

Approximate Models and Optimal Decisions

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Approximate models, such as INLA, are increasingly popular as data sets get larger and more complex. However, statistical decisions based on probabilistic models may be sensitive to model approximation. Statisticians are taught from an early stage that "all models are wrong" but little formal guidance exists on how to assess the downstream impact of model misspecification, or how to proceed when optimal decisions appear sensitive to model fidelity. To address this we present new diagnostics for highlighting decision stability, including graphs and summary statistics. We then discuss formal methods through investigating the variation of expected loss within a local neighbourhood of the approximating model. Connections are made to Bayesian nonparametrics and some recent literature in robust control, mathematical finance and macroeconomics. This is very much work in progress.