

Richly Parameterized Linear Models

Hodges (2014). Richly Parameterized Linear Models: Additive, Time Series, and Spatial Models Using Random Effects.

1 An Opinionated Survey of Methods for Mixed Linear Models

The general notation of mixed linear models is $y = X\beta + Zu + \epsilon$, where the observation y is explained through a design matrix X connected to fixed effects β , a design matrix Z connected to normal random effects u , and a normally distributed error ϵ . The covariance matrix of the random effects u is a function of unknowns ϕ_G . “All of the oddities and inconveniences examined in this book arise because ϕ_G is unknown.” The author distinguishes between old-style (the underlying distribution is of interest) versus new-style random effects (also the levels themselves are of interest). Three examples are given, which can be reproduced in R with `{lme4}`. Estimation results present some oddities (non-convergence, zero variance estimates), probably due to non-identified models, too less data points, numerical problems.

Estimation: