Package ‘lsmeans’

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R topics documented:

lsmeans-package ................................................................. 2
auto.noise .............................................................................. 2
ref.grid .................................................................................. 3
ref.grid-class ....................................................................... 4
transition .............................................................................. 4
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

ref.grid

Create a reference grid from a fitted model

Description

These functions are provided in \texttt{lsmeans} because they have been renamed in \texttt{emmeans}.

Usage

\begin{verbatim}
ref.grid(object, ...)
recover.data(object, ...)
lsm.basis(object, ...)
\end{verbatim}

Arguments

\begin{itemize}
  \item \texttt{object}: A model object in a supported class.
  \item \texttt{...}: Additional arguments passed to companion functions in the \texttt{emmeans} package.
\end{itemize}

Value

\texttt{lsmeans} now passes all its computations to \texttt{emmeans}, and the return values are thus what is returned by the corresponding functions \texttt{ref_grid}, \texttt{recover_data}, and \texttt{emm_basis}, respectively.

Author(s)

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Examples

\begin{verbatim}
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:
rg. <- new("ref.grid", rg)
lsmeans(rg., "machine")
\end{verbatim}
The codebase for \pkg{lsmeans} is now mostly in \pkg{emmeans}. These two classes are simple extensions of the \code{emmGrid} class defined in \pkg{emmeans}, and are provided as support for objects created in older versions of \pkg{lsmeans}. For details, see \code{emmGrid-class}.

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

### Details
In transitioning to \pkg{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, \pkg{emmeans} users are encouraged to use the functions \code{emmeans()}, \code{emtrends()}, \code{emmip()}, etc. in lieu of \code{lsmeans()}, etc. The latter functions are still available in \pkg{emmeans}; they run the corresponding \code{emmeans} function and relabel the results.

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

### Author(s)
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Index

* datasets
  auto.noise, 2

* htest
  lsmeans-package, 2

* models
  lsmeans-package, 2
  ref.grid, 3

* package
  lsmeans-package, 2

* regression
  lsmeans-package, 2
  ref.grid, 3
  auto.noise, 2
  contrast(ref.grid), 3

  emm.basis, 3
  emmeans-transition(transition), 4

  feedlot(auto.noise), 2
  fiber(auto.noise), 2
  lsm.basis(ref.grid), 3
  lsmeans(ref.grid), 3
  lsmeans-package, 2
  lsmeans-package(ref.grid-class), 4
  MOats(auto.noise), 2
  nutrition(auto.noise), 2
  oranges(auto.noise), 2
  recover.data(ref.grid), 3
  recover.data, 3
  ref.grid, 3
  ref.grid-class, 4
  ref_grid, 3
  summary.ref.grid(ref.grid), 3

  transition, 4