

# Package ‘gmethods’

January 29, 2021

**Type** Package

**Title** An implementation of g-methods

**Version** 0.1.0

**Date** 2020-11-26

**Depends** R (>= 4.0.2)

**Description** This package facilitates causal inference by implementing g-methods: g-formula, inverse probability weighting (IPW), and g-estimation. These methods are comprehensively described in Causal Inference: What If book by Hernán and Robins using 1 of 4 NHEFS datasets described in this book (<https://www.hsph.harvard.edu/miguel-hernan/causal-inference-book/>). This package only provides nhefs table, a cleaned version of NHEFS data, for example data. The remaining datasets from that book could be retrieved from cidata R package (<https://github.com/malcolmbarrett/cidata>) for more information.

**License** GPL-3

**Encoding** UTF-8

**LazyData** true

**Roxygen** list(markdown = TRUE)

**RoxygenNote** 7.1.1

**Imports** tidyverse,  
pbapply,  
geepack

**Suggests** BiocStyle,  
knitr,  
rmarkdown,  
kableExtra,  
testthat

**URL** <https://github.com/herdiantrisufriyana/gmethods>

**BugReports** <https://github.com/herdiantrisufriyana/gmethods/issues>

**VignetteBuilder** knitr

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gestimation	<i>Causal inference by g-estimation</i>
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## Description

This function conduct causal inference by implementing g-estimation. Please read (<https://www.hsph.harvard.edu/miguel-hernan/causal-inference-book/>) before applying this test.

## Usage

```
gestimation(formula, data, bootstrap = 30, state = 33, verbose = F)
```

## Arguments

formula	An object of class "formula": a symbolic description of the model to be fitted. The exposure of interest should be plugged-in as the first covariate at the right-hand size of the formula.
data	A data frame containing the variables in the model.
bootstrap	An integer determining how many times this procedure being repeated by re-sampling with replacement.
state	An integer to set random seed for reproducible results.
verbose	A logical determining whether a progress bar is shown.

## Value

output A list containing the formula, exposure of interest, marginal effect, 95% confidence interval (CI), significance by p-value obtained from the CI (<https://doi.org/10.1136/bmj.d2304>), data, bootstrapping times, random seed, and index for each bootstrap set.

## Examples

```
# Load example data for formula and data
input=input_example()
formula=input$formula
data=input$data

# Conduct g-formula
gestimation(formula,data)
```

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gformula	<i>Causal inference by g-formula</i>
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### Description

This function conduct causal inference by implementing g-formula. Please read (<https://www.hsph.harvard.edu/miguel-hernan/causal-inference-book/>) before applying this test.

### Usage

```
gformula(formula, data, bootstrap = 30, state = 33, verbose = F)
```

### Arguments

formula	An object of class "formula": a symbolic description of the model to be fitted. The exposure of interest should be plugged-in as the first covariate at the right-hand size of the formula.
data	A data frame containing the variables in the model.
bootstrap	An integer determining how many times this procedure being repeated by re-sampling with replacement.
state	An integer to set random seed for reproducible results.
verbose	A logical determining whether a progress bar is shown.

### Value

output A list containing the formula, exposure of interest, marginal effect, 95% confidence interval (CI), significance by p-value obtained from the CI (<https://doi.org/10.1136/bmj.d2304>), data, bootstrapping times, random seed, and index for each bootstrap set.

### Examples

```
# Load example data for formula and data
input=input_example()
formula=input$formula
data=input$data

# Conduct g-formula
gformula(formula,data)
```

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input_example	<i>Make an input example for gmethods package</i>
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### Description

This function load a causal model as formula object and a data frame of nhefs table, a cleaned version of NHEFS data. In Causal Inference: What If book by Hernán and Robins, four NHEFS datasets are described in this book (<https://www.hsph.harvard.edu/miguel-hernan/causal-inference-book/>). The remaining datasets from that book could be retrieve from cidata R package (<https://github.com/malcolmbarrett/cidata>) for more information.

**Usage**

```
input_example()
```

**Value**

output A list of a formula and a data frame with dimension of 1629 rows and 10 columns.

**Examples**

```
# Load example data for formula and data
input=input_example()
formula=input$formula
data=input$data
```

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ipw

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*Causal inference by Inverse Probability Weighting (IPW)*


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**Description**

This function conduct causal inference by implementing inverse probability weighting (IPW). Please read (<https://www.hsph.harvard.edu/miguel-hernan/causal-inference-book/>) before applying this test.

**Usage**

```
ipw(formula, data, bootstrap = 30, state = 33, verbose = F)
```

**Arguments**

formula	An object of class "formula": a symbolic description of the model to be fitted. The exposure of interest should be plugged-in as the first covariate at the right-hand size of the formula.
data	A data frame containing the variables in the model.
bootstrap	An integer determining how many times this procedure being repeated by re-sampling with replacement.
state	An integer to set random seed for reproducible results.
verbose	A logical determining whether a progress bar is shown.

**Value**

output A list containing the formula, exposure of interest, marginal effect, 95% confidence interval (CI), significance by p-value obtained from the CI (<https://doi.org/10.1136/bmj.d2304>), data, bootstrapping times, random seed, and index for each bootstrap set.

**Examples**

```
# Load example data for formula and data
input=input_example()
formula=input$formula
data=input$data

# Conduct g-formula
ipw(formula,data)
```

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