Variational Bayesian Inference for Parametric and Nonparametric Regression with Missing Data

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Bayesian hierarchical models are attractive structures for conducting regression analyses when the data are subject to missingness. However, the requisite probability calculus is challenging and Monte Carlo methods typically are employed. We develop an alternative approach based on deterministic variational Bayes approximations. Both parametric and nonparametric regression are considered. Attention is restricted to the more challenging case of missing predictor data. We demonstrate that variational Bayes can achieve good accuracy, but with considerably less computational overhead. The main ramification is fast approximate Bayesian inference in parametric and nonparametric regression models with missing data.