    BodyMemberCharacteristics = c("A","A","C","A","C","A"),
                    PopShares = c("A"=1/3,"B"=2/3, "C"=1/3))

print( ObsRep )
```

SDRepresentation   *Compute the amount of representation left unexplained by a random*
                        sampling model.

Description

Finds the residual standard deviation when using the expected representation for any group in a
political body to predict observed representation as described in Gerring, Jerzak and Oncel, 2023.

Usage

```
SDRepresentation(PopShares, BodyN, a = -0.5, b = 1, nMonte = 10000)
```

Arguments

PopShares   A numeric vector containing the group-level population proportions.

BodyN   A positive integer denoting the size of the political body in question.

a, b   Parameters controlling the affine transformation for how the representation mea-
sure is summarized. That is, a and b control how the expected L1 deviation of
the population shares from the body shares is re-weighted. The expected L1
deviation is the average value of the absolute deviation of the population from

body shares under a random sampling model. This expected L1 deviation is multiplied by a; b is as an additive re-scaling term: `a*E[L1]+b`. By default, `a=-0.5` and `b=1` so that the expected Rose Index of Proportionality is used in the calculation.

nMonte   A positive integer denoting number of Monte Carlo iterations used to approximate the variance of representation under a random sampling model.

Value

A scalar summary of the amount of representation not explained by a random sampling model. More precisely, this function returns the the residual standard deviation when using the expected degree of representation to predict observed representation under a random sampling model.

References

- John Gerring, Connor T. Jerzak, Erzen Oncel. (2023), The Composition of Descriptive Representation, *American Political Science Review*, p. 1-18. doi:10.1017/S0003055423000680

Examples

```
SDRep <- SDRepresentation(PopShares = c(1/3, 2/3, 1/3),
                             BodyN = 50)

print( SDRep )
```

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