

Package ‘glme’

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Type Package

Title Generalized Linear Mixed Effects Models

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Description Provides Generalized Inferences based on exact distributions and exact probability statements for mixed effect models, provided by such papers as Weerahandi and Yu (2020) <[doi:10.1186/s40488-020-00105-w](https://doi.org/10.1186/s40488-020-00105-w)> under the widely used Compound Symmetric Covariance structure. The package returns the estimation of the coefficients in random and fixed part of the mixed models by generalized inference.

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LazyData true

Imports nlme, reshape, dplyr, stats

NeedsCompilation no

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 glme

Generalized Linear Mixed Effects Models

Description

This function fits a linear mixed effect model with generalized inference.

Usage

```
glme(fixed, data, random, correlation, weights, subset,
     method, na.action, control, contrasts, keep.data)
```

Arguments

fixed	a linear model formula, with the response on the left of an operator and an expression involving parameters and covariates on the right.
data	an optional data frame containing the variables named in model, fixed, random, correlation, weights, subset, and naPattern. By default the variables are taken from the environment from which glme is called.
random	a two-sided linear formula of the form $f_1 + \dots + f_n \sim x_1 + \dots + x_m$, or a list of two-sided formulas of the form $f_1 \sim x_1 + \dots + x_m$, with possibly different models for different parameters. The f_1, \dots, f_n are the names of parameters included on the right hand side of model and the $x_1 + \dots + x_m$ expressions define linear models for these parameters. On the right hand side of the formula(s) indicates a single fixed effects for the corresponding parameter(s).
correlation	an optional corStruct object describing the within-group correlation structure
weights	an optional varFunc object or one-sided formula describing the within-group heteroscedasticity structure.
subset	an optional expression indicating the subset of the rows of data that should be used in the fit. This can be a logical vector, or a numeric vector indicating which observation numbers are to be included, or a character vector of the row names to be included. All observations are included by default.
method	a character string. If "GM" the model is fit by generalized inference. If "REML" the model is fit by maximizing the restricted log-likelihood. If "ML" the log-likelihood is maximized. Defaults to "GM".
na.action	a function that indicates what should happen when the data contain NAs.
control	a list of control values for the estimation algorithm to replace the default values returned.
contrasts	an optional list. See the contrasts.arg of model.matrix.default.
keep.data	logical: should the data argument (if supplied and a data frame) be saved as part of the model object.

Value

fixed	returns the coefficient estimations and model summary of the fixed part.
sd	returns the standard deviation of random effects.
coefficients	returns the coefficient estimations of the fixed and random part of the mixed model.

Author(s)

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References

Yu, C.R., Kelly H.Z., Carlsson, M.O., and Weerahandi, S. (2015) Generalized Estimation of the BLUP in Mixed-Effects Models: A Comparison with ML and REML, *Communications in Statistics - Simulation and Computation*, 44:3, 694-704, <https://doi.org/10.1080/03610918.2013.790445>

Weerahandi, S. and Yu, CR. (2020) Exact distributions of statistics for making inferences on mixed models under the default covariance structure. *Journal of Statistical Distributions and Applications*, 7:4, <https://doi.org/10.1186/s40488-020-00105-w>

Gamage, J., Mathew, T., and Weerahandi, S. (2013) Generalized prediction intervals for BLUPs in mixed models, *Journal of Multivariate Analysis*, 120, 226 - 233, <https://doi.org/10.1016/j.jmva.2013.05.011>.

Examples

```
library(nlme)
library(glme)
glme(distance ~ age + Sex, data = Orthodont, random = ~ age|Subject, method = "GM")
```

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