

# Package ‘lindia’

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**Type** Package

**Title** Automated Linear Regression Diagnostic

**Version** 0.10

**Description** Provides a set of streamlined functions that allow easy generation of linear regression diagnostic plots necessarily for checking linear model assumptions. This package is meant for easy scheming of linear regression diagnostics, while preserving merits of ``The Grammar of Graphics'' as implemented in 'ggplot2'. See the 'ggplot2' website for more information regarding the specific capability of graphics.

**Depends** R (>= 3.2.2)

**License** MIT + file LICENSE

**Encoding** UTF-8

**RoxygenNote** 7.2.3

**Imports** MASS, ggplot2, gridExtra

**URL** <https://github.com/yeukyul/lindia>

**BugReports** <https://github.com/yeukyul/lindia/issues>

**NeedsCompilation** no

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**Repository** CRAN

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gg_boxcox	<i>Plot boxcox graph in ggplot with suggested lambda transformation</i>
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## Description

Plot boxcox graph in ggplot with suggested lambda transformation

## Usage

```
gg_boxcox(fitted.lm, showlambda = TRUE, lambdaSF = 3, scale.factor = 0.5)
```

## Arguments

fitted.lm	a fitted linear model (i.e. lm, glm) that contains fitted regression
showlambda	logical; controls whether lambda value should be displayed on graph. Defaults to TRUE
lambdaSF	numeric; controls to how many significant figure is lambda rounded to. Defaults to 3.
scale.factor	numeric; scales the point size and linewidth to allow customized viewing. Defaults to 0.5.

## Value

A ggplot object that contains boxcox graph

## Examples

```
library(MASS)
data(Cars93)
cars_lm <- lm(Price ~ Passengers + Length + RPM, data = Cars93)
gg_boxcox(cars_lm)
```

---

`gg_cooksd`*Plot cook's distance graph*

---

**Description**

Plot cook's distance graph

**Usage**

```
gg_cooksd(  
  fitted.lm,  
  label = TRUE,  
  show.threshold = TRUE,  
  threshold = "convention",  
  scale.factor = 0.5  
)
```

**Arguments**

<code>fitted.lm</code>	a fitted linear model (i.e. <code>lm</code> , <code>glm</code> ) that contains fitted regression
<code>label</code>	logical; whether or not to label observation number larger than threshold. Default to <code>TRUE</code> .
<code>show.threshold</code>	logical; determine whether or not threshold line is to be shown. Default to <code>TRUE</code> .
<code>threshold</code>	string; determining the cut off label of cook's distance. Choices are "baseR" (0.5 and 1), "matlab" ( $\text{mean}(\text{cooksd}) \times 3$ ), and "convention" ( $4/n$ and 1). Default to "convention".
<code>scale.factor</code>	numeric; scales the point size and linewidth to allow customized viewing. Defaults to 0.5.

**Value**

A `ggplot` object that contains a cook's distance plot

**Examples**

```
library(MASS)  
data(Cars93)  
cars_lm <- lm(Price ~ Passengers + Length + RPM, data = Cars93)  
gg_cooksd(cars_lm)
```

---

gg\_diagnose

*Plot all diagnostic plots given fitted linear regression line.*


---

### Description

Plot all diagnostic plots given fitted linear regression line.

### Usage

```
gg_diagnose(
  fitted.lm,
  theme = NULL,
  ncol = NA,
  plot.all = TRUE,
  mode = "all",
  scale.factor = 0.5,
  boxcox = FALSE,
  max.per.page = NA
)
```

### Arguments

fitted.lm	lm object that contains fitted regression
theme	ggplot graphing style using 'ggplot::theme()'. A ggplot graphing style to apply to all plots. Default to null.
ncol	specify number of columns in resulting plot per page. Default to make a square matrix of the output.
plot.all	logical; determine whether plot will be returned as an arranged grid. When set to false, the function will return a list of diagnostic plots. Parameter defaults to TRUE.
mode	A string. Specifies which set of diagnostic plots to return: * 'all' (the default) * 'base_r': only graphs included in the base R 'plot(lm(...))' (i.e. residual vs fitted, QQ plot, scale location, residual vs leverage)
scale.factor	numeric; scales the point size, linewidth, labels in all diagnostic plots to allow optimal viewing. Defaults to 0.5.
boxcox	logical; determine whether boxcox plot will be included. Parameter defaults to FALSE.
max.per.page	numeric; maximum number of plots allowed in one page.

