Bayesian estimation of the discrepancy with misspecified parametric models

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We study a Bayesian semi--parametric model where we have made specific requests about the parameter values to be estimated. The aim is to find the parameter of a parametric family which minimizes a distance to the data generating density and then to find the discrepancy using nonparametric methods. We illustrate how coherent Bayesian updating can proceed given that we are out of the standard Bayes framework. Bayesian updating is performed using MCMC methods and in particular a novel method for dealing with intractable normalizing constants is required. Illustrations using synthetic data are provided.

Joint work with Stephen Walker, University of Kent, UK