

Some comments on SAS proc nlmixed

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The `nlmixed` procedure involves several complicated steps: numerical integration, differentiation, optimization, iteration, etc. Each step has a good number of controls.

A small set of options are listed below with a brief description of what they do, generate or output.

```
proc nlmixed data=A cov corr empirical ecov ecorr outr=B subgrad=C;
```

`cov, corr`: Estimated covariance and corr matrix of parameter estimates

`empirical`: The empirical (=sandwich) covariance estimator

`outr=` : A data set of Bayes estimates of the random effects

`subgrad=` : A data set of subject (cluster) contributions to the score vector

`ecov, ecorr`: The estimated covariance matrix for all expressions specified in `estimate` statements

The `model` statement specifies the conditional distribution of the response given the random effects. Options:

`normal(mean, variance)`

`binary(p)`

`binomial(n, p)`

`gamma(shape, scale)`: Gamma with mean $\text{shape} \times \text{scale}$ and variance $\text{shape} \times \text{scale}^2$

`negbin(n, p)`: Negative binomial with mean nq/p and variance nq/p^2 , $q := 1 - p$

`poisson(mean)`

`general(lcd)`: `lcd` is a log conditional density (of the response given the random effects) computed using programming statements

The `random` statement specifies the distribution of the random effects. Only the normal distribution (uni- and multi-variate) is available. Examples:

```
random u ~ normal(0, g11) subject=id;
```

```
random u1 u2 ~ normal([0,0],[g11,g21,g22]) subject=id;
```

```
random u1 u2 u3 ~ normal([0,0,0],[g11,g21,g22,g31,g32,g33]) subject=id;
```

ODS Table Names:

ODS Table Name: Description, Statement or Option

AdditionalEstimates: Results from ESTIMATE statements, ESTIMATE

Contrasts Results: from CONTRAST statements, CONTRAST

ConvergenceStatus: Convergence status, default

CorrMatAddEst: Correlation matrix of additional estimates, ECORR

CorrMatParmEst: Correlation matrix of parameter estimates, CORR

CovMatAddEst: Covariance matrix of additional estimates, ECOV

CovMatParmEst: Covariance matrix of parameter estimates, COV

DerAddEst: Derivatives of additional estimates, EDER

Dimensions: Dimensions of the problem, default
FitStatistics: Fit statistics, default
Hessian: Second derivative matrix, HESS
IterHistory: Iteration history, default
Parameters: Initial parameters, default
ParameterEstimates: Parameter estimates, default
Specifications: Model specifications, default
StartingHessian: Starting Hessian matrix, START HESS
StartingValues: Starting values and gradient, START