Package ‘regweight’

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Title  Convenience Functions for Implicit Regression Weights

Version 1.0.2

Description  A simple wrapper for calculating regression weights as defined by Aronow and Samii (2015) <doi:10.1111/ajps.12185>. Given a model object and a term of interest, ‘regweight’ will calculate implicit regression weights and provide a variety of useful visualizations and summary statistics.

URL  https://github.com/ddimmery/regweight
     https://ddimmery.github.io/regweight/

BugReports https://github.com/ddimmery/regweight/issues

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Encoding UTF-8

RoxygenNote 7.1.2

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**calculate_weights**

Given a model and a term of interest, calculate the Aronow and Samii (2015) regression weights and return an object which can be used to diagnose these implicit weights.

**Usage**

```r
calculate_weights(mod, term)
```

**Arguments**

- `mod` The linear model object from `lm` or `lm_robust`.
- `term` String indicating the term for which to calculate the implicit regression weights. This must uniquely match a coefficient name (i.e. it must be a string which appears in only one element of `coef(mod)`).

**Details**

This calculates the implicit regression weights for a particular term in a given regression model. In short, this calculates the weights for a coefficient \( \beta \) such that:

\[
\frac{E[w_i \beta_i]}{E[w_i]} \rightarrow \beta
\]

where \( \beta_i \) is the unit level effect. The expectation of \( w_i \) is the conditional variance of the variable of interest.

For details and examples, view the vignette: `vignette("example-usage", package = "regweight")`

**Value**

An object of class `regweight` containing:

- `term` The term in the regression for which weights were calculated.
- `model` The partial regression model object.
- `weights` The implicit regression weights.
hist.regweight

References


Examples

```r
y <- rnorm(100)
a <- rbinom(100, 1, 0.5)
x <- rnorm(100)
m1 <- stats::lm(y ~ a + x)
w1 <- calculate_weights(m1, "a")
```

---

hist.regweight

Plot histogram of implicit regression weights

Description


Usage

```r
## S3 method for class 'regweight'
hist(x, bw = NULL, ...)
```

Arguments

- `x` Weighting model object
- `bw` Bandwidth for histogram bins. If not provided, the Freedman-Diaconis rule will be used.
- `...` unused arguments

Value

A ggplot2::ggplot object.
plot.regweight

Plot diagnostics for implicit regression weights

Description
This provides access to all plotting functions and tries to smartly use the appropriate one based on
the covariate provided. If covariate type is inappropriately recognized please use the appropriate
plotting function directly.

Usage
## S3 method for class 'regweight'
plot(x, covariate, ...)

Arguments
x Weighting model object
covariate Covariate vector
... additional arguments passed to individual plotting functions

Value
A ggplot2::ggplot object.

See Also
calculate_weights(), plot_weighting_discrete(), plot_weighting_continuous(), plot_weighting_map()

plot_weighting_continuous
Plot weights across a continuous covariate

Description
This provides a simple plot for the distribution of a single continuous covariate in the nominal
sample and the implicit sample defined by the Aronow and Samii (2015) doi: 10.1111/ajps.12185
regression weights.

Usage
plot_weighting_continuous(mod, covariate, alpha = 0.05, num_eval = 250, ...)
### Arguments
- **mod**: Weighting model object
- **covariate**: Covariate vector
- **alpha**: Number between zero and one indicating the desired alpha level for confidence intervals.
- **num_eval**: Number of points at which to evaluate the density.
- ... unused arguments

### Details
Kernel density estimates use the bias-corrected methods of Cattaneo et al (2020).

### Value
A `ggplot2::ggplot` object.

### References

### See Also
- `lpdensity::lpdensity()`

### Examples
```r
y <- rnorm(100)
a <- rbinom(100, 1, 0.5)
x <- rnorm(100)
cov <- runif(100)
mod <- stats::lm(y ~ a + x)
rw_mod <- calculate_weights(mod, "a")
plot_weighting_continuous(rw_mod, cov, num_eval = 25)
```

---

### Description
This provides a simple plot for the distribution of a single discrete covariate in the nominal sample and the implicit sample defined by the Aronow and Samii (2015) doi: 10.1111/ajps.12185 regression weights.
Usage

```
plot_weighting_discrete(mod, covariate, alpha = 0.05, ...)
```

Arguments

- **mod**: Weighting model object
- **covariate**: Covariate vector
- **alpha**: Number between zero and one indicating the desired alpha level for confidence intervals.
- **...**: unused arguments

Value

A `ggplot2::ggplot` object.

Examples

```r
y <- rnorm(100)
a <- rbinom(100, 1, 0.5)
x <- rnorm(100)
g <- sample(1:4, 100, replace = TRUE)
mod <- stats::lm(y ~ a + x)
rw_mod <- calculate_weights(mod, "a")
plot_weighting_discrete(rw_mod, g)
```

---

**plot_weighting_map**

*Plot weights in a choropleth map*

Description

This provides a choropleth map showing the distribution over geometries under the implicit sample defined by the Aronow and Samii (2015) doi: 10.1111/ajps.12185 regression weights.

Usage

```
plot_weighting_map(mod, geometry, ...)
```

Arguments

- **mod**: Weighting model object
- **geometry**: A column of class `sf::sfc` with the geometry associated with each observation.
- **...**: unused arguments

Value

A `ggplot2::ggplot` object.
summary.regweight

See Also

hist.regweight(), plot.regweight(), sf::sfc()

summary.regweight  Create summary statistics for implicit sample

Description


Usage

## S3 method for class 'regweight'
summary(object, df, output = "tibble", ...)

Arguments

object  Weighting model object
df     dataframe with one column for each covariate to include in the resulting table of summary statistics.
output Desired output type. Default is to return a tibble, but can also select from "latex" and "html" to return a formatted table for inclusion in a paper or report.
...    unused

Value

One of three outputs depending on the requested type:

- tibble: Returns a tibble object (see tibble::tibble()).
- latex: Returns a knit_asis object (see knitr::asis_output()).
- html: Returns an html object (see htmltools::HTML()).
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