### Value

An arranged grid of linear model diagnostics plots in ggplot. If plot.all is set to FALSE, a list of ggplot objects will be returned instead. Name of the plots are set to respective variable names.

**Examples**

```

library(MASS)
data(Cars93)
# a regression with categorical variable
cars_lm <- lm(Price ~ Passengers + Length + RPM + Origin, data = Cars93)
gg_diagnose(cars_lm)
# customize which diagnostic plot is included
plots <- gg_diagnose(cars_lm, plot.all = FALSE)
names(plots)      # get name of the plots
exclude_plots <- plots[-c(1, 3) ]      #exclude certain diagnostics plots
include_plots <- plots[c(1, 3)]        # include certain diagnostics plots
plot_all(exclude_plots)                # make use of plot_all() in lindra
plot_all(include_plots)

```

---

gg\_qqplot

*Plot quantile-quantile plot (QQPlot) in ggplot with qqline shown.*


---

**Description**

Plot quantile-quantile plot (QQPlot) in ggplot with qqline shown.

**Usage**

```
gg_qqplot(fitted.lm, scale.factor = 1)
```

**Arguments**

fitted.lm	a fitted linear model (i.e. lm, glm) that contains fitted regression
scale.factor	numeric; scales the point size and linewidth to allow customized viewing. Defaults to 1.

**Value**

A qqplot with fitted qqline

**Examples**

```

library(MASS)
data(Cars93)
cars_lm <- lm(Price ~ Passengers + Length + RPM, data = Cars93)
gg_qqplot(cars_lm)

```

---

gg_resfitted	<i>Generate residual plot of residuals against fitted value</i>
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---

**Description**

Generate residual plot of residuals against fitted value

**Usage**

```
gg_resfitted(fitted.lm, scale.factor = 1)
```

**Arguments**

fitted.lm	a fitted linear model (i.e. lm, glm) that contains fitted regression
scale.factor	numeric; scales the point size and linewidth to allow customized viewing. Defaults to 1.

**Value**

A ggplot object

**Examples**

```
library(MASS)
data(Cars93)
cars_lm <- lm(Price ~ Passengers + Length + RPM, data = Cars93)
gg_resfitted(cars_lm)
```

---

gg_reshist	<i>Generate histogram of residuals in ggplot.</i>
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---

**Description**

Generate histogram of residuals in ggplot.

**Usage**

```
gg_reshist(fitted.lm, bins = NULL)
```

**Arguments**

fitted.lm	a fitted linear model (i.e. lm, glm) that contains fitted regression
bins	bin size for histogram

**Value**

A ggplot object

**Examples**

```
library(MASS)
data(Cars93)
cars_lm <- lm(Price ~ Passengers + Length + RPM, data = Cars93)
gg_reshist(cars_lm)
# specify number of bins
gg_reshist(cars_lm, bins = 20)
```

---

gg_resleverage	<i>Plot residual versus leverage plot in ggplot.</i>
----------------	--

---

**Description**

Plot residual versus leverage plot in ggplot.

**Usage**

```
gg_resleverage(fitted.lm, method = "loess", se = FALSE, scale.factor = 1)
```

**Arguments**

fitted.lm	a fitted linear model (i.e. lm, glm) that contains fitted regression
method	smoothing method of fitted line on scale-location plot. eg. "lm", "glm", "gam", "loess", "rlm". See <a href="https://ggplot2.tidyverse.org/reference/geom_smooth.html">https://ggplot2.tidyverse.org/reference/geom_smooth.html</a> for more details.
se	logical; determines whether se belt should be plotted on plot
scale.factor	numeric; scales the point size and linewidth to allow customized viewing. Defaults to 1.

