Package ‘MargCond’

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MargCond Function to fit joint marginal-conditional models for longitudinal multivariate data.

Description

Produces an object of class "MargCond" which is a marginal-conditional multivariate model.
Usage

```r
MargCond(formula, data, ID, tol = 1e-04, max.iter = 50,
         corstr = "independence", silent = F)
```

Arguments

- `formula`: a two-sided linear formula object similar to those in `lmer`.
- `data`: a data frame in which to interpret the variables occurring in the formula.
- `ID`: a vector which identifies the clusters. The length of `ID` should be the same as the number of observations. Data are assumed to be sorted so that observations on a cluster are contiguous rows for all entities in the formula.
- `tol`: the tolerance used in the fitting algorithm.
- `max.iter`: the maximum number of iterations for the ES algorithm.
- `corstr`: a character string specifying the correlation structure. The following are permitted: "independence", "fixed", "stat_M_dep", "non_stat_M_dep", "exchangeable", "AR-H" and "unstructured"
- `silent`: a logical variable controlling whether an indication at each iteration is printed.

Details

The joint marginal-conditional model

Care should be taken when specifying the random effects structure (see the singular models section of [https://bbolker.github.io/mixedmodels-misc/glmmFAQ.html](https://bbolker.github.io/mixedmodels-misc/glmmFAQ.html)). As initial estimates for the expectation-substitution algorithm are taken from the univariate mixed model fits, we recommend that these models be fit separately first and examined to ensure that they are not over parameterized.

Value

An object of class "MargCond" representing the fit.

An object of class "MargCond" is a list containing the following components:

- `coefficients`: a named vector of coefficients.
- `sigma`: a named vector of outcome error standard deviations.
- `SE`: a vector of coefficient, random effect, and error standard deviations.
- `residuals`: the residuals, that is response minus fitted values.
- `working.correlation`: the working correlation returned by the GEE step at convergence.
- `rand.eff`: the random effect covariance matrix.
- `outcomes`: vector of outcome names
- `Call`: the matched call.
- `v.cov`: the scaled covariance matrix of theta
- `obs`: the total number of observations
groups
converge

the total number of clusters
logical indicator of whether the expectation-substitution algorithm converged
(i.e. the difference between each element of theta from the previous iteration is
smaller than tol, and the number of iterations is less than max.iter).

References


See Also

gg, lmer.

Examples

set.seed(2112)
NN = 80
n_times = 1:3

## Simulating some data
simdat <- simDat(n = NN,
   fixed_effects = list(c(1, 1, 2), c(1.5, 1, 3)),
   rand_effects = list(1, 1),
   error_var = c(4, 4),
   error_structure = 'normal',
   rho = .35,
   times = n_times,
   X = cbind(rep(1, NN * length(n_times)),
     rnorm(NN * length(n_times), 0, 2),
     rbinom(NN * length(n_times), 1, .5)),
   Z = cbind(rep(1, NN * length(n_times))))

## Adding random missing values
aa <- sample(1:nrow(simdat), 10, replace = TRUE)
bb <- sample(1:7, 10, replace = TRUE)
for (i in 1:length(aa)) {
  simdat[aa[i], bb[i]] <- NA
}

## A fit for this simulated multivariate longitudinal data,
## including a random intercept and exchangeable correlation
## structure.
summary(MargCond(c(outcome1, outcome2) ~ X2 + X3 + (1 | ID),
   data = simdat, ID = simdat$ID, corstr = "exchangeable"))
**simDat**

*Function to simulate multivariate longitudinal data*

**Description**

A function that simulates correlated multivariate data based on a set of fixed and random effects.

**Usage**

```r
simDat(n, fixed_effects, rand_effects, error_var = c(2, 2),
       error_structure = "normal", rho = 0, times = 1:5, X = NULL, Z = NULL)
```

**Arguments**

- `n`: total sample size (number of clusters)
- `fixed_effects`: list of fixed effect vectors for each outcome
- `rand_effects`: list of random effect vectors for each outcome
- `error_var`: vector of error variances for each outcome
- `error_structure`: structure for the random error term, either "normal" for multivariate normal or a mixture of two normal distributions
- `rho`: correlation between outcomes
- `times`: times for each repeated measure
- `X`: fixed effect design matrix
- `Z`: random effect design matrix

**Value**

A dataframe included simulated outcomes and the design matrices

**Examples**

```r
set.seed(112)
NN = 80
n_times = 1:3

## Simulating some data
simdat <- simDat(n = NN,
                 fixed_effects = list(c(1, 1, 2), c(1.5, 1, 3)),
                 rand_effects = list(1, 1),
                 error_var = c(4, 4),
                 error_structure = 'normal',
                 rho = .35,
                 times = n_times,
                 X = cbind(rep(1, NN * length(n_times)),
                           rnorm(NN * length(n_times), 0, 2)),
                 Z = NULL)
```
```r
rbinom(NN * length(n_times), 1, .5),
Z = cbind(rep(1, NN * length(n_times)))

## Adding random missing values
aa <- sample(1:nrow(simdat), 10, replace = TRUE)
bb <- sample(1:7, 10, replace = TRUE)
for (i in 1:length(aa)) {
  simdat[aa[i], bb[i]] <- NA
}
```
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