

# Package ‘GLMMselect’

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**Title** Bayesian Model Selection for Generalized Linear Mixed Models

**Version** 1.2.0

**Description** A Bayesian model selection approach for generalized linear mixed models.

Currently, 'GLMMselect' can be used for Poisson GLMM and Bernoulli GLMM. 'GLMMselect' can select fixed effects and random effects simultaneously.

Covariance structures for the random effects are a product of a unknown scalar and a known semi-positive definite matrix.

'GLMMselect' can be widely used in areas such as longitudinal studies, genome-wide association studies, and spatial statistics.

'GLMMselect' is based on Xu, Ferreira, Porter, and Franck (202X), Bayesian Model Selection Method for Generalized Linear Mixed Models, Biometrics, under review.

**License** GPL-3

**Encoding** UTF-8

**RoxygenNote** 7.2.3

**Imports** stats (>= 4.2.2)

**Suggests** knitr, rmarkdown

**VignetteBuilder** knitr

**LazyData** true

**Depends** R (>= 3.5.0)

**NeedsCompilation** no

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GLMMselect	<i>GLMMselect: Bayesian model selection method for generalized linear mixed models</i>
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## Description

GLMMselect: Bayesian model selection method for generalized linear mixed models

## Usage

```
GLMMselect(
  Y,
  X,
  Sigma,
  Z,
  family,
  prior,
  offset = NULL,
  NumofModel = 10,
  pip_fixed = 0.5,
  pip_random = 0.5
)
```

## Arguments

Y	A numeric vector of observations.
X	A matrix of covariates.
Sigma	A list of covariance matrices for random effects.
Z	A list of design matrices for random effects.
family	A description of the error distribution to be used in the model.
prior	The prior distribution for variance component of random effects.
offset	This can be used to specify an a priori known component to be included in the linear predictor during fitting. This should be NULL or a numeric vector of length equal to the number of observations.

NumofModel	The number of models with the largest posterior probabilities being printed out.
pip_fixed	The cutoff that if the posterior inclusion probability of fixed effects is larger than it, the fixed effects will be included in the best model.
pip_random	The cutoff that if the posterior inclusion probability of random effects is larger than it, the random effects will be included in the best model.

**Value**

A list of the indices of covariates and random effects which are in the best model.

**Examples**

```
library(GLMMselect)

data("Y");data("X");data("Z");data("Sigma")
Model_selection_output <- GLMMselect(Y=Y, X=X, Sigma=Sigma,
                                     Z=Z, family="poisson", prior="AR", offset=NULL)
```

---

lipcancer\_offset      *The vector of priori information for lip cancer case study*

---

**Description**

The expected number of lip cancer cases in each Scotland county between 1975 and 1980.

**Usage**

```
lipcancer_offset
```

**Format**

```
lipcancer_offset:
A vector
```

---

lipcancer_Sigma	<i>A list of covariance matrices</i>
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**Description**

This is a list of two covariance matrices for two types of random effects. The first component is for spatial random effects. The second component is for overdispersion random effects.

**Usage**

```
lipcancer_Sigma
```

**Format**

```
lipcancer_Sigma:  
A list of covariance matrices for random effects.
```

---

lipcancer_X	<i>The matrix of candidate covariates</i>
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**Description**

This is a matrix with one candidate covariates, which is the proportion of population engaged in agriculture, fishing, or forestry.

**Usage**

```
lipcancer_X
```

**Format**

```
lipcancer_X:  
A matrix with 56 observations and 1 covariate.
```

---

lipcancer_Y	<i>The vector of observations for lip cancer case study</i>
-------------	---

---

**Description**

The observations about the observed number of lip cancer cases in each Scotland county between 1975 and 1980.

**Usage**

lipcancer\_Y

**Format**

lipcancer\_Y:  
A vector with 56 observations.

---

lipcancer_Z	<i>A list of design matrices</i>
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**Description**

This is a list of two design matrices for two types of random effects. The first component is for spatial random effects. The second component is for overdispersion random effects.

**Usage**

lipcancer\_Z

**Format**

lipcancer\_Z:  
A list of design matrices for random effects.

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Sigma	<i>A list of covariance matrices</i>
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**Description**

This is a list of two covariance matrices for two types of random effects. The first component is for spatial random effects. The second component is for overdispersion random effects.

**Usage**

Sigma

**Format**

Sigma:

A list of covariance matrices for random effects.

---

X	<i>The matrix of candidate covariates</i>
---	---

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**Description**

This is a matrix with four candidate covariates. The covariates in the first two columns are in the true model.

**Usage**

X

**Format**

X:

A matrix with 100 observations and 4 covariates.

---

Y *The vector of observations*

---

**Description**

The data was simulated under a Poisson Generalized linear mixed model with four candidate covariates, a vector of spatial random effects, and a vector of overdispersion random effects. The matrix of candidate covariates, the design matrices for two types of random effects, and the covariance matrices for two types of random effects are provide in the package.

**Usage**

Y

**Format**

Y:  
A vector with 100 observations.

---

Z *A list of design matrices*

---

**Description**

This is a list of two design matrices for two types of random effects. The first component is for spatial random effects. The second componet is for overdispersion random effects.

**Usage**

Z

**Format**

Z:  
A list of design matrices for random effects.

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