Bayesian hierarchical linear mixed models for additive smoothing splines

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Abstract Bayesian hierarchical models have been used for smoothing splines, thin-plate splines, and L-splines. In analyzing high dimensional data sets, additive models and backfitting methods are often used. A full Bayesian analysis for such models may include a large number of random effects, many of which are not intuitive, so researchers typically use noninformative improper or nearly improper priors. We investigate propriety of the posterior for these cases. Our findings extend known results for normal linear mixed models to certain cases with Bayesian additive smoothing spline models.