

# Package: lsmeans (via r-universe)

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**Type** Package

**Title** Least-Squares Means

**Version** 2.30-1

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**Depends** emmeans (>= 1.3), methods, R (>= 3.2)

**ByteCompile** yes

**Description** Obtain least-squares means for linear, generalized linear, and mixed models. Compute contrasts or linear functions of least-squares means, and comparisons of slopes. Plots and compact letter displays. Least-squares means were proposed in Harvey, W (1960) ``Least-squares analysis of data with unequal subclass numbers'', Tech Report ARS-20-8, USDA National Agricultural Library, and discussed further in Searle, Speed, and Milliken (1980) ``Population marginal means in the linear model: An alternative to least squares means'', The American Statistician 34(4), 216-221  
<doi:10.1080/00031305.1980.10483031>. NOTE: lsmeans now relies primarily on code in the 'emmeans' package. 'lsmeans' will be archived in the near future.

**License** GPL-2 | GPL-3

**Repository** <https://rvlenth.r-universe.dev>

**RemoteUrl** <https://github.com/rvlenth/lsmeans>

**RemoteRef** HEAD

**RemoteSha** c79ceabf468bc3080dad2cba6f3db4d9d6a344b7

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lsmeans-package	<i>Least-squares means</i>
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**Description**

This package provides methods for obtaining so-called least-squares means for factor combinations in a variety of fitted linear models. It can also compute contrasts or linear combinations of these least-squares means, (several standard contrast families are provided), and in addition can estimate and contrast slopes of trend lines. Popular adjustments for multiple-comparisons are provided, as well as graphical ways of displaying the results.

Almost the entire codebase for **lsmeans** now resides in the **emmeans** package (named for the more general term, “estimated marginal means”). **lsmeans** exists only as a transitional entity for the few remaining packages that depend on it.

**Author(s)**

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**References**

Russell V. Lenth (2016) Least-Squares Means: The R Package lsmeans. *Journal of Statistical Software*, 69(1), 1-33. doi:10.18637/jss.v069.i01

Searle S.R. Speed F.M. Milliken G.A. (1980) Population marginal means in the linear model: An alternative to least squares means. *The American Statistician* **34**(4), 216-221.

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auto.noise	<i>Data sets</i>
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**Description**

The datasets ‘auto.noise’, ‘feedlot’, ‘fiber’, ‘MOats’, ‘nutrition’, and ‘oranges’ are provided in case a user customarily loads the data from **lsmeans**. But the same datasets are provided in the **emmeans** package, and they are documented there.

**Usage**

auto.noise

**Author(s)**

Russell V. Lenth

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ref.grid	<i>Create a reference grid from a fitted model</i>
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## Description

These functions are provided in **lsmeans** because they have been renamed in **emmeans**

## Usage

```
ref.grid(object, ...)  
  
recover.data(object, ...)  
lsm.basis(object, ...)
```

## Arguments

object	A model object in a supported class.
...	Additional arguments passed to companion functions in the <b>emmeans</b> package.

## Value

**lsmeans** now passes all its computations to **emmeans**, and the return values are thus what is returned by the corresponding functions [ref\\_grid](#), [recover\\_data](#), and [emm\\_basis](#), respectively.

## Author(s)

Russell V. Lenth

## Examples

```
fiber.lm <- lm(strength ~ machine + diameter, data = fiber)  
rg <- ref.grid(fiber.lm, at = list(diameter = c(20, 24, 28)))  
rg  
  
# Note this is an emmGrid object defined in emmeans. The old "ref.grid"  
# class is now an extension of this:  
r.g. <- new("ref.grid", rg)  
lsmeans(r.g., "machine")
```

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ref.grid-class	<i>The ref.grid and lsmobj classes</i>
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### Description

The codebase for **lsmeans** is now mostly in **emmeans**. These two classes are simple extensions of the `emmGrid` class defined in **emmeans**, and are provided as support for objects created in older versions of **lsmeans**. For details, see [emmGrid-class](#).

### Author(s)

Russell V. Lenth

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transition	<i>Transition to <b>emmeans</b></i>
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### Description

The **lsmeans** package is being deprecated and further development will take place in its successor, **emmeans**. Users may use **emmeans** in almost exactly the same way as **lsmeans**, but a few function names and internal details are changed.

### Details

In transitioning to **emmeans**, users will find that the vignettes are constructed quite differently and that, in those and in the documentation, emphasis is placed on “estimated marginal means” rather than “least-squares means”. The term “estimated marginal means” is broader and more appropriate for use with some models, e.g. ordinal regression, that don’t really involve least-squares methods. That is the reason for the change.

Accordingly, **emmeans** users are encouraged to use the functions `emmeans()`, `emtrends()`, `emmip()`, etc. in lieu of `lsmeans()`, etc. The latter functions *are still available* in **emmeans**; they run the corresponding `emmxxx` function and relabel the results.

The **emmeans** package provides some functions that help convert scripts and R Markdown files containing **lsmeans** code so they will work in **emmeans**. There is also a function to convert `ref.grid` and `lsmobj` objects to the `emmGrid` objects used in **emmeans**. More extensive information is given in `vignette("transition-from-lsmeans", package = "emmeans")`.

### Author(s)

Russell V. Lenth

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