Comparison of GLMM Parameter Estimation Methods

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Outline

Generalized Linear Mixed Models

- In ecological and evolutionary biology, ordinary linear models are not always well suited for data analysis.
  - Presence/absence and count data are two common situations where a linear model is not well suited (non-normal responses).
  - Dependence between observations occur through repeated measures, clustered observations, or within spatial elements violate independence assumptions (correlated observations).

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  - Dependence between observations occur through repeated measures, clustered observations, or within spatial elements violate independence assumptions (correlated observations).
- If both non-normal responses and correlated observations occur in a dataset, we can use generalized linear mixed models (GLMMs) for estimation and inference.

A Motivating Example

- Owlet begging data from Roulin and Bersier (2007) is an example of a dataset suitable for analysis with GLMMs.
  - Data consist of 599 observations from 27 barn owl nests in western Switzerland.
  - Response: number of calls in a 30 sec. interval before the parent arrived.
  - Covariates used: brood size, food treatment, and arrival time of parent (between 2130 and 0530 hours).
- Observations are correlated at the nest level due to repeated measurements and the count data should follow a Poisson distribution.

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