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Fast and Accurate Frequentist Generalised Linear Mixed Model Analysis via Expectation Propagation

Generalised linear mixed models are a particularly powerful and well established statistical tool. Unlike linear mixed models, where the integrals arising in likelihood functions can be expressed in closed form, the likelihood functions expressed in generalised linear mixed models do not follow tractable solutions. Methods such as Gauss-Hermite quadrature and Laplace approximation are the standard approaches to overcome these integrals. While Gauss-Hermite quadrature is accurate, it is slow, rendering it unsuitable for analyses with more than two or three random effects. Laplace approximations are the most feasible solution, however, the approximate inference they provide in binary models is well known to be inaccurate. This talk aims to explain a new fast and accurate method of solving this integral for frequentist generalised linear mixed models called expectation propagation.