

Title:

**Estimation in Nonlinear and Generalized Linear Mixed Effects Models**

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Abstract:

A nonparametric approach is developed herein to estimate parameters in nonlinear mixed effects models. This nonparametric approach is compared in a simulation study with a new parametric method based on a combination of both Laplace's approximation and Monte Carlo simulations to evaluate integrals in the parametric likelihood. The study shows that the parametric estimates of fixed effects are close to the nonparametric estimates even though the mixing distribution is far from the assumed normal parametric family. An asymptotic theory of this hybrid method for parametric estimation without requiring the true mixing distribution to belong to the assumed parametric family is developed to explain these results. This hybrid method and its asymptotic theory are also extended to generalized linear mixed effects models.