**Value**

A ggplot object that contains residual vs. leverage graph

**Examples**

```
library(MASS)
data(Cars93)
cars_lm <- lm(Price ~ Passengers + Length + RPM, data = Cars93)
gg_resleverage(cars_lm)
```

gg\_resX

*Generate residual plot of residuals against predictors***Description**

Generate residual plot of residuals against predictors

**Usage**

```
gg_resX(
  fitted.lm,
  plot.all = TRUE,
  scale.factor = 0.5,
  max.per.page = NA,
  ncol = NA
)
```

**Arguments**

fitted.lm	a fitted linear model (i.e. lm, glm) that contains fitted regression
plot.all	boolean value to determine whether plot will be return as a plot arranged using 'grid.arrange()'. When set to false, the function would return a list of residual plots. Parameter defaults to TRUE.
scale.factor	numeric; scales the point size and linewidth to allow customized viewing. Defaults to 0.5.
max.per.page	numeric; maximum number of plots allowed in one page. Parameter defaults to fit all plots on one page.
ncol	specify number of columns in resulting plot per page. Default to make a square matrix of the output.

**Value**

An arranged grid of residuals against predictor values plots in ggplot. If plotall is set to FALSE, a list of ggplot objects will be returned instead. Name of the plots are set to respective variable names.

**Examples**

```
library(MASS)
data(Cars93)
# a regression with categorical variable
cars_lm <- lm(Price ~ Passengers + Length + RPM + Origin, data = Cars93)
gg_resX(cars_lm)
# customize which diagnostic plot is included by have gg_resX to return a list of plots
plots <- gg_resX(cars_lm, plot.all = FALSE)
names(plots) # get name of the plots
exclude_plots <- plots[-1 ] #exclude certain residual plots
```

```
include_plots <- plots[1]      # include certain residual plots
plot_all(exclude_plots)      # make use of plot_all() in lindra
plot_all(include_plots)
```

---

gg\_scalelocation      *Plot scale-location (also called spread-location plot) in ggplot.*

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## Description

Plot scale-location (also called spread-location plot) in ggplot.

## Usage

```
gg_scalelocation(fitted.lm, method = "loess", scale.factor = 1, se = FALSE)
```

## Arguments

fitted.lm	a fitted linear model (i.e. lm, glm) that contains fitted regression
method	smoothing method of fitted line on scale-location plot. eg. "lm", "glm", "gam", "loess", "rlm". See <a href="https://ggplot2.tidyverse.org/reference/geom_smooth.html">https://ggplot2.tidyverse.org/reference/geom_smooth.html</a> for more details.
scale.factor	numeric; scales the point size and linewidth to allow customized viewing. Defaults to 1.
se	logical; determines whether se belt should be plotted on plot

## Value

A ggplot object that contains scale-location graph

## Examples

```
library(MASS)
data(Cars93)
cars_lm <- lm(Price ~ Passengers + Length + RPM, data = Cars93)
gg_scalelocation(cars_lm)
```

---

plot_all	<i>Plot all given plots in a square matrix form.</i>
----------	--

---

**Description**

Plot all given plots in a square matrix form.

**Usage**

```
plot_all(plots, ncol = NA, max.per.page = NA)
```

**Arguments**

plots	a list of plots
ncol	numeric; the number of column that the arranged grid need to be. defaults to fitting all plots in square matrix
max.per.page	numeric; maximum number of plots allowed in one page.

**Value**

plots in a given list arranged using gridExtra

**Examples**

```
library(MASS)
data(Cars93)
# a regression with categorical variable
cars_lm <- lm(Price ~ Passengers + Length + RPM + Origin, data = Cars93)
plots <- gg_diagnose(cars_lm, plot.all = FALSE)
names(plots)
selected.plots <- plots[-c(2, 5)]
plot_all(selected.plots)
```